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DEDICATORIA

A Dios

Por tu amor, compañía y paciencia

A mi mamá

Por ser aguerrida, ingeniosa, paciente con tú loca hija y la persona más amable y calmada que conozco. Como tu hija madre querida me siento muy afortunada de ser testigo de tú lucha por mí y mi hermana, ese amor desmedido que nos tienes y con el cual he sentido tu apoyo y amor incondicional. Te amo mamá, gracias.

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RESUMEN

El presente estudio consistió en el procesamiento y análisis de datos provenientes de un estudio de metabolómica por la técnica de resonancia magnética nuclear de seis distintos cultivares de *Tropaeolum tuberosum* (mashua), cuyos resultados están publicados por Valle-Parra et al 2020: From morphological traits to the food fingerprint of *Tropaeolum tuberosum* through metabolomics by NMR. Los datos incluyen: ID del cultivar (A-F); zona de recolección de muestras (I, II y III); información del contenido de 34 metabolitos (en mM); y valores de integración de cada espectro de resonancia a un intervalo de 0.4 ppm (234 valores por espectro).

Estos datos fueron sometidos a análisis multivariable por PCA revelando una agrupación entre los cultivares A-B, C-D-E y F. Estos tres subgrupos coincidieron con la agrupación del análisis de la zona de recolección. Posteriormente se evaluó el desempeño de los modelos de clasificación de aprendizaje automático: LDA, SVM y RF. El primero obtuvo el desempeño más bajo con un rango de precisión en porcentajes de entre 83.2 y 87.6, el segundo entre 86.5 y 96.4 y RF tuvo el mejor desempeño entre 96.4 y 100.

Finalmente, se evaluó el aporte nutraceútico de los cultivares y se jerarquizaron de acuerdo con su contenido de aminoácidos, carbohidratos, ácidos orgánicos entre otros nutrientes. En términos globales y de aminoácidos el cultivar F destacó por su aporte superior a los demás cultivares; el cultivar A tiene el más alto contenido de ácidos orgánicos, mientras que el cultivar B y D de carbohidratos.

Palabras claves: *Tropaeolum tuberosum*, mashua, tubérculos andinos, metabolómica, metabolitos, nutracéuticos, aprendizaje automático, análisis multivariable.

ABSTRACT

The present study consisted of the processing and analysis of data from a metabolomics study using the nuclear magnetic resonance technique of six different cultivars of Tropaeolum tuberosum (mashua), whose results are published by Valle-Parra et al 2020: From morphological traits to the food fingerprint of *Tropaeolum tuberosum* through metabolomics by NMR. Data includes: cultivar ID (A-F); sample collection area (I, II and III); information on the content of 34 metabolites (in mM); and integration values of each resonance spectrum at an interval of 0.4 ppm (234 values per spectrum).

These data were subjected to multivariable analysis by PCA revealing a grouping between cultivars A-B, C-D-E and F. These three subgroups coincided with the grouping of the analysis of the collection area. Subsequently, the performance of the machine learning classification models was evaluated: LDA, SVM and RF. The former had the lowest performance with a percentage accuracy range between 83.2 and 87.6, the second between 86.5 and 96.4, and RF had the best performance between 96.4 and 100.

Finally, the nutraceutical contribution of the cultivars was evaluated, and they were ranked according to their content of amino acids, carbohydrates, organic acids, among other nutrients. In global and amino acid terms, cultivar F stood out for its superior contribution to the other cultivars; cultivar A has the highest content of organic acids, while cultivars B and D of carbohydrates.

Key words: *Tropaeolum tuberosum*, mashua, andean tubers, metabolomics, metabolites, nutraceuticals, machine learning, multivariable análisis.

CAPITULO 1.

MARCO TEÓRICO

1.1 ANTECEDENTES INVESTIGATIVOS

El interés por mejorar la calidad en diferentes alimentos ha generado que diversos sectores industriales y académicos enfoquen su atención en el análisis de la autenticidad, origen geográfico o aporte nutricional de los productos de origen vegetal (Schieber, 2018). A medida que se incrementa la producción y se moderniza el procesamiento de estos alimentos, se vuelve extremadamente difícil distinguir entre especies, variedades o cultivares utilizados, hecho que se utiliza a menudo para realizar adulteraciones alimentarias o sustitución del producto original (Medina et al., 2019).

La demanda cada vez mayor de nuevos compuestos o nuevas fuentes de compuestos activos con mira a una aplicación industrial, junto con la necesidad de un mejor conocimiento sobre su efectividad, modo de acción, seguridad alimentaria, etc., ha llevado a la comunidad científica a realizar un esfuerzo significativo hacia el desarrollo de enfoques analíticos, capaces de responder a las muchas preguntas relacionadas con este tema. Un enfoque analítico con capacidades de responder estas interrogantes es la metabolómica. La cual de manera general permite la detección y posterior cuantificación de metabolitos específicos o característicos y también de compuestos no específicos o poco estudiados de especies vegetales, para de esta forma discriminar entre cada uno de ellos en base a la construcción de un perfil metabolómico (Lalaleo et al., 2020; Shulaev, 2006).

Hoy en día, existen escasos estudios que referencien análisis de este tipo enfocado al estudio de identificación y caracterización de especies vegetales endémicas de la zona andina del Ecuador, las cuales pueden contener un alto valor nutricional o compuestos bioactivos de interés popular. *Tropaeolum tuberosum* o mashua, es el nombre común del tubérculo andino que hace parte de la dieta diaria de las poblaciones rurales andinas, debido a sus beneficios tanto alimenticios como farmacológicos (Dilas, 2020; Grau, 2003), ha sido cultivado desde la época pre Incaica, sin embrago, es poco conocido y comercializado fuera de estas zonas (Morillo C. et al., 2016).

Por otro lado, la metabolómica ha sido exitosamente aplicada a la investigación de cultivos de interés agronómico y las plataformas analíticas actuales como la resonancia magnética nuclear (RMN) proporcionan diferentes enfoques para estudios de perfiles metabólicos dirigidas y no dirigidas. A través de la metabolómica se ha podido investigar la autenticación de cultivos de *Caucus carota*, *Chenopodium quinoa*, diferentes especies del género *Capsicum*, *Punica granatum* (Becerra-Martínez et al., 2017; Cubero-Leon et al., 2018; Lalaleo et al., 2020; Villa-Ruano et al., 2020). El conocimiento y aplicación de investigaciones basadas en RMN, para la búsqueda de nuevos compuestos o nuevas fuentes de nutracéuticos conocidos, puede generar un gran aporte para potencializar el cultivo, comercio e industrialización de especies olvidadas en Ecuador. Así, también evaluar posibles aplicaciones como en el control de calidad y la optimización nutracéutica (Valle-Parra et al., 2020).

1.1.1 Metabolómica Por RMN

Desde hace un par de décadas, la metabolómica se ha desarrollado como un campo importante para el estudio de alimentos de origen vegetal y de los productos naturales provenientes de estos. Como objetivo primordial es proporcional una imagen metabólica del alimento u organismo de origen vegetal estudiado a través de la medición de metabolitos del organismo o alimento de forma cualitativa y cuantitativamente (Choi et al., 2006). La RMN es un método muy adecuado para realizar dicho análisis porque permite la detección simultánea de diversos grupos de metabolitos secundarios como: flavonoides, alcaloides, terpenoides, etc. además de abundantes metabolitos primarios tales como: azúcares, ácidos orgánicos, aminoácidos, etc. Finalmente, en un espectro de RMN, las señales son proporcionales a su concentración molar, lo que hace posible la comparación directa de concentraciones de todos los compuestos, sin necesidad de curvas de calibración de cada compuesto individual (Dias-audibert et al., 2020).

Sin embargo, la aplicación de la espectroscopia de RMN en el análisis metabolómico tiene varias limitaciones, la principal de las cuales es quizás su baja sensibilidad. En consecuencia, las cantidades de muestras necesarias para los análisis basados en RMN son mayores que las necesarias cuando se utilizan otros métodos

analíticos. Sin embargo, la sensibilidad ha mejorado considerablemente debido a los recientes desarrollos en hardware de RMN (Kim et al., 2009).

1.1.2 Análisis Por RMN

Un protocolo de rutina dirigido al análisis de compuestos de polaridad moderada a alta puede ser resumido en 4 etapas (Kim et al., 2009; Marchev et al., 2017). **ETAPA1.** Toma de muestra. Suponiendo que el experimento ha sido diseñado para evaluar cambios específicos en el metaboloma, la recolección de la muestra tiene que evitar o reducir la degradación de compuestos. Esto se consigue de forma general mediante el enfriamiento rápido con nitrógeno líquido y preservadas así hasta su procesamiento. **ETAPA 2. Preparación de la muestra para su extracción.** El método recomendado consiste en el secado mediante liofilización, previa trituración con nitrógeno líquido. Una vez seco el material se procede a pesar y colocar en un tubo adecuado para su posterior extracción, la cantidad recomendada de material seco oscila entre 50 y 100 mg. **ETAPA 3. Extracción.** Esta se realiza mediante la adición del disolvente seleccionado, seguido de sonicación y finalmente clarificación de la fase liquida mediante centrifugación. El disolvente está integrado en una solución tampón, la cual ayuda a equilibrar y homogenizar el pH de los extractos, aspecto importante para evitar cambios en las señales de RMN. El disolvente de rutina para este tipo de análisis es el Metanol deuterado en un tampón de fosfato mono potásico (90 mM, pH 6.0) con una concentración final de 0.01% del estándar interno, ácido Trimethylsilyl propanoico o por sus siglas en ingles TPS. **ETAPA 4. Experimento de resonancia.** Con el extracto clarificado, se procede a realizar el experimento en el equipo de resonancia. Por su rapidez (5-10 min) y alta reproducibilidad el análisis de protón de hidrogeno (^{1}H NMR) es el preferido para la extracción de datos para la metabolómica. **ETAPA 5. Extracción de datos.** Una vez analizada la muestra por el equipo, se obtienen archivos con la información de los espectros. Estos archivos tienen que ser convertidos a datos numéricos mediante la integración de los picos del espectro, el ancho del pico de forma general tiene un valor de 0.04 ppm, ancho que ayuda a evitar el efecto de la fluctuación de las señales debido al pH o la concentración de la muestra. En esta etapa, las señales remanentes del disolvente deben eliminarse para el análisis estadístico.

1.1.3 Machine Learning

Teniendo en cuenta que la metabolómica se enfoca al análisis una gran cantidad de metabolitos de la muestra y que la información extraída mediante la espectroscopia por resonancia genera gran cantidad de datos, las técnicas de aprendizaje automático o de Machine Learning proporcionan útiles herramientas para reconocer patrones o metabolitos diferenciales que contribuyan a la correcta identificación de un grupo de muestras respecto a otras (Kononenko, 2001; Jordan & Mitchell, 2015).

Los algoritmos de Machine Learning puede agruparse por su estilo de aprendizaje en: Supervisado, No Supervisado y Semi supervisado. El primer grupo, a los datos de entrada se denominan datos de entrenamiento y tienen una etiqueta o resultado conocido, como, por ejemplo: Control/Enfermo, Tratamiento A / Tratamiento B, etc. En el segundo grupo, los datos de entrada no están etiquetados y no tienen un resultado conocido. Aquí el modelo mediante reglas matemáticas extrae información de los datos para posteriormente agruparlos por similitud o tendencia. Para el último grupo, los datos de entrada son una mezcla de muestras etiquetadas y no etiquetadas. Aquí se tiene un problema de predicción deseado, pero el modelo debe aprender las estructuras para organizar los datos y hacer predicciones (Varmuza et al., 2009; Wiley, 2003).

Los algoritmos de Machine Learning también puede agruparse por su similitud en términos de funcionamiento (van den Berg et al., 2006). Por ejemplo, métodos basados en árboles y métodos inspirados en redes neuronales. En el presente trabajo nos enfocaremos en el uso tres métodos para hacer predicciones:

1. Análisis Discriminante Lineal o por sus siglas en ingles LDA. El cual está enfocado en la reducción de la dimensionalidad de los datos (Zubiri Gaitán, 2018).
2. Máquinas de vectores de soporte o por sus siglas en ingles SVM. El cual es un algoritmo basado en instancias o ejemplos de datos de entrenamiento que se consideran importantes o necesarios para el modelo (Ebbels & Cavill, 2009).
3. Bosque aleatorio o en ingles Random Forest (RF). El cual es un algoritmo de conjunto, compuesto por múltiples modelos más débiles (Árbol de decisión) que se entrenan de forma independiente y cuyas predicciones se combinan de alguna manera para hacer la predicción general (Ebbels & Cavill, 2009).

Considerando los antecedentes aquí descritos, el presente trabajo plantea aplicar distintos modelos de predicción a datos crudos obtenidos mediante RMN y reportados en (Valle-Parra et al., 2020), para así demostrar cómo se puede utilizar análisis metabolómicos en la verificación de los alimentos, en este caso específico cultivares de *T. tuberosum*.

1.2 OBJETIVOS

1.2.1 Objetivo General

- Mostrar como la metabolómica por resonancia magnética nuclear (NMR) puede ser utilizada para verificar autenticidad, origen y valor nutracéutico en cultivos de *T. tuberosum*.

1.2.2 Objetivos Específicos

- Adquirir y preparar set de datos para someterlos a análisis multivariable y de Machine Learning.
- Aplicar modelos predictivos de Machine Learning para comparar su desempeño de clasificación de los distintos cultivares de *T. tuberosum*.
- Identificar los metabolitos diferenciales que permitan establecer marcadores clave entre cultivares.
- Elaborar un análisis de grupos para Jerarquizar los cultivares de *T. tuberosum* según su contenido de metabolitos.

CAPITULO 2.

MATERIALES Y METODOS

2.1 MATERIALES

2.1.1 Material Virtual

- Artículos Científicos
- Base de Datos

2.1.2 Software Bioinformático

- Excel. Microsoft Corporation. (2018).
- Plataforma de *RStudio Team (2020).*

2.1.3 Equipos

- Ordenador

2.1.4 Organismo estudiado

- *Tropaeolum Tuberosum.*

2.2 METODOLOGÍA

2.2.1 Datos

El material principal de este trabajo es un conjunto de datos crudos correspondientes a un estudio de metabolómica por RMN realizado con 6 cultivares de Mashua. Resultados de este estudio están documentados en el trabajo titulado "From morphological traits to the food fingerprint of *Tropaeolum tuberosum* through metabolomics by NMR" y publicado por Valle-Parra et al 2020. Los datos están compuestos por valores de concentración (mM) de metabolitos para cada cultivar; valores numéricos obtenidos mediante la integración de los picos del espectro de cada muestra, cuyo ancho del pico de integración fue de 0.04 ppm; y datos de localización de origen de los cultivares. La manipulación de estos datos se realizó mediante Microsoft Excel.

2.2.2 Preprocesamiento y Análisis exploratorio

El preprocesamiento de los datos de metabolitos consistió en su transformación mediante el método Unit-Variance (UV) o autoscalling, método de escalado basado en la dispersión de datos mediante escala de varianza unitaria en la que se usa la desviación estándar como factor de escalado 1 y por tanto los datos de analizan sobre la base de correlaciones y no de covarianzas. En los datos de integración se aplicó el método de escalado conocido como Pareto, el cual es muy similar escalado UV, sin embargo, en lugar de la desviación estándar, se utiliza la raíz cuadrada de la desviación estándar como factor de escala. Este escalado reduce la importancia relativa de los valores grandes, pero mantiene la estructura de datos parcialmente intacta.

La distribución de los datos antes y después de preprocesamiento se realizó mediante diagramas de cajas o Boxplots. El análisis de componentes principales o por sus siglas en ingles PCA se ejecutó con los datos ya transformados mediante UV o Pareto. La transformación y manipulación de datos se realizó con el lenguaje de programación R mediante entrono de RStudio.

2.2.3 Modelos de predicción

Partiendo de unos datos transformados por UV o Pareto, se procedió a: (1) Generar subconjuntos de datos de entrenamiento y de validación. La partición seleccionada para la generación de estos subconjuntos fue de 70% para datos de entrenamiento y el 30% restante para los de validación. (2) El entrenamiento de cada uno de los modelos seleccionados (LDA, SVM y RF). (3) Predicción de clases del subconjunto de validación. (4) Evaluación del desempeño de cada modelo partir de su precisión de clasificación, matriz de confusiones, sensibilidad y especificidad.

Para la identificación de los metabolitos diferenciales entre cultivares se realizó el cálculo de la importancia de las variables mediante el modelo RF. Finalmente, mediante un análisis de conjuntos aplicado a los datos de concentración de metabolitos se jerarquizaron los cultivares de acuerdo con su aporte nutracéutico.

La generación de los modelos se realizó mediante el paquete caret del lenguaje de programación R (Max Kuhn (2021)).

CAPITULO 3.

RESULTADOS Y DISCUSIÓN

3.1 PREPROCESAMIENTO Y EXPLORACIÓN DE DATOS

Se adquirieron conjuntos de datos, el primer conjunto de datos (tabla 4 - Anexos) consta de valores de concentración en mM de 34 metabolitos, correspondientes a 6 cultivares distintos de Mashua con seis replicas bilógicas. El segundo conjunto de datos (tabla 6 - Anexos), (de las mismas 36 muestras) son datos correspondientes al área bajo la curva de cada espectro a un intervalo de integración de 0.04 ppm, la división del espectro con este intervalo proporciono la generación de 235 variables, adicionalmente, este conjunto de datos contiene información sobre la zona geográfica de colecta de los cultivares, en total se tienen tres zonas distintas.

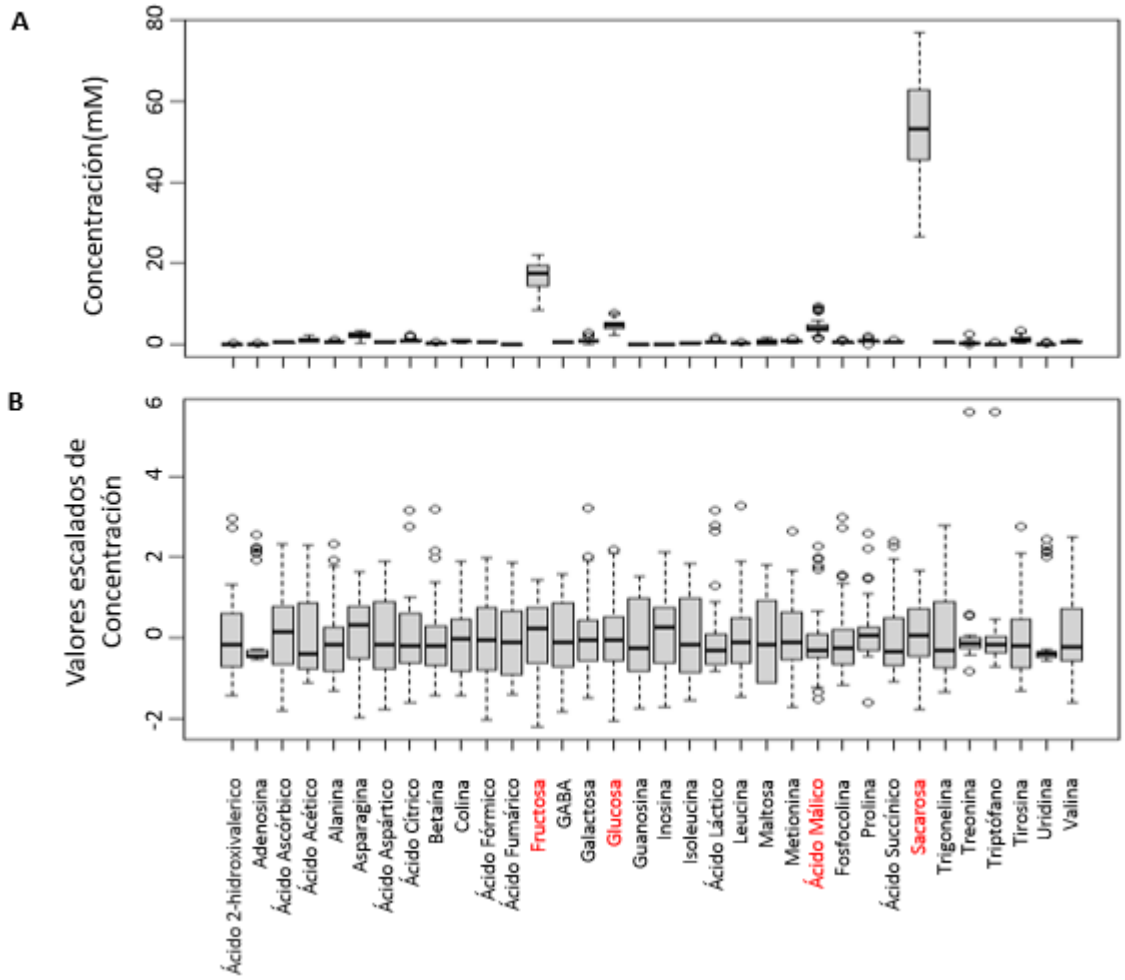
3.1.1 Datos de metabolitos

El conjunto de datos fue escalado por el método UV con el propósito de darle la misma importancia a cada metabolito en los análisis posteriores. La figura 1 muestra el pre y el post tratamiento de datos. Los principales compuestos que destacan en la figura 1A por sus valores promedio son en orden descendente: sacarosa (52.4 mM), fructosa (16.7 mM), glucosa (4.7 mM) y ácido málico (4.5 mM). Con la transformación figura 1 B, todos los metabolitos son visibles y están contenidos en un rango diez veces menor en comparación a los datos originales.

La reducción de la dimensionalidad de la gran carga de datos favorece a su vez reducir la influencia de factores perturbadores que dificulten la interpretación de los resultados como el ruido de la medición ya que no es proporcional a su relevancia biológica (van den Berg et al., 2006) o en este caso el escalado que reduce la disparidad de los rangos de medida de las variables originales, para evitar el enmascaramiento de variables abundantes sobre las de presencia escasa (Varmuza et al., 2009; Wiley, 2003).

Figura 1.

Boxplot de metabolitos

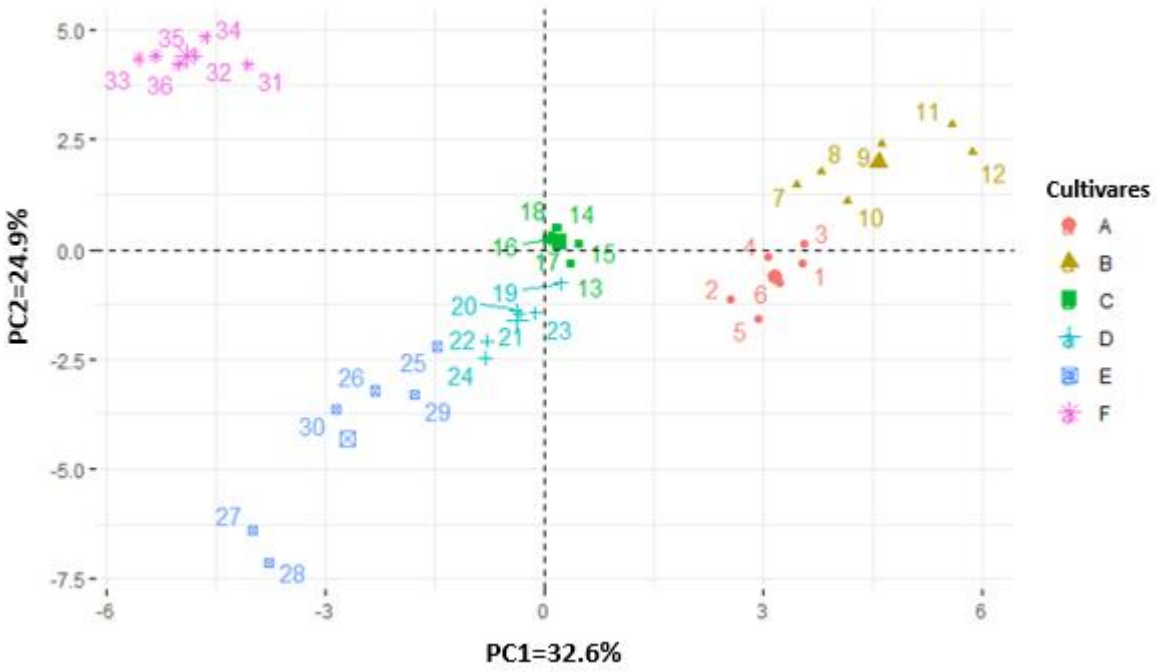


Con los datos preprocesados se realizó un análisis de componentes, con el fin de visualizar la mayor cantidad de información en las gráficas que se presenta a continuación, esto también permitió determinar tendencias o agrupaciones especificas entre muestras y metabolitos. La figura 2 muestra un gráfico de puntuación o mejor conocido como score-plot, el cual exhibe la relación de los cultivares entre sí. El primer componente principal (PC1) muestra el 32.6% de la variación mientras que el segundo (PC2) el 24.9%. En el grafico se representa los cultivares con mayor diferencia, siendo los más relevantes B y F, mediante el uso de una gama de coloración por cultivar. En general se distinguieron 3 grandes grupos, el primero compuesto por los cultivares A y B; segundo C, D y E y finalmente el más aislado de todos el cultivar F.

Los PC1 y PC2 explican el 57,5% de la variabilidad total de los datos escalados, con una cantidad similar de metabolitos presentes en cada grupo. La separación entre los 3 grupos ya mencionados se debe a que la variación de datos dentro del grupo es significativamente menor que la variación entre grupos, por el reconocimiento de los patrones no discriminatorio de las señales químicas implicadas en el proceso de distinción de los metabolomas (Dias-audibert et al., 2020; Kim et al., 2009; Varmuza et al., 2009).

Figura 2.

Scoreplot

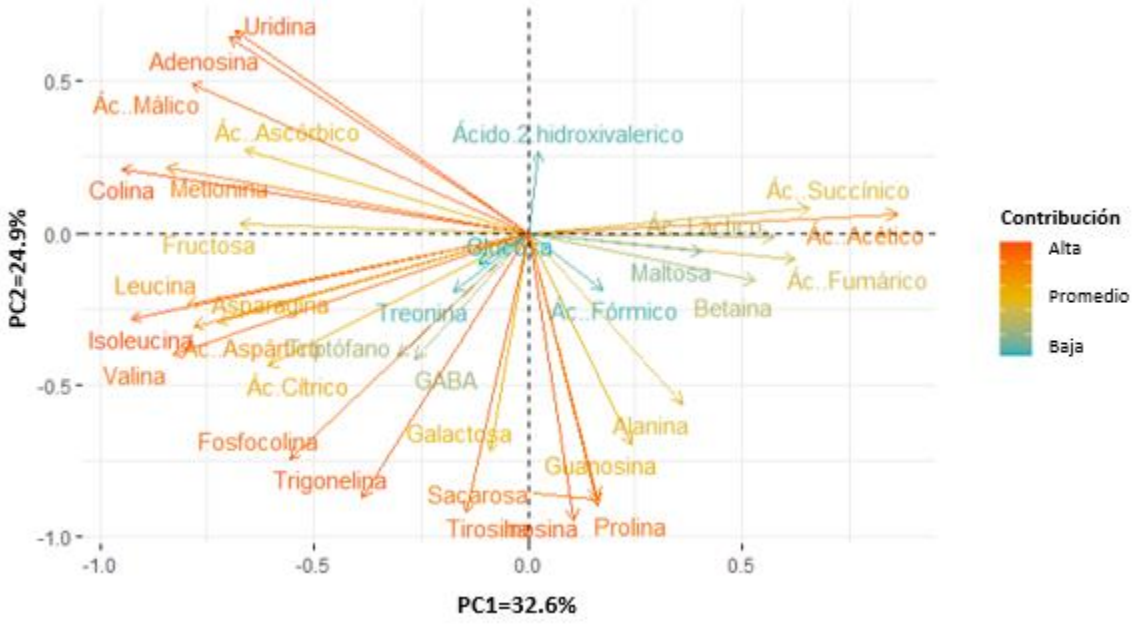


La figura 3, muestra el grafico de cargas o mejor conocido como loadings-plot, el cual indica la relación entre los componentes principales (PC1 y PC2) con las variables originales, en este caso los valores de metabolitos. La contribución de cada metabolito a la agrupación especifica de cada cultivar está representada por un gradiente de color, donde un naranja intenso indica una alta contribución, contrariamente, el turquesa una baja contribución. De acuerdo con lo anterior, en la agrupación de A y B los ácidos orgánicos Succínico, Acético, Fumárico y Láctico junto con la Betaína y Maltosa

contribuye positivamente y con mayor impacto con respecto a los demás cultivares. Los cultivares C y D no mostraron estar fuertemente influenciados por algún metabolito en específico, lo cual permite inferir que sus valores de concentración están en un punto medio respecto a los demás cultivares. El cultivar E se aleja un poco de C y D debido a la influencia principalmente de metabolitos como Fosfocolina, Ácido Cítrico y Aspártico, aminoácidos: Treonina, Isoleucina, Tirosina, Triptófano, Asparagina, Valina y GABA, así como de trigonelina. El cultivar F, la distancia entre los demás cultivares esta influenciada principalmente por su contenido de Colina, Fructosa, Ácido Ascórbico y Málico, Metionina y nucleósidos.

Figura 3.

Loadings



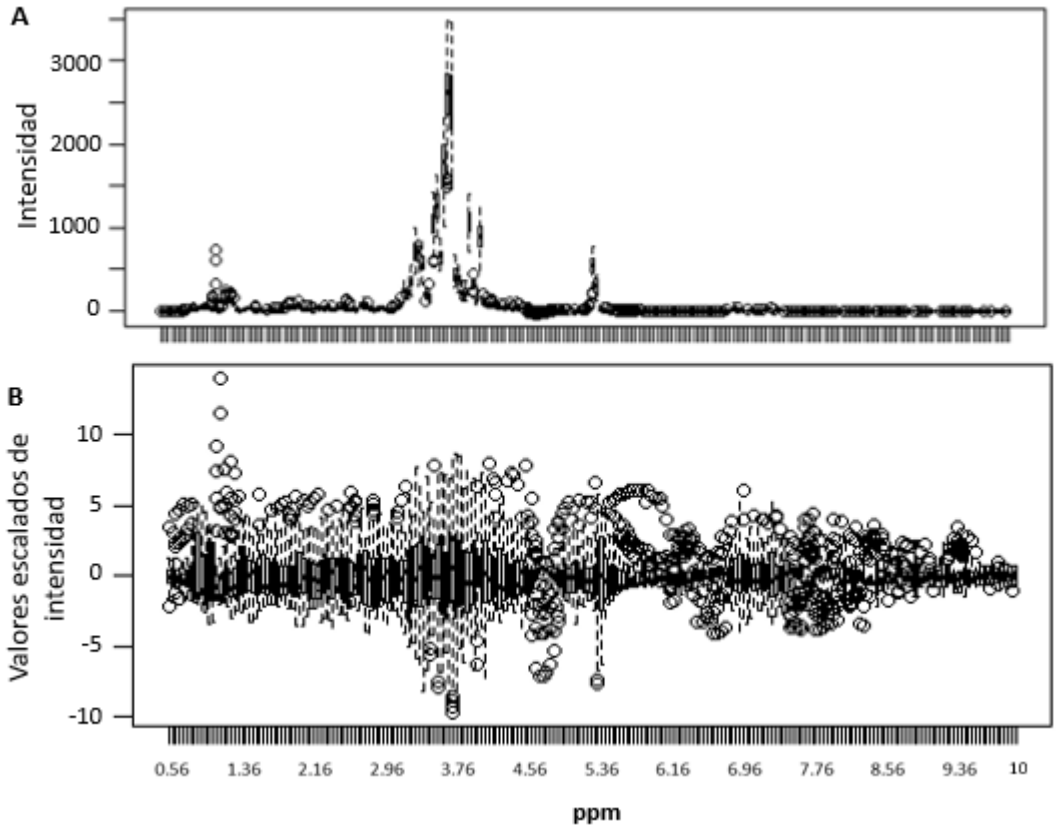
3.1.2 Datos de integración

El conjunto de datos de integración fue transformado con el método de Pareto, cuyo propósito es reducir la importancia relativa de los valores grandes, pero mantener la estructura de datos parcialmente intacta. La figura 4 muestra el antes y el después de la transformación de datos. La figura 4A se asemeja mucho al espectro original de RMN

el cual se puede dividir en tres regiones principales; la región de 0,5 a 3,0 ppm contiene señales de aminoácidos y ácidos orgánicos; la región de 3,0 a 5,5 ppm señales concernientes a los carbohidratos, por último, la región aromática de 5,5 a 10,0 ppm cuyas señales son relativamente débiles. Con los datos de integración procesados en este trabajo la región con intensidades más altas se localiza entre 2.6 ppm y 4.56 ppm. Con la transformación figura 4B, el perfil de señales cambia completamente, aquí se aprecia el efecto de reducción de los valores grandes de intensidad con el método de Pareto (Kim et al., 2009). Cabe mencionar que el Pareto enfatiza las señales más débiles dentro del espectro pero que pueden tener mayor relevancia biológica debido a que el factor de escala es la varianza (Varmuza et al., 2010).

Figura 4.

Boxplot Binning



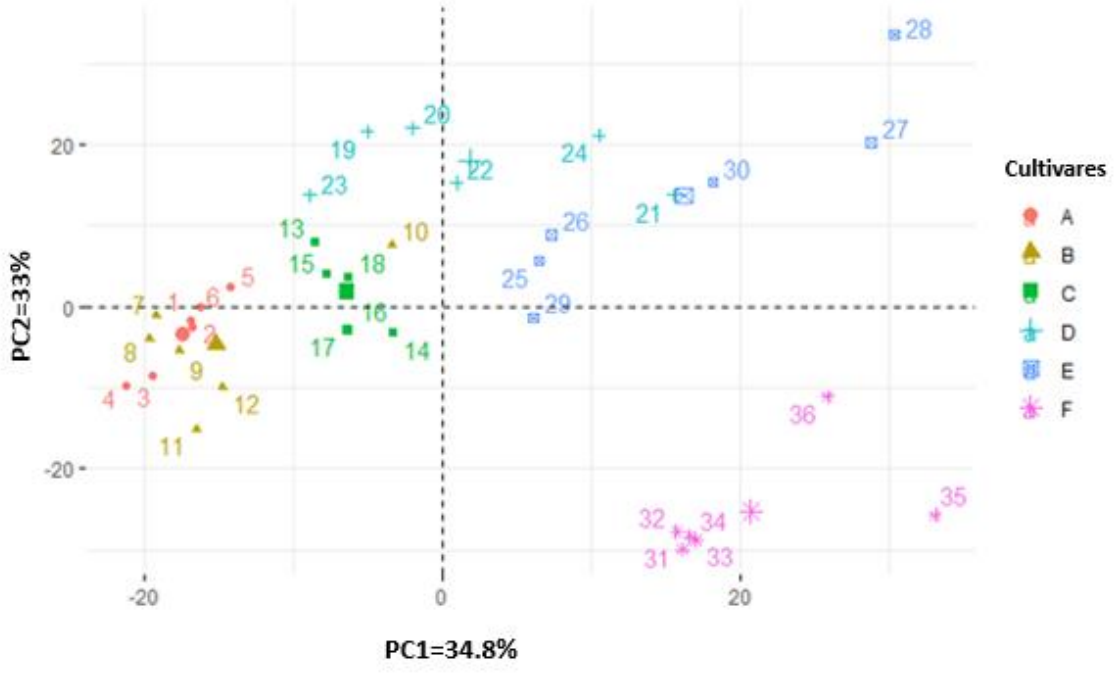
Con los datos de integración preprocesados, se realizó un análisis de componentes. La figura 5 muestra como los cultivares se relacionan entre si a partir de

su intensidad en el espectro de RMN. El primer componente principal (PC1) explica el 34.8% de la variación mientras que el segundo (PC2) el 33%. El gráfico se muestra mediante agrupación de cada cultivar por color, lo cual permitió establecer fácilmente a los grupos de cultivares con mayor semejanza entre sí, el primero fue A con B, seguido de C con D, mientras que E y el cultivar F se encuentran más aislados. Los grupos con mayores diferencias son el A-B con el F de acuerdo con el primer componente principal.

El uso de datos de integración es ampliamente utilizado en la metabolómica no dirigida debido a que pueden reflejar cambios mininos en el perfil metabolómico en el objeto de estudio (Erban et al., 2019). A pesar de no tener información exacta sobre que metabolitos están causando las perturbaciones en el metaboloma, mediante el análisis multivariable (específicamente uno encargado de reducir las dimensiones de los datos) es posible identificar tendencias o agrupaciones especificas del objeto de estudio (Worley & Powers, 2013). En caso puntual de este estudio, en los cultivares de Mashua, se ha podido realizar interpretaciones de forma eficiente, ejemplo de esto es la identificación de cultivares mediante el agrupamiento de los ecotipos que poseen mayor similitud en su perfil metabolómico.

Figura 5.

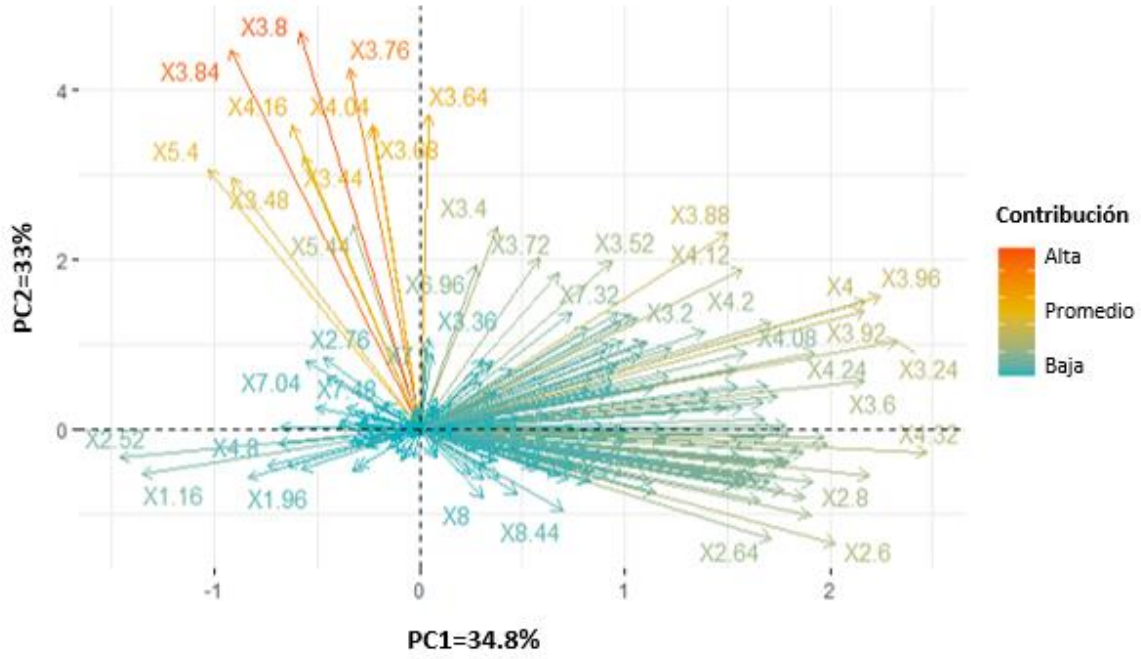
Scoreplot binning



La figura 6, muestra el diagrama de cargas (loadings-plot) de los valores de integración transformados que en total son 235 (variables) a diferencia de 34 para el conjunto de datos de metabolitos. La contribución de cada señal a la agrupación especifica de cada cultivar está representada por un gradiente de color, donde un naranja intenso indica una alta contribución, contrariamente, el turquesa una baja contribución. A diferencia de la figura 3 es más complicado distinguir a simple vista que grupo de señales contribuyen a la discriminación de los cultivares; sin embargo, se puede visualizar que las señales de 1.16, 1.96, 2.52 y 4.8 contribuyen positivamente al cultivar A y B, mientras que las señales correspondientes a 3.44, 3.48, 3.76, 3.8, 3.84, 4.04, 4.16 y 5.4 se correlacionan más los cultivares C y D. Al cultivar E se le asocian más las señales 3.88, 3.92, 3.96 y 4.12. Finalmente, para el cultivar F las señales a 2.6, 2.64, 2.8 y 4.32 son las señales que más se distinguen.

Figura 6.

Loadings binning

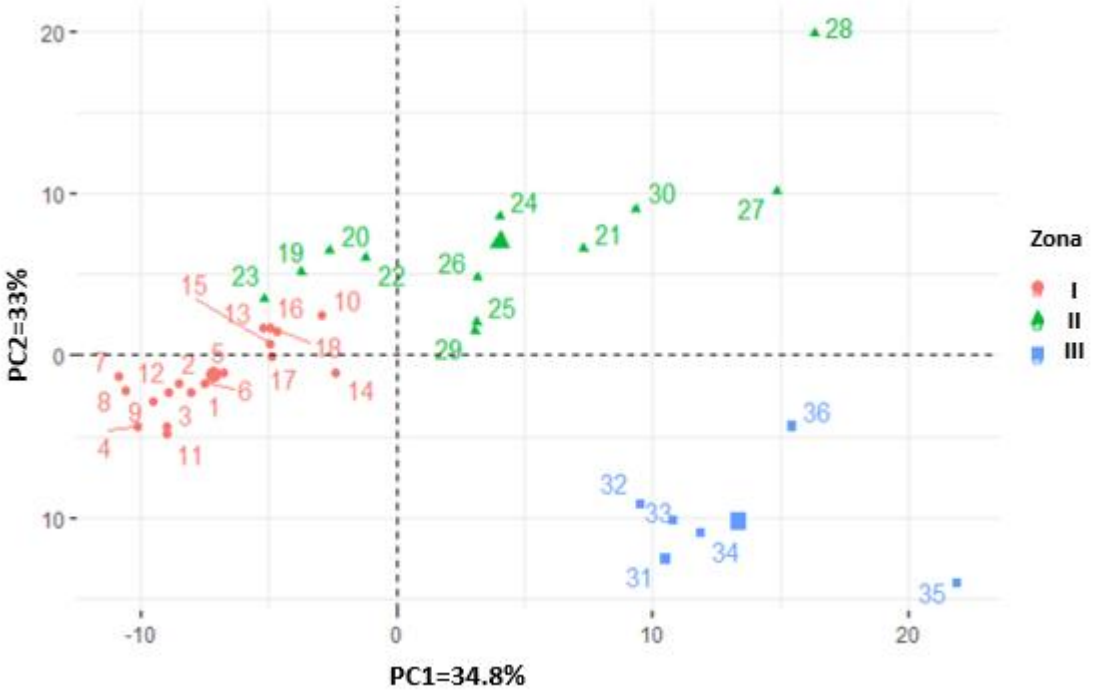


Adicionalmente se realizo una coloración del análisis de componentes utilizando los datos de ubicación geográfica de recolección de los distintos cultivares. La figura 7

muestra la distribución de las muestras de acuerdo con su zona de recolección. La zona de recolección resulta ser determinante para discriminar las muestras del cultivar F. La zona I contiene las muestras del cultivar A y B, mientras que la zona II la C y D.

Figura 7.

Scoreplot binning zonas



3.2 MODELADO Y DESEMPEÑO DE CLASIFICACIÓN DE CULTIVARES

Con los datos ya preparados y terminado el análisis exploratorio inicial, se realizó el modelado con el propósito de discriminar los distintos cultivares de acuerdo con su contenido de metabolitos o de sus datos de integración. Tres modelos fueron entrenados: LDA, SVM y RF, con el fin de estudiar su desempeño en el tipo de datos proporcionados. Estos modelos fueron validados durante su entrenamiento mediante validación cruzada.

3.2.1 Modelado con datos de metabolitos

Para este primer conjunto de datos los resultados del desempeño se resumen en la tabla 1. Este desempeño nos indica que tan bueno es el modelo para discriminar entre

cultivares. El modelo con mayor desempeño fue RF seguido de SVM con 0.964 de precisión y finalmente LDA con 0.876. El cultivar asociado con la menor sensibilidad fue el D seguido por C y F. La especificidad se vio menos afectada que la sensibilidad del modelo, los cultivares C y F comparten los valores más bajos, seguidos por D. A excepción de RF, lo modelos tuvieron más dificultad para establecer verdaderos positivos entre los cultivares C, D y E, los cuales se pueden observar juntos en la parte central como se muestra en figura 2.

La sensibilidad y precisión obtenida del RF comprueba lo ya establecido por García, 2018 ya que este es capaz de captar las interacciones entre variables ortogonales (independientes) facilitando el análisis de cada factor y su respuesta. Mientras que SVM suele presentar complicaciones por sobreentrenamiento y la intensidad de las variables a analizar como menciona Lloyd et al., 2021 dificultando la evaluación metabolómica al pasar por alto las relaciones funcionales entre ellos. Una de las razones del bajo desempeño del LDA puede deberse a que el conjunto de datos puede no tener una distribución estrictamente normal, mientras que RF o SVM son modelos capaces de trabajar adecuadamente con datos que no se ajusten a una distribución normal (James, G., Witten, D., Hastie, T., Tibshirani, 2013).

Tabla 1.

Modelos Metabolitos

Modelo	Precisión	Sensibilidad por cultivar						Especificidad por cultivar					
		A	B	C	D	E	F	A	B	C	D	E	F
LDA	0.876	1	1	0.5	0.5	0.5	1	1	1	0.9	0.9	1	0.9
SVM	0.964	1	1	1	0.5	1	1	1	1	0.9	1	1	0.9
RF	1	1	1	1	1	1	1	1	1	1	1	1	1

La sensibilidad de un modelo de predicción también denominada Tasa de Verdaderos Positivos, hace referencia a la habilidad o capacidad que posee de detectar y predecir correctamente la presencia real de una variable. Mientras que la Especificidad o Tasa de Verdaderos Negativos, es la habilidad del mismo modelo para predecir la exclusión correcta de aquella variable cuando no está presente. En el caso del modelo RF se obtuvo un ajuste ideal (Morán, 2014; Lee, 2019).

3.2.2 Modelado con datos de integración

El modelado con los datos de integración es más robusto que el realizado con metabolitos, esto se debe a que la cantidad de variables es casi 7 veces más, al mismo tiempo que no requiere de un análisis profundo y laborioso para la identificación particular de metabolitos. Como desventaja se tiene la perdida de particularidad, ya que no es posible establecer que metabolitos específicamente contribuyen a la discriminación de cultivares. El resumen del desempeño de estos modelos se muestra en la tabla 2. Nuevamente el modelo con mayor desempeño fue RF con una precisión de 0.964, seguido por SVM con 0.865 y finalmente LDA con un valor de precisión de 0.832, con este tipo de datos la sensibilidad se vio muy poco afectada, siendo el cultivar C del modelo LDA el único afectado. En el caso de la especificidad, el cultivar D del mismo LDA fue el único afectado.

Tabla 2.

Modelos de integración

Modelo	Precisión	Sensibilidad por cultivar						Especificidad por cultivar					
		A	B	C	D	E	F	A	B	C	D	E	F
LDA	0.832	1	1	0.5	1	1	1	1	1	1	0.9	1	1
SVM	0.865	1	1	1	1	1	1	1	1	1	1	1	1
RF	0.964	1	1	1	1	1	1	1	1	1	1	1	1

Adicional al tipo de cultivar, se aplicaron los modelos usando como ente discriminante la zona geográfica de recolección de cada cultivar. La tabla 3 muestra el resumen del desempeño de los modelos aplicados. El modelo con mayor desempeño fue RF, seguido por SVM con 0.963 y finalmente LDA con un valor de precisión de 0.876. con este tipo de datos la sensibilidad se vio muy poco afectada, siendo la zona I del modelo LDA el único afectado. En el caso de la especificidad, la zona I y II del mismo LDA fueron los afectados.

Tabla 3.

Modelos de zona

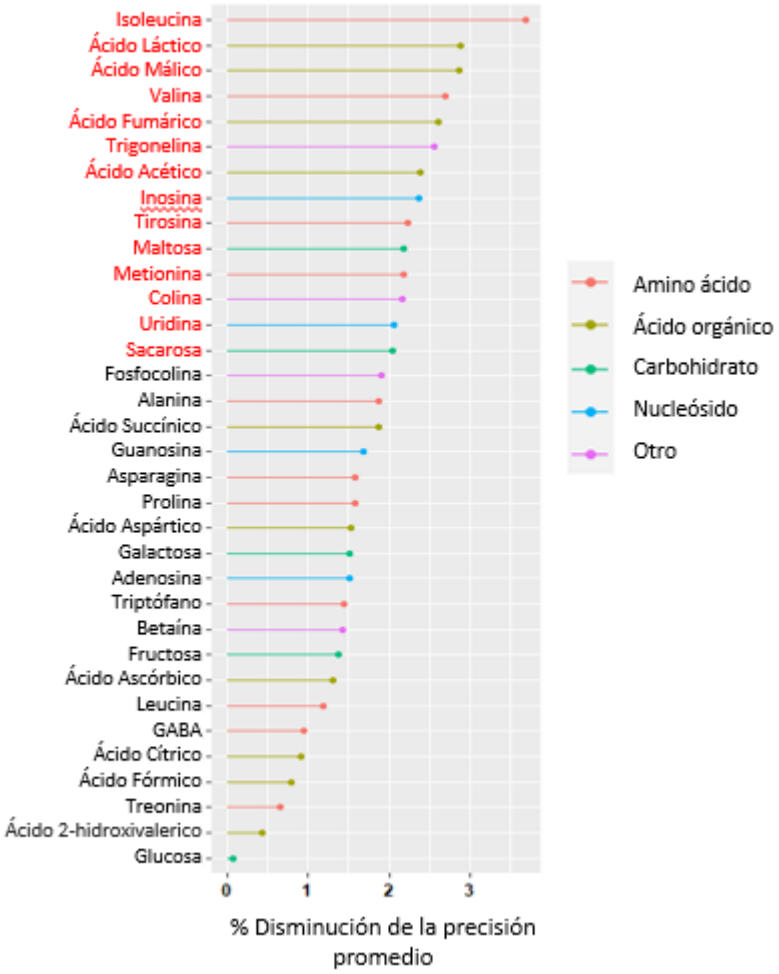
Modelo	Precisión	Sensibilidad por Zona			Especificidad por Zona		
		I	II	III	I	II	III
LDA	0.876	0.5	1	0.5	0.83	0.63	1
SVM	0.963	1	1	1	1	1	1
RF	1	1	1	1	1	1	1

3.3 METABOLITOS DIFERENCIALES

Para determinar cuáles son los metabolitos diferenciales, en primer lugar, se eligió el modelo con mejor desempeño, en este caso RF. Seguido a esto, se extrajo la importancia en términos disminución de precisión de cada una de las variables calculadas por el modelo, posteriormente se organizaron de mayor a menor disminución. Finalmente, se consideraron como diferenciales aquellos metabolitos que disminuyen la precisión en más de un 2%. Como diferenciales nos referimos a metabolitos que contribuyen a establecer diferencias entre los distintos cultivares. La figura 8 expresa cuánta precisión pierde el modelo al excluir cada metabolito. Cuanto más sufre la precisión, más importante es la variable para la clasificación exitosa. Las variables que disminuyeron en más de un 2% la precisión fueron: Isoleucina, Ácido Láctico, Ácido Málico, Valina, Ácido Fumárico, Trigonelina, Ácido Acético, Inosina, Tirosina, Maltosa, Metionina, Colina, Uridina y Sacarosa.

Figura 8.

Mean Decrease Accuracy



3.4 ANÁLISIS NUTRACEÚTICO

Las propiedades nutraceúticas de los distintos ecotipos de Mashua se realizó mediante un análisis de clúster con los 34 metabolitos identificados en los espectros de RMN.

3.4.1 Evaluación global

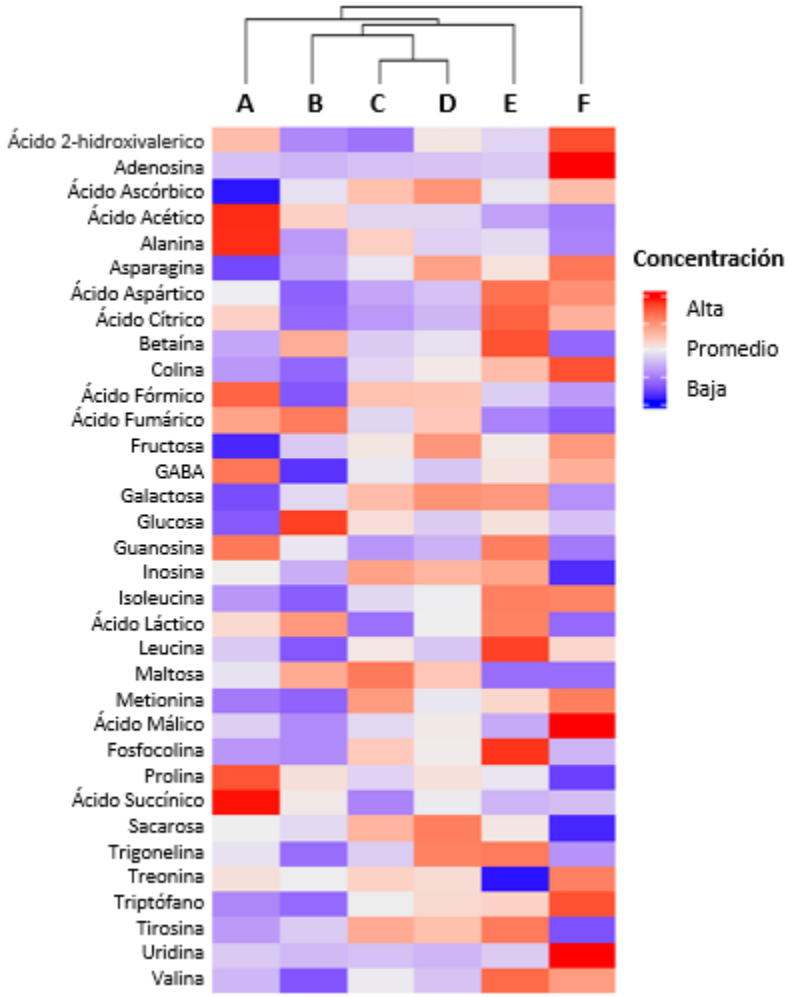
La jerarquización inicial incluyo la evaluación simultanea de todos los metabolitos. La figura 9 muestra cómo se agrupan los cultivares de acuerdo con su concentración. De entre todas las accesiones analizadas, el cultivar F es el que presentó las concentraciones más altas de la gran mayoría de los metabolitos, especialmente adenosina, malato, uridina y colina. En contraste la variedad B es la que presenta menor concentración de los metabolitos estudiados, siendo el único destacable la glucosa. Los cultivares E y A muestran cantidades relevantes de algunos metabolitos como el ácido acético, alanina y succinato y poca cantidad respecto a las concentraciones mínimas de otros metabolitos como el ácido ascórbico y treonina respectivamente. Los cultivares C y D no muestran concentraciones muy alejadas del promedio de ningún tipo de metabolito, de manera general se podría considerar que se encuentran en una concentración promedio de las variedades.

El ácido Acético y el ascórbico son metabolitos importantes en T. *tuberosum*, sin embargo, se ha encontrado que el ácido ascórbico en ocasiones suele no producirse, lo cual se relaciona con el genotipo del cultivar de acuerdo con (Mironowicz, 1998; Valcarcel et al., 2016; Finlay et al., 2003) los tubérculos con similitudes morfológicas como el color de la piel y la pulpa presentan concentraciones del metabolitos diferentes, por lo cual se asume que afecta al contenido antiocianinas y su actividad antioxidante. Además, los factores como la ubicación geográfica, el almacenamiento y forma de cultivo pueden ser claves para la expresión de una vía metabólica (Hamouz et al., 2018).

Por otro lado, la colina es un precursor de la fosfocolina y betaína ya mencionadas y al igual que ellas funciona como un osmolito no tóxico protector usado por las plantas tuberosas como respuesta al estrés abiótico ya sea salinidad, sequía o temperaturas extremas (Rivoal & Hanson, 1994). La Alanina aun cuando no es un aminoácido esencial es fundamental para el tubérculo pues se produce en concentraciones significativas en situaciones de estrés hipóxico inducido por anegamiento o inundación debido a la poca disponibilidad de oxígeno en los tejidos de las plantas tuberosas (Dias-audibert et al., 2020).

Figura 9.

Heatmap General



3.4.2 Perfil de aminoácidos

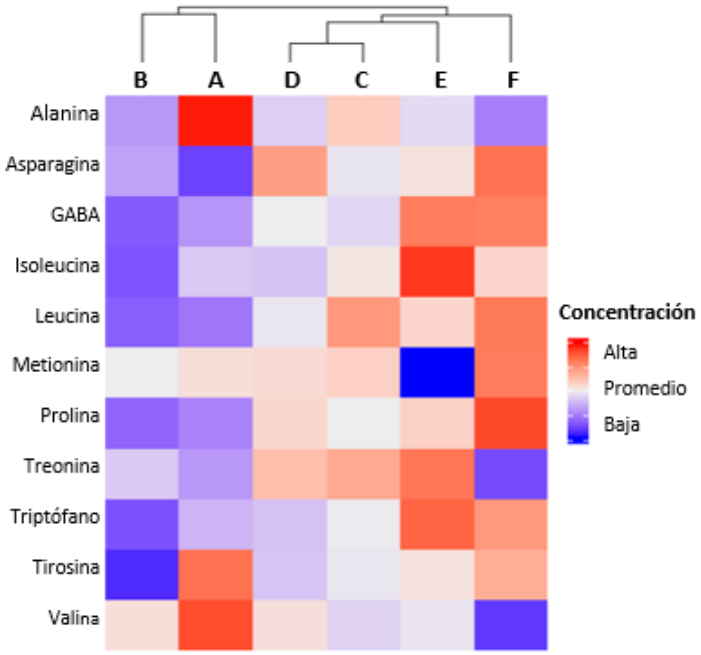
La figura 10 muestra la distribución de 12 aminoácidos esenciales y no esenciales identificados en cada cultivar. Como esenciales se encontraron: Isoleucina, Leucina, Metionina, Treonina, Triptófano y Valina. En el grupo de los no esenciales se encontraron: Alanina, Asparagina, ácido Aspártico, Tirosina y Prolina. Adicional a estos aminoácidos se cuantifico la presencia del ácido gamma-aminobutírico o mejor conocido como GABA. El cultivar F presenta un contenido mayor de la todos los aminoácidos a excepción de la Prolina y Tirosina. En contraste, el cultivar B resulto ser el que menos contenido de aminoácidos posee. En términos de GABA, este último cultivar presenta de igual forma el valor más bajo, siendo el cultivar A el que mayor

presencia de este aminoácido presenta, seguido del cultivar F. Se destaca la poca cantidad de Treonina presente en el cultivar E debido a que este cultivar está situado en segundo lugar de aporte de aminoácidos más, sin embargo, mostró el valor más elevado para otro aminoácido esencial como lo es la Leucina. Las muestras de C y D tuvieron un perfil promedio en su contenido.

De acuerdo a los estudios en papa por Roessner-tunali et al., 2003, el perfil de aminoácidos libres esta negativamente correlacionado con la cantidad de carbohidratos tales como la sacarosa. De acuerdo con los resultados presentados en este estudio, se cumple de forma general, siendo el cultivar F el que posee contenidos de sacarosa más bajos y con contenidos de aminoácidos libres más altos.

Figura 10.

Heatmap Aminoácidos



3.4.3 Ácidos Orgánicos

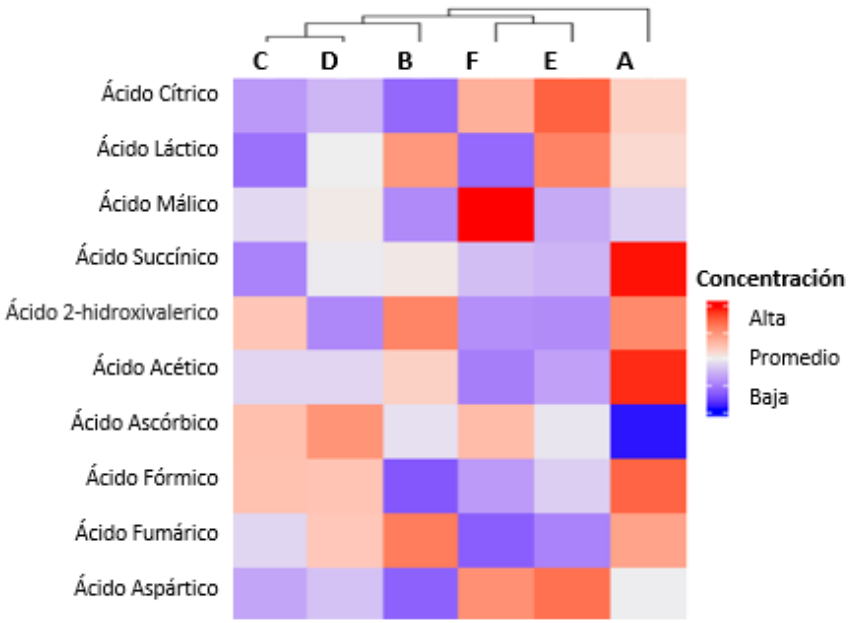
La figura 11, se muestra como los cultivares han sido jerarquizados de acuerdo con su perfil de ácidos orgánicos. En la gráfica se puede observar al cultivar A, el cual presenta el mayor contenido de ácidos, siendo el succínico y el acético los que mayor concentración y el valor más bajo registrado para el ácido ascórbico con respecto a los

cultivares restantes. Seguido, se puede observar a los cultivares E y F los cuales presentan mayor similitud en cuanto a presencia y concentración de ácidos orgánicos; siendo el cultivar F, el que mayor concentración de ácido málico obtuvo. El cultivar B tiene valores más cercanos al promedio mientras que D y C resultaron ser los cultivares con los valores más bajos para 7 de los 10 ácidos reportados.

El contenido de ácidos orgánicos en la muestras analizadas podría estar asociada a un nivel de domesticación de los cultivares estudiados de acuerdo a lo descrito por Bradbury & Emshwiller, 2011. Adicional a esto en patata Shekhar & Iritani, 1979, los altos contenidos de ácido málico están asociado a baja temperaturas, mientras que los bajos coinciden con los momentos más óptimos de cosecha. Lo cual coincide al menos con los cultivares D y E cuyo periodo de cosecha optimo coincide con los niveles bajos este ácido (Valle-Parra et al., 2020).

Figura 11.

Heatmap Ácidos Orgánicos



3.4.4 Carbohidratos

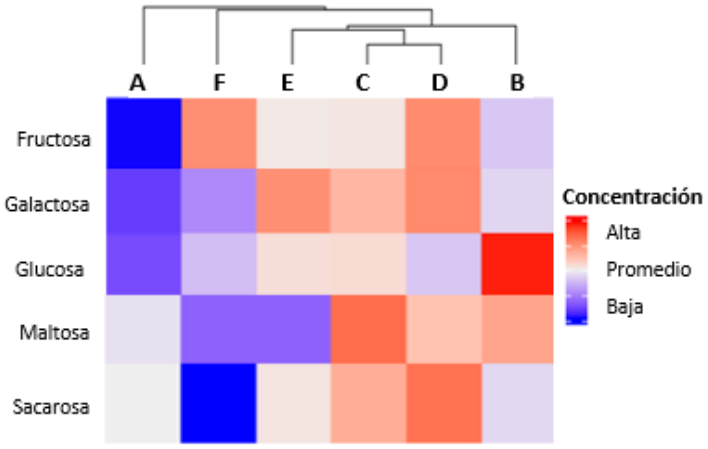
La figura 12 muestra como los distintos carbohidratos están distribuidos a lo largo de los cultivares. El cultivar B destaca por tener la mayor cantidad de glucosa, valor que lo coloca en la primera posición en términos de aporte nutracéutico, seguido

por el cultivar D. Los cultivares C y E mostraron valores promedio mientras que F y A son los que presentan las concentraciones notablemente más bajas de la sacarosa y fructosa respectivamente, en el primer caso el único metabolito que produce una concentración relevante es la fructosa, mientras que en el cultivar A exclusivamente la maltosa y sacarosa presentan concentraciones promedio.

La presencia de carbohidratos en tubérculos de asocia a la resistencia a enfermedades en la planta debido a la acumulación de estos en la endomembrana de la célula (Eugen & King, 2016), por lo cual azucares reductores como la fructosa o glucosa que son los más representativos en esta especie tienden a acumularse para aumentar la tolerancia al congelamiento, donde además la sacarosa se utiliza como la principal fuente de acumulación de estos azúcares, más este metabolito no es relevante en el cultivar F lo que puede estar relacionado con la inhibición de su expresión genética como mecanismo regulador dentro de la biosíntesis del almidón (S.N.I.M.Salehuzzaman & R.G.F.Visser, 1994; Duarte-Delgado et al., 2015). En contraste la maltosa le sirven al tubérculo como reserva energética producto de la digestión de dicho almidón (Szecowka et al., 2012; Surcos et al., 2004).

Figura 12.

Heatmap Carbohidratos



3.4.5 Otros nutrientes

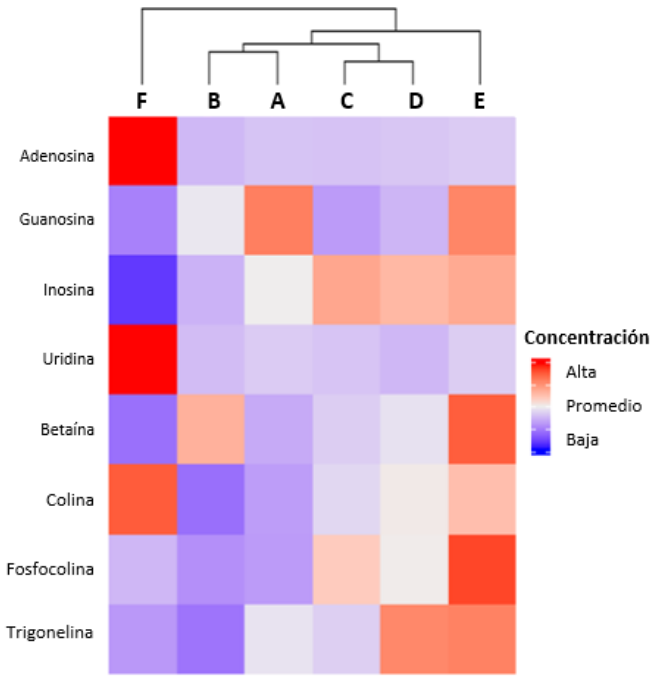
La figura 13 muestra la distribución de otros nutrientes importantes identificados en la Mashua. El cultivar E resultó ser la variedad con concentraciones más altas,

destacando la Fosfocolina y la Betaína. En contraste la variedad A es la que presenta menor concentración de los tres compuestos reportados, seguida del cultivar B donde únicamente la Betaína muestra una concentración considerablemente alta. Los cultivares C y D no muestran concentraciones muy polarizadas de algún nutriente, de manera general se podría considerar que se encuentran en una concentración promedio comparadas con los demás cultivares, a excepción de la Fosfocolina en el cultivar C que muestra una pequeña tendencia a la concentración alta. Entre tanto el cultivar F muestra un patrón más polarizado respecto a los demás, pero colocándose en segunda posición de aporte nutricional por su contenido alto de Colina.

La betaína y fosfocolina con su alta presencia respectivamente demuestran su importancia para la especie ya que estos metabolitos actúan como osmolito (osmoprotector y osmoregulador) no tóxicos de las células, proteínas y enzimas del tubérculo ante la presencia de estrés abiótico ya sea salinidad, sequía o temperaturas extremas (Rivoal & Hanson, 1994; Kumar et al., 2004; Tuomola et al., 1996), cabe mencionar que este último es un recurso propio de las plantas tuberosas.

Figura 13.

Heatmap Otros



CAPITULO 4

CONCLUSIONES

Mediante el presente trabajo se ha evidenciado como la metabolómica es utilizada para verificar la autenticidad, origen y distintos aportes nutraceúticos de seis distintos cultivares de *T. tuberosum*.

El preprocesamiento de datos resulta clave a la hora de aplicar cualquier modelado de datos, siendo el tipo de transformación a aplicar dependiente de la naturaleza de los datos. En el presente trabajo, la transformación más adecuada para datos de concentración corresponde a UV, mientras que para los datos de integración fue el método de Pareto.

El empleo de análisis multivariables y de aprendizaje automático es indispensable para el manejo e interpretación de experimentos de esta naturaleza, debido a la gran cantidad de variables y tipos de cultivares. El PCA aplicado a los datos de metabolitos describió el 57.5% de varianza de todos los datos, mientras que para datos de integración el 67.8%, en ambos casos fue posible distinguir con claridad a cada uno de los cultivares estudiados.

De los modelos empleados para realizar la discriminación de cultivares, el método de Random Forest resulto superior en todas las tareas de clasificación. Mientras que el Linear Discriminant Análisis el que peor desempeño mostro.

La reducción en la precisión de clasificación en el modelo Random Forest, fue imprescindible para la identificación de metabolitos diferenciales entre cultivares. Los que más destacaron fueron la Isoleucina, Ácido Láctico, Ácido Málico, Valina y Ácido Fumárico.

El aporte nutraceútico de los cultivares fue satisfactoriamente jerarquizado y diagramado, lo cual contribuyo a la mejor interpretación en términos globales, aminoácidos, carbohidratos, ácidos orgánicos y otros nutrientes presentes en las muestras. En un enfoque general y por aminoácidos, el cultivar F destaca por poseer un aporte superior frente a los demás cultivares; en cuanto al contenido de ácidos orgánicos el cultivar A tiene mayor contenido de casi todos los ácidos reportados, mientras que el cultivar B y D proporcionan un espectro mayor en termino de contenido de carbohidratos.

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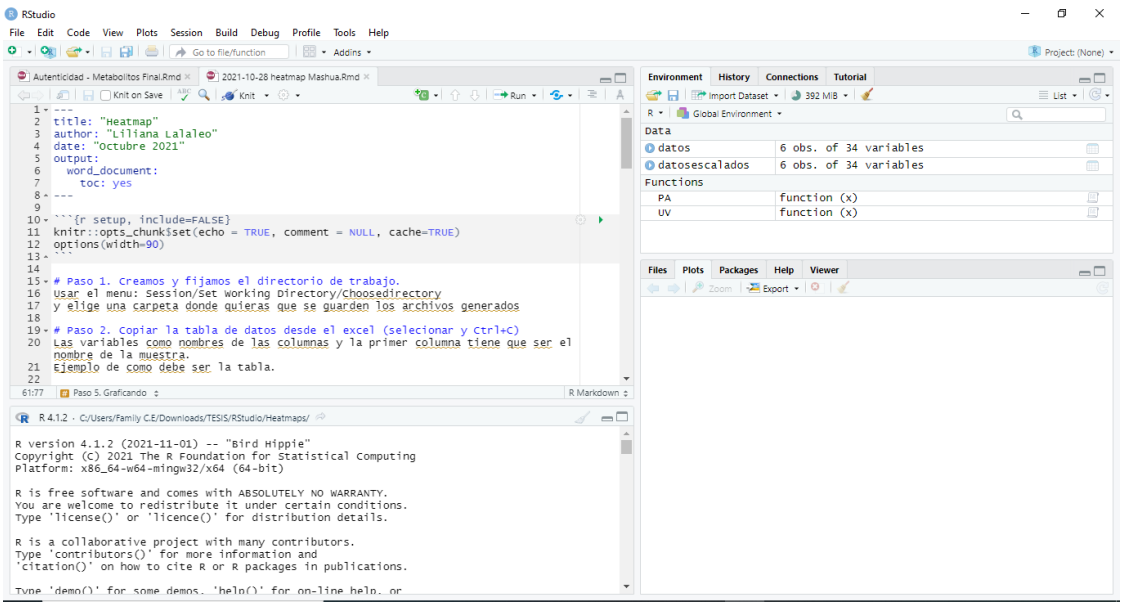
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ANEXOS

ANEXO 1: RStudio

Figura 14.

Entorno de Trabajo RStudio



ANEXO 2: METABOLITOS

Tabla 4.

Metabolitos

Cultivar	Ác. 2-hidroxivalerico	Adenosina	Ác. Ascórbico	Ác. Acético	Alanina	Asparagina
A	0.0339	0.0156	0.2535	1.5048	0.8444	0.4745
A	0.0264	0.0148	0.2855	1.6023	0.9211	2.5116
A	0.0498	0.0153	0.2526	1.5045	0.8811	1.6633
A	0.0336	0.0146	0.2292	1.4438	0.8983	2.4721
A	0.0345	0.0214	0.2621	1.8063	1.0172	2.2102
A	0.0248	0.0166	0.2475	1.6482	0.9449	1.5502
B	0.0185	0.0081	0.3775	0.9143	0.4557	1.1615
B	0.0122	0.0086	0.3557	0.9733	0.4423	1.1051
B	0.0394	0.0111	0.3502	1.2945	0.3972	0.4272

B	0.0564	0.0135	0.4898	1.8077	0.4713	0.6932
B	0.0826	0.0091	0.3153	1.9983	0.5936	0.3144
B	0.0863	0.0104	0.3028	2.0842	0.6798	0.4387
C	0.0165	0.0147	0.4233	0.6963	0.6245	1.6414
C	0.0222	0.0122	0.4357	0.7461	0.5135	1.7842
C	0.0234	0.0108	0.4459	0.7228	0.6086	1.6854
C	0.0182	0.0142	0.5071	0.8234	0.5372	1.7721
C	0.0314	0.0131	0.3981	0.6432	0.5876	1.7552
C	0.023933333	0.013166667	0.446966667	0.73756667	0.5461	1.7705
D	0.0291	0.0169	0.4569	0.6965	0.5297	2.4304
D	0.0242	0.0183	0.5061	0.7071	0.5412	2.5452
D	0.0246	0.0106	0.4763	0.8601	0.5713	3.1013
D	0.0407	0.0123	0.3452	0.9149	0.6322	3.4462
D	0.0215	0.0148	0.3352	0.8254	0.5988	2.9171
D	0.0253	0.0222	0.4583	0.8968	0.6239	3.0832
E	0.0257	0.0205	0.3805	0.5107	0.5452	1.8293
E	0.0482	0.0201	0.3403	0.5134	0.6229	2.6792
E	0.0537	0.0226	0.3596	0.5142	0.7726	3.0482
E	0.0349	0.0248	0.4085	0.5906	0.8838	3.0449
E	0.0265	0.0276	0.4349	0.5625	0.5572	1.4322
E	0.0432	0.0262	0.5002	0.5655	0.6022	2.4574
F	0.0449	0.1828	0.4262	0.3831	0.4244	2.7755
F	0.0412	0.2051	0.5195	0.4332	0.4412	2.9047
F	0.0514	0.1975	0.5098	0.5065	0.4286	2.5346
F	0.0367	0.2265	0.5167	0.4862	0.4253	2.3772
F	0.0588	0.2033	0.6237	0.5763	0.3797	2.4082
F	0.049113	0.193953	0.47736	0.453696	0.43503	2.708151

Cultivar	Ác. Aspártico	Ác. Cítrico	Betaína	Colina	Ác. Fórmico	Ác. Fumárico
A	0.4745	1.0007	0.1701	0.4401	0.6462	0.0288
A	0.5552	1.1785	0.1724	0.4458	0.6106	0.0448
A	0.4717	0.7041	0.1636	0.4345	0.6611	0.0337
A	0.3681	0.9599	0.1612	0.3974	0.6236	0.0317
A	0.7296	1.2497	0.1792	0.5067	0.7893	0.0422
A	0.4807	0.8597	0.2817	0.3269	0.6755	0.0379
B	0.3116	0.5834	0.2905	0.3309	0.4079	0.0332
B	0.2229	0.5356	0.2542	0.3092	0.4354	0.0393
B	0.2004	0.4232	0.3548	0.3022	0.4092	0.0247

B	0.2654	0.5711	0.5342	0.3752	0.5491	0.0295
B	0.1609	0.4431	0.4238	0.2906	0.6052	0.0146
B	0.1898	0.3417	0.4379	0.2733	0.6852	0.0204
C	0.3909	0.7023	0.2003	0.5749	0.5674	0.0174
C	0.3582	0.6397	0.1992	0.6915	0.7602	0.0184
C	0.4692	0.8695	0.2339	0.4217	0.6482	0.0182
C	0.3523	0.6651	0.2077	0.7317	0.7906	0.0206
C	0.3928	0.9824	0.2181	0.6105	0.4393	0.0253
C	0.367766667	0.7624	0.20833333	0.6779	0.663366667	0.021433333
D	0.4251	0.7743	0.2166	0.6426	0.5643	0.0245
D	0.6891	0.8247	0.2125	0.6431	0.6242	0.0252
D	0.5811	0.8035	0.2214	0.7259	0.3443	0.0441
D	0.6958	0.8309	0.2419	0.7636	0.4688	0.0452
D	0.4975	0.7748	0.2227	0.6322	0.4627	0.0298
D	0.5606	0.8541	0.2559	0.6324	0.5289	0.0295
E	0.6492	1.3012	0.3669	0.7657	0.4997	0.0091
E	0.7902	1.9392	0.3395	0.7762	0.4866	0.0064
E	0.8181	2.0854	0.2358	0.6992	0.5395	0.0063
E	0.9068	1.2931	0.2242	0.8005	0.7095	0.0102
E	0.3894	0.9538	0.2391	0.7662	0.6633	0.0089
E	0.7912	1.1388	0.2715	0.7838	0.5696	0.0094
F	0.6101	1.0927	0.1207	1.0184	0.4595	0.0054
F	0.7041	1.0515	0.1282	1.1021	0.4741	0.0113
F	0.7829	1.1755	0.1466	1.1555	0.5577	0.0114
F	0.7182	0.8255	0.1038	1.1387	0.6083	0.0119
F	0.6832	1.1844	0.1732	1.1296	0.4937	0.0123
F	0.71043	1.156782	0.136323	1.108689	0.518772	0.008568

Cultivar	Fructosa	GABA	Galactosa	Glucosa	Guanosina	Inosina
A	8.8275	0.4199	0.3189	2.7354	0.041	0.0215
A	10.5146	0.4921	0.5173	3.2973	0.0425	0.0241
A	8.3226	0.4509	0.4788	2.6634	0.0409	0.0213
A	8.5819	0.4882	0.5318	2.0701	0.0382	0.0209
A	9.8322	0.5404	0.5315	2.9392	0.0417	0.0288
A	15.3726	0.4934	0.8006	6.1407	0.0402	0.0248
B	14.4518	0.2624	0.7282	7.0903	0.0315	0.0142
B	14.2117	0.2702	0.6159	5.2478	0.0307	0.0139
B	13.1601	0.2573	0.6104	5.4351	0.0281	0.0131
B	19.4937	0.3449	1.0149	6.5526	0.0318	0.0162

B	14.1456	0.3011	0.5703	3.9973	0.0206	0.0099
B	14.0657	0.5269	0.4312	3.9712	0.0229	0.0099
C	16.1024	0.3482	0.9732	4.9153	0.0263	0.0318
C	17.4152	0.3761	0.8515	4.5228	0.0248	0.0268
C	17.4707	0.2454	0.8442	5.2633	0.0286	0.0208
C	16.6916	0.3106	1.1423	4.4291	0.0274	0.0262
C	20.2608	0.3872	0.9163	6.1104	0.0245	0.0252
C	18.1225333	0.3579667	0.97003333	5.02076667	0.02556667	0.02606667
D	19.5445	0.3321	1.1146	4.1942	0.0281	0.0293
D	19.2409	0.3792	1.1446	5.1929	0.0292	0.0315
D	20.0945	0.4772	0.9939	7.5149	0.0357	0.0228
D	18.4801	0.5559	0.4111	7.6024	0.0364	0.0267
D	16.9896	0.4389	1.1278	4.0344	0.0243	0.0328
D	21.7735	0.5142	2.0053	4.5902	0.0273	0.0332
E	15.9727	0.3586	1.0975	4.8774	0.0405	0.0313
E	14.6843	0.4952	0.9248	5.3432	0.0425	0.0297
E	17.6183	0.5108	1.3668	5.4195	0.0357	0.0385
E	19.4736	0.5586	1.7217	5.8775	0.0416	0.0474
E	20.9931	0.3749	2.6861	3.1187	0.0387	0.0335
E	19.2332	0.5206	1.9542	4.2579	0.0344	0.0332
F	19.4406	0.3893	0.5195	4.0675	0.0245	0
F	18.9124	0.3857	0.5233	4.5898	0.02	0
F	19.3278	0.4772	0	4.7742	0.0176	0
F	19.5456	0.3496	0	3.8353	0.0197	0
F	22.1075	0.4851	0	5.4945	0.0267	0
F	19.771884	0.441915	0.264945	4.509267	0.021471	0

Cultivar	Isoleucina	Ác. Láctico	Leucina	Maltosa	Metionina	Ác. Málico
A	0.1602	0.4813	0.1774	0.4946	0.4171	3.7061
A	0.1962	0.5652	0.2285	0.5217	0.5674	3.6022
A	0.1254	0.4912	0.1484	0.4267	0.4378	3.4038
A	0.1763	0.4901	0.1478	0.3661	0.4247	3.7359
A	0.1562	0.6968	0.1852	0.4326	0.6366	3.7362
A	0.1722	0.6042	0.1954	0.4223	0.5685	3.5032
B	0.0949	0.5694	0.1069	0.8976	0.3779	2.3908
B	0.0859	0.5761	0.1121	0.6719	0.3672	2.6768
B	0.0751	1.0517	0.0915	0.7612	0.4109	1.8212
B	0.1192	1.5415	0.1368	0.7491	0.5463	2.7875

B	0.1282	1.5885	0.1502	0.3953	0.3118	1.2132
B	0.0941	1.7302	0.1207	0.5075	0.2902	1.5847
C	0.2338	0.3109	0.2059	1.1272	0.776	3.8812
C	0.2539	0.3086	0.2394	1.3645	0.8546	4.0302
C	0.2176	0.3272	0.1931	1.1467	0.7337	4.2512
C	0.2698	0.3522	0.2367	1.4019	0.9284	4.0099
C	0.2437	0.3494	0.2477	1.5318	0.6388	4.2227
C	0.2558	0.33673333	0.24126667	1.43273333	0.80726667	4.0876
D	0.2577	0.4514	0.1747	0.7594	0.5962	4.4244
D	0.2424	0.4365	0.2305	1.1141	0.6506	4.6993
D	0.2987	0.3851	0.2398	1.4438	0.6377	5.1274
D	0.3668	0.4092	0.341	1.2175	0.6985	5.9083
D	0.3025	0.3922	0.2358	0.8372	0.6912	4.6345
D	0.3342	0.4397	0.2109	1.0345	0.7519	4.4085
E	0.4102	0.5955	0.3165	0	0.6593	2.9996
E	0.4446	0.6798	0.3432	0	0.6306	3.5334
E	0.5049	0.6138	0.3918	0	0.6098	3.6111
E	0.5255	0.5762	0.4439	0	0.6947	3.5169
E	0.4129	0.9013	0.3122	0	0.8915	3.5893
E	0.4856	0.7531	0.3634	0	0.8138	3.3764
F	0.4038	0.3025	0.2184	0	0.8306	8.365
F	0.4141	0.2984	0.2767	0	0.8992	9.385
F	0.4006	0.3422	0.5871	0	1.0579	8.7949
F	0.4105	0.2756	0.2609	0	1.0514	8.1903
F	0.4159	0.3417	0.2484	0	1.2726	9.3794
F	0.410244	0.328797	0.410805	0	0.963135	8.751549

Cultivar	Fosfocolina	Prolina	Ác. Succínico	Sacarosa	Trigonelina	Treonina
A	0.2742	1.4466	0.7333	53.0787	0.3842	0.2202
A	0.3017	0.8205	0.8084	59.2443	0.4044	0.2852
A	0.2663	0.6729	0.7346	52.4882	0.3847	0.2292
A	0.2508	0.6462	0.6677	53.3132	0.3787	0.2399
A	0.3228	0.8222	0.9772	62.9083	0.4339	0.2852
A	0.2396	0.6579	0.8653	50.4246	0.4244	0.2492
B	0.2545	0.8019	0.4898	50.3129	0.2672	0.2003
B	0.2248	0.5422	0.5355	52.9297	0.2582	0.1633
B	0.2114	0.5673	0.6049	45.0269	0.2717	0.1593
B	0.3352	0.7874	0.8162	55.4882	0.3368	0.2042

B	0.1757	0.6132	0.9582	33.4007	0.2644	0.2871
B	0.1784	0.6421	0.9029	37.4055	0.2871	0.2495
C	0.4802	0.6092	0.3522	62.8205	0.3633	0.2372
C	0.3532	0.7974	0.3597	46.1875	0.3575	0.2387
C	0.6014	0.7561	0.3652	54.4749	0.3606	0.2381
C	0.3879	0.7064	0.3932	48.1182	0.4021	0.2638
C	0.4289	0.8298	0.3528	48.4142	0.3823	0.3167
C	0.39	0.77786667	0.368566667	47.5733	0.38063333	0.27306667
D	0.4158	0.7956	0.4759	71.2478	0.5244	0.2256
D	0.4853	0.8313	0.4965	74.3575	0.5297	0.2189
D	0.4073	1.2309	0.5178	67.3979	0.5035	0.2649
D	0.4677	1.2726	0.5611	67.8903	0.5472	0.3085
D	0.4352	0.8112	0.4603	67.0382	0.5594	0.2925
D	0.4659	0.9794	0.4597	73.1824	0.5701	0.3308
E	0.7135	0.6826	0.4122	54.5866	0.5313	0
E	0.7643	0.9482	0.4318	57.3525	0.5792	0
E	1.0225	1.7917	0.4168	68.2939	0.6601	0.5313
E	1.0784	1.9766	0.4784	77.0834	0.7634	0.5207
E	0.7238	0.9311	0.5014	62.7861	0.5472	2.4171
E	0.7698	1.4649	0.5085	62.3031	0.5677	0
F	0.3202	0	0.4243	26.4511	0.3055	0.3304
F	0.3493	0	0.4889	28.4701	0.3298	0.3172
F	0.3649	0	0.4876	27.3502	0.3277	0.3309
F	0.3587	0	0.4556	29.2724	0.3504	0.3135
F	0.4112	0	0.4726	31.2051	0.3732	0.3215
F	0.349401	0	0.465069	27.438663	0.322932	0.337263

Cultivar	Triptófano	Tirosina	Uridina	Valina
A	0.0359	0.5783	0.0485	0.4155
A	0.0379	0.8361	0.0312	0.4966
A	0.0316	0.5809	0.0426	0.4144
A	0.0331	0.6653	0.0348	0.4518
A	0.0411	0.9706	0.0381	0.4232
A	0.0388	0.7926	0.0337	0.4709
B	0.0302	0.8723	0.0311	0.2197
B	0.0313	0.9989	0.0276	0.2139
B	0.0325	0.8502	0.0299	0.1931
B	0.0352	1.0109	0.0507	0.2672

B	0.0251	0.4446	0.0253	0.3217
B	0.0312	0.5859	0.0271	0.2875
C	0.0558	1.5751	0.0402	0.5188
C	0.0482	1.2761	0.0347	0.5086
C	0.0539	1.1984	0.0422	0.4912
C	0.0573	1.4428	0.0434	0.5231
C	0.0672	0.9451	0.0402	0.5063
C	0.05756667	1.22133333	0.03943333	0.5126667
D	0.0612	1.4264	0.0263	0.4403
D	0.0582	1.4947	0.0283	0.4547
D	0.1056	1.3774	0.0291	0.4881
D	0.1122	1.4044	0.0307	0.5455
D	0.0946	1.5309	0.0251	0.5287
D	0.0966	1.7105	0.0232	0.5724
E	0.0626	1.9042	0.0503	0.8388
E	0	2.0437	0.0492	0.9023
E	0.6015	2.7642	0.0428	1.0251
E	0.0896	3.2544	0.0536	1.1516
E	0	2.4171	0.0421	0.8375
E	0.0723	2.3015	0.0452	0.9656
F	0.09	0.1381	0.3211	0.7287
F	0.0493	0.1609	0.3511	0.7766
F	0.0391	0.1321	0.3377	0.7231
F	0.0383	0.1556	0.3702	0.7517
F	0.0731	0.1505	0.3336	0.6872
F	0.065841	0.137802	0.335988	0.740418

Tabla 5.

Metabolitos Promedio

Metabolitos	Cultivar					
	A	B	C	D	E	F
Ác. 2-Hidroxiisovalerato	0.0339	0.0185	0.0165	0.0291	0.0257	0.0449
Adenosina	0.0156	0.0081	0.0147	0.0169	0.0205	0.1828
Ác. Ascórbico	0.2535	0.3775	0.4233	0.4569	0.3805	0.4262
Ác. Acético	1.5048	0.9143	0.6963	0.6965	0.5107	0.3831
Alanina	0.8444	0.4557	0.6245	0.5297	0.5452	0.4244
Asparagina	0.4745	1.1615	1.6414	2.4304	1.8293	2.7755
Ác. Aspártico	0.4745	0.3116	0.3909	0.4251	0.6492	0.6101
Ác. Cítrico	1.0007	0.5834	0.7023	0.7743	1.3012	1.0927

Betaína	0.1701	0.2905	0.2003	0.2166	0.3669	0.1207
Colina	0.4401	0.3309	0.5749	0.6426	0.7657	1.0184
Formiato	0.6462	0.4079	0.5674	0.5643	0.4997	0.4595
Fumarato	0.0288	0.0332	0.0174	0.0245	0.0091	0.0054
Fructosa	8.8275	14.4518	16.1024	19.5445	15.9727	19.4406
GABA	0.4199	0.2624	0.3482	0.3321	0.3586	0.3893
Galactosa	0.3189	0.7282	0.9732	1.1146	1.0975	0.5195
Glucosa	2.7354	7.0903	4.9153	4.1942	4.8774	4.0675
Guanosina	0.041	0.0315	0.0263	0.0281	0.0405	0.0245
Inosina	0.0215	0.0142	0.0318	0.0293	0.0313	0
Isoleucina	0.1602	0.0949	0.2338	0.2577	0.4102	0.4038
Lactato	0.4813	0.5694	0.3109	0.4514	0.5955	0.3025
Leucina	0.1774	0.1069	0.2059	0.1747	0.3165	0.2184
Maltosa	0.4946	0.8976	1.1272	0.7594	0	0
Metionina	0.4171	0.3779	0.776	0.5962	0.6593	0.8306
Malato	3.7061	2.3908	3.8812	4.4244	2.9996	8.365
Fosfocolina	0.2742	0.2545	0.4802	0.4158	0.7135	0.3202
Prolina	1.4466	0.8019	0.6092	0.7956	0.6826	0
Succinato	0.7333	0.4898	0.3522	0.4759	0.4122	0.4243
Sucrosa	53.0787	50.3129	62.8205	71.2478	54.5866	26.4511
Trigonelina	0.3842	0.2672	0.3633	0.5244	0.5313	0.3055
Treonina	0.2202	0.2003	0.2372	0.2256	0	0.3304
Triptófano	0.0359	0.0302	0.0558	0.0612	0.0626	0.09
Tirosina	0.5783	0.8723	1.5751	1.4264	1.9042	0.1381
Uridina	0.0485	0.0311	0.0402	0.0263	0.0503	0.3211
Valina	0.4155	0.2197	0.5188	0.4403	0.8388	0.7287

ANEXO 3: BINNING

Tabla 6.

Binning

Variedad	0.56	0.6	0.64	0.68	0.72	0.76	0.8
A	-0.0004650	8.6527416	4.84219995	-0.3324175	0.40658117	-0.8487493	0.38030587
A	-0.101654	8.06412	5.00621	-0.618139	0.181003	-0.87877	0.189217
A	0.00536984	8.42622	4.7344	-0.147075	1.00844	-0.262146	1.0905
A	-0.0087492	8.42908	4.82966	-0.169288	0.919336	-0.201427	0.908929
A	0.00784619	8.37236	4.57267	-0.476183	-0.129858	-1.44663	-0.170471
A	0.00444196	8.69615	5.08876	-0.183537	0.546638	-0.360998	0.684433
B	-0.0162875	9.09053	5.06899	-0.0872014	0.589494	-0.637788	-0.0712314
B	0.0896068	9.82343	4.90562	-0.0438916	0.683882	-0.296597	0.693579
B	0.0915655	9.4536	4.63728	0.0687761	0.657776	-0.164181	1.12459

B	0.0591908	8.25769	2.92126	-0.103408	0.614492	-0.241089	2.38157
B	-0.116324	8.78643	3.60862	-0.589845	-0.508154	-1.06188	0.71635
B	-0.0310359	9.66818	5.16228	0.847947	0.380463	-0.498862	0.558708
C	0.0455125	9.34559	5.15412	-0.332345	0.601366	-0.454979	0.495245
C	0.0880301	9.77834	4.94608	-0.259147	0.906162	-0.028631	1.51355
C	0.0646838	9.04378	4.89903	-0.623261	0.0881571	-1.10162	0.22637
C	-0.133906	8.78628	4.7761	-1.32561	-1.26811	-3.00888	-2.194
C	-0.0973933	7.26915	4.19846	-0.648152	0.39065	-1.34069	0.0660071
C	-0.0631675	8.6363468	4.8037512	-0.7840763	-0.0938719	-1.6335466	-0.5551342
D	-0.0601644	8.91787	4.68872	-0.258352	0.493732	-0.841151	-0.730349
D	0.0862951	8.52533	4.42038	-0.34875	0.362177	-1.22103	-1.04585
D	0.251172	8.5956	3.51542	0.431947	2.00375	2.19838	4.31854
D	0.0185251	7.97652	3.95901	-0.181155	0.849094	-0.519777	0.164694
D	0.0904047	8.93058	5.02479	-0.225138	0.528357	-1.07901	-1.16037
D	0.065364	8.29262	3.89615	-0.325897	0.205791	-0.810919	0.346684
E	0.0175806	8.64426	3.51511	-0.164204	1.43229	0.260417	2.95628
E	-0.082254	7.9199	4.24992	-0.426808	0.963608	-0.253164	2.45343
E	1.2403	9.30935	4.64052	2.45724	4.94342	5.60454	10.5027
E	-0.0710863	7.70746	3.1607	-0.946942	-0.792826	-1.69079	0.113813
E	0.00354866	6.76264	3.28151	-0.22848	0.98755	0.57369	3.01213
E	0.27262709	7.9248375	3.8331625	0.2137525	1.525438	1.058569	4.02051825
F	0.12273	8.67158	4.75647	-0.190126	1.7741	2.3139	5.48054
F	-0.054879	8.41583	4.76062	-0.717499	0.956927	0.857123	3.41042
F	-0.109371	8.31082	3.72074	-0.380708	1.631	2.33811	5.09447
F	0.0451599	8.83988	4.81034	-0.259153	1.88921	2.18391	4.88926
F	2.32107	11.7933	6.98876	4.69626	8.12251	10.3599	14.9708
F	1.16883033	9.83949333	5.4633	2.14533367	4.67428567	5.60718767	9.62797333

Variedad	0.84	0.88	0.92	0.96	1	1.04	1.08
A	2.6153348	20.6539205	29.453983	21.700864	24.403996	43.3815915	38.154702
A	1.65491	21.0858	32.2534	21.804	24.9922	42.579	38.169
A	3.72333	22.1699	30.2651	20.8381	23.0752	40.065	35.5746
A	3.0472	19.9049	27.7685	19.4257	22.202	39.8047	35.0581
A	2.03112	20.1998	29.4237	22.7119	25.1844	44.4314	39.0287
A	2.54074	23.2723	32.3745	22.7389	25.0879	43.0042	37.8671
B	2.47534	18.6043	24.2013	14.2145	20.5349	25.4801	24.7324
B	3.7067	23.209	26.5335	15.9679	21.5416	26.6607	25.5215
B	5.34832	23.4231	28.885	18.3834	22.0708	26.001	29.4407
B	8.99037	36.6069	38.3707	25.1107	27.7092	33.2518	39.5355
B	6.91392	25.3987	31.7216	24.2194	29.3855	37.2088	45.2438

B	6.74895	34.5411	41.3941	25.2088	27.9886	32.5283	40.276
C	2.01078	20.281	29.8749	25.3346	40.2947	57.8151	51.3362
C	4.46492	25.4364	33.6169	29.7423	46.2436	61.2476	52.7012
C	2.14061	21.3519	30.8523	25.1094	40.6707	55.5542	49.9958
C	-0.162339	20.2835	30.7254	25.4505	43.3323	59.1068	51.1023
C	3.4278	22.729	33.6056	25.4564	42.6875	54.7599	50.5079
C	1.79392194	21.51979	32.030006	25.92211	42.94693	58.371812	52.001776
D	1.58234	21.879	29.2947	22.9488	35.422	48.7134	38.5005
D	1.55195	20.8075	28.0349	22.2839	34.1508	47.4888	38.2912
D	8.54907	26.594	30.8712	32.5704	49.4901	57.7267	47.7073
D	3.57882	21.5767	29.079	27.3949	47.0698	57.888	46.6386
D	0.956035	19.491	29.0503	24.257	38.6627	56.3535	44.2312
D	3.65278	23.6616	30.2635	29.1446	42.6054	58.499	46.9858
E	6.68158	36.5685	42.4996	40.6627	60.6402	89.1633	78.8634
E	6.59951	57.2945	83.2375	42.8158	60.1211	91.8493	81.7979
E	19.7944	82.2555	88.7895	54.9033	67.4831	99.3343	85.1414
E	3.64869	59.8709	74.2757	43.416	57.86	98.4266	85.0613
E	7.03288	57.8137	85.38	37.8787	45.775	69.3592	60.9191
E	9.26887	64.30865	82.920675	44.75345	57.8098	89.74235	78.229925
F	12.1413	55.6323	87.036	55.2031	76.0962	88.9798	74.9731
F	9.04807	50.895	84.4705	55.1065	78.0348	91.5638	78.0314
F	11.6654	55.0258	84.4493	54.7449	70.4905	83.5943	70.5231
F	10.8692	53.3057	86.3024	55.5858	74.8554	88.8982	75.0115
F	24.6736	71.6856	98.8654	70.0625	87.264	93.096	78.6506
F	17.83869	68.2787	90.7084667	60.0241	77.5939667	94.6647	80.6078

Variedad	1.12	1.16	1.2	1.24	1.28	1.32	1.36
A	30.2968835	95.7773825	20.2643745	16.729363	117.84642	121.93964	76.0509255
A	25.6602	90.9403	19.859	15.1608	125.751	135.515	83.1125
A	30.2646	90.2316	17.915	15.6348	122.451	126.936	71.606
A	28.4095	88.6558	17.058	13.5956	112.888	115.639	66.7807
A	30.4194	97.3197	22.2903	18.8886	115.94	121.137	80.891
A	27.7038	94.4189	20.3113	17.2471	129.122	132.834	87.3782
B	42.3631	156.431	20.0774	13.458	99.8882	105.789	70.5228
B	45.4292	155.546	17.6484	15.5501	116.181	119.676	72.8393
B	91.9697	324.331	27.8738	20.9598	108.24	109.028	100.152
B	128.646	317.944	42.898	40.0542	168.79	163.377	125.724
B	183.055	615.819	57.8991	35.3247	113.286	132.623	103.76
B	157.614	724.862	74.6621	42.8058	172.073	171.091	161.817

C	21.0795	11.3705	9.17965	8.23894	118.232	116.919	70.813
C	27.5547	27.4318	12.426	13.9981	130.966	129.985	74.6089
C	21.6711	11.2261	9.75061	10.0951	124.696	120.886	71.3969
C	24.6273	24.4023	7.67284	7.44799	127.038	132.183	78.0787
C	25.5923	13.5696	10.8586	10.9766	131.323	135.998	81.7498
C	24.241694	16.776416	9.4217706	9.0656002	128.04162	130.934	78.41811
D	18.1472	30.996	9.31937	8.77825	118.436	127.755	77.7624
D	19.1382	31.2369	10.0534	9.80586	112.54	122.56	75.5326
D	28.5325	28.1382	19.4836	24.7879	105.764	110.379	69.6573
D	23.2538	20.9948	10.4494	13.0646	107.756	118.551	73.5854
D	17.9179	33.003	9.73687	7.47151	111.318	120.089	76.5629
D	24.7886	38.3553	17.2715	19.766	116.517	122.146	79.2159
E	51.3492	74.1057	22.2733	23.0096	171.67	161.899	93.9791
E	47.4172	75.73	24.6064	25.5524	173.51	186.976	139.81
E	54.6601	67.2003	35.9832	59.0343	243.798	227.993	145.005
E	44.5597	62.5444	21.0229	29.3737	206.762	203.204	136.397
E	33.4168	39.3994	21.0544	24.8209	133.664	151.882	132.333
E	45.01345	61.218525	25.666725	34.695325	189.4335	192.51375	138.38625
F	36.1626	18.6297	17.5548	22.7089	91.8286	107.773	106.284
F	37.3964	17.4145	15.577	20.3129	96.5372	113.567	106.075
F	35.685	19.7912	18.5166	23.078	88.1962	102.489	103.589
F	35.4339	16.9245	16.0981	21.184	107.573	123.791	103.402
F	45.4361	25.9005	28.2075	36.934	108.065	118.22	112.07
F	45.8308667	36.8384333	26.5892333	38.7604	149.466733	153.26	121.05

Variedad	1.4	1.44	1.48	1.52	1.56	1.6	1.64
A	17.956505	6.4436285	31.0010945	47.844324	30.0141485	24.1356295	10.1893008
A	20.3378	6.80812	26.6	46.5415	32.8308	27.1682	11.0736
A	15.5302	5.28523	28.407	43.8508	26.7228	24.9756	10.2313
A	14.422	4.35121	27.5406	42.233	25.1712	22.0291	8.85645
A	20.445	8.16069	32.6557	50.6686	33.1087	24.8362	10.9286
A	18.4678	5.55183	29.7894	47.7929	30.7808	26.2544	9.73175
B	11.1378	0.782783	12.1441	26.6006	20.2949	18.828	5.50279
B	9.84521	0.896901	13.412	26.216	19.4372	22.2282	6.37019
B	11.7033	3.37574	14.0177	27.747	21.2647	21.4086	7.83207
B	22.1281	10.7287	23.1112	35.3553	26.9527	34.7439	13.7579
B	15.1991	5.87686	21.162	31.2412	21.5424	22.3701	8.63394
B	20.998	6.18707	21.3308	34.2152	23.5539	33.5888	10.359
C	20.1384	4.89309	22.0271	42.488	37.4078	25.3931	9.85652
C	22.4327	7.96399	22.5803	40.9019	35.3396	30.6568	12.6267

C	20.1322	5.25871	21.8497	42.1563	37.6263	27.3865	11.1173
C	22.206	5.01698	18.6265	38.0977	34.1698	28.7652	9.72504
C	27.1612	8.536	20.9568	38.6418	34.3929	30.6819	13.8342
C	23.631904	6.2716638	20.947536	40.53735	36.02997	28.845668	11.3613584
D	18.1849	5.059	18.592	32.8689	27.6421	26.1959	8.37157
D	19.1992	6.55549	19.1135	32.7043	27.3336	25.9821	9.11051
D	26.4382	17.2677	32.1826	43.3039	37.448	33.987	20.3168
D	22.1409	9.15335	23.207	36.0316	29.9474	27.8892	12.1701
D	18.4397	4.3424	19.2834	33.4364	27.2125	23.9334	7.77985
D	25.5934	14.1335	29.3628	39.9217	34.033	32.1579	16.3153
E	25.6782	10.3089	25.12	37.318	33.2013	42.3905	20.0684
E	41.275	12.2984	23.803	37.246	35.8528	39.1251	22.4417
E	44.0664	23.5499	41.6984	51.0524	47.869	57.9663	33.1736
E	39.4589	14.7288	31.795	44.5345	42.5885	47.4573	23.3623
E	44.2254	17.0411	25.4773	33.1912	29.8627	31.8248	21.926
E	42.256425	16.90455	30.693425	41.506025	39.04325	44.093375	25.2259
F	48.5697	18.4592	26.5217	40.9782	44.3885	25.9642	24.5473
F	49.0738	17.6292	25.804	40.6941	45.4327	26.6545	24.2298
F	48.6427	20.9271	27.6255	41.7831	41.1315	25.8758	25.0019
F	45.8815	16.3501	24.867	38.8815	44.3862	28.6917	24.2313
F	55.1454	28.8937	36.7308	50.5009	50.2783	35.4383	34.8595
F	49.4285333	23.3576	34.7444	47.4158	47.86	40.0197	30.7543

Variedad	1.68	1.72	1.76	1.8	1.84	1.88	1.92
A	1.69122395	1.37908245	4.22682645	18.683376	5.1181833	9.94226555	28.6286955
A	1.18915	0.696255	3.04413	17.6628	4.26459	8.3389	26.2885
A	1.85569	1.64827	4.48097	18.8466	5.5868	10.366	28.8353
A	1.00162	1.03299	3.7548	17.6693	4.32365	8.57847	27.2586
A	2.28231	1.64484	4.45263	18.6091	5.61457	10.7269	28.3311
A	0.711815	0.321351	3.43226	17.7412	4.23538	8.90758	27.621
B	-1.71576	-3.44015	-1.19885	14.6843	2.20076	6.11334	17.3805
B	-0.717938	-2.15435	0.757517	16.4477	3.37453	7.63155	19.7985
B	1.39634	-0.871702	1.25529	16.3754	4.48824	9.13293	17.7078
B	4.80366	2.28555	4.60187	17.6205	7.9238	12.9143	23.5564
B	2.61544	0.18216	2.59722	16.4974	5.21933	9.69568	21.8888
B	1.39987	-1.46909	0.395273	15.3957	2.44535	6.84518	19.365
C	2.38145	0.75871	3.2289	22.356	6.19118	13.7526	20.7279
C	5.50186	4.11823	7.50177	26.8599	10.4734	18.7838	25.6596
C	3.68518	2.32767	4.77913	24.0049	7.75356	15.5177	22.3575
C	1.84507	-0.0890758	2.7172	22.2524	5.91329	13.9608	20.8511
C	4.97806	3.00137	4.25113	21.5159	8.31507	14.8503	23.8529
C	3.1295572	1.24814143	3.4670582	22.482262	6.9426436	14.471658	22.246846

D	0.506537	0.820678	4.18771	22.5086	4.77674	11.8766	23.7642
D	1.55514	1.52634	4.60044	22.549	5.72193	12.6709	23.758
D	15.512	17.082	21.315	36.2198	20.2034	25.9612	43.2358
D	5.17885	5.50963	8.88171	25.1963	8.41264	13.7587	30.9768
D	0.45955	1.68047	5.40626	23.0368	4.07816	10.5329	27.3296
D	10.3038	11.7244	15.8484	30.7331	14.2177	20.9796	37.1508
E	12.0914	9.56105	11.5989	28.5761	13.7744	20.3478	23.1812
E	12.3359	8.26393	14.8292	27.4432	12.1294	18.2937	21.5914
E	23.0015	20.2479	27.921	35.9445	23.9179	30.5186	34.8963
E	13.9552	9.82477	16.4055	26.7257	12.5327	19.5952	22.911
E	14.1124	10.1595	18.6622	25.699	14.4239	19.8453	21.6992
E	15.85125	12.124025	19.454475	28.9531	15.750975	22.0632	25.274475
F	20.6882	19.8671	28.9986	43.0747	24.8687	31.8859	32.0345
F	19.4446	18.5126	26.7917	42.2438	23.9679	31.9642	31.2555
F	21.2766	20.2761	29.4898	41.5046	25.6381	33.3467	33.3222
F	18.8666	17.1323	24.6287	39.482	21.7613	29.3663	28.2812
F	30.826	30.4699	40.1777	52.4973	37.2062	47.0794	45.1725
F	24.4240333	23.0768	31.6301333	43.5618667	28.364	36.5207333	37.1081

Variedad	1.96	2	2.04	2.08	2.12	2.16	2.2
A	88.4327615	35.72143	41.2210635	59.1762295	28.302958	19.376772	18.5287215
A	86.129	34.4487	42.7213	62.8998	27.6805	19.4989	18.053
A	84.0211	32.9566	39.921	55.1673	26.2263	17.4801	16.7818
A	78.9191	31.2051	36.4255	50.8005	24.2253	15.8106	14.7124
A	92.795	38.1569	43.6154	64.1048	30.7319	21.8142	21.2657
A	90.3429	40.2136	45.1236	64.7091	29.0669	19.6122	18.7892
B	57.4293	27.0706	30.9781	47.5201	16.6182	14.3978	13.7751
B	63.5316	27.1573	35.1959	50.5455	17.3512	15.2912	14.999
B	31.5361	74.4499	33.3762	51.7864	19.0596	16.4849	16.6784
B	37.9081	91.4233	50.0002	64.66	26.5571	22.4587	22.1597
B	97.4453	34.1292	36.073	44.8517	22.0655	16.3219	16.8219
B	44.0392	105.349	45.2477	55.104	21.4028	15.0593	14.749
C	36.1573	58.9154	41.3263	80.3402	27.3292	26.9887	26.2142
C	43.2472	66.0607	48.5681	88.5811	32.0699	30.6343	31.234
C	38.2638	60.1784	42.7312	79.7078	27.1595	27.4944	26.5418
C	39.3401	64.7311	45.8095	89.1743	30.3961	27.9565	27.647
C	41.9299	48.3103	42.3189	71.0168	27.6159	26.6056	24.7444
C	39.925282	58.465312	44.014598	81.780642	29.016008	27.727272	26.725904
D	40.0396	57.2589	44.6776	69.3706	27.252	23.6883	23.651
D	40.4871	56.2808	44.1707	69.9615	28.2239	24.6809	24.5192
D	56.6014	67.7833	51.2682	70.8994	36.51	36.034	35.266
D	44.7972	59.4089	42.2968	65.9445	26.7575	25.5706	24.2073
D	40.9911	62.6291	41.7404	72.4487	26.8002	25.0932	24.3333
D	50.0098	70.3853	52.2897	78.587	36.8076	35.3899	34.327

E	40.5526	64.6367	61.9002	81.2057	37.111	34.9144	29.5551
E	38.393	62.5156	57.8324	78.8985	36.681	33.9439	27.6184
E	49.1386	77.3459	79.1639	88.0519	49.1148	44.584	39.2239
E	37.6096	69.0022	67.4414	80.1327	41.7041	36.5511	30.2603
E	31.7797	54.3283	47.3453	72.4191	35.7371	33.6778	29.5806
E	39.230225	65.798	62.94575	79.87555	40.80925	37.1892	31.6708
F	48.8412	52.847	63.3166	86.2189	43.8456	46.0421	41.6967
F	49.0329	54.535	67.357	91.9664	45.2627	48.2625	43.6598
F	48.2211	53.8012	68.1429	92.4437	48.7387	50.0843	45.5778
F	44.8955	52.3137	70.3083	97.1576	43.2234	45.5933	40.9105
F	62.1707	68.9744	85.8775	117.017	61.087	64.7834	60.6692
F	53.4474	66.9517667	77.4661333	99.0117667	51.8215	52.5433	47.8509667

Variedad	2.24	2.28	2.32	2.36	2.4	2.44	2.48
A	24.444784	27.83987	28.844738	41.5040045	40.8349165	18.1866585	23.92566
A	28.6159	26.4943	28.4403	39.3625	43.0379	17.5167	24.8373
A	25.1903	24.4125	27.2677	40.0929	40.0254	17.5784	24.5836
A	21.3056	22.117	25.0312	37.8642	36.6276	15.5006	21.5249
A	26.16	31.941	30.978	42.7261	42.6635	19.8133	24.9327
A	25.8359	31.4653	29.3688	41.9132	42.9602	17.0317	21.349
B	17.426	20.8533	16.319	26.0054	39.4074	8.46265	10.8619
B	21.6975	22.9778	18.5715	28.5281	41.1733	9.37276	13.8133
B	18.0457	30.8948	18.7039	27.4677	34.481	10.3483	12.0372
B	25.1644	41.1086	26.7066	37.0757	40.716	16.5473	18.0614
B	23.3279	26.0076	21.3696	28.812	29.8292	11.1977	12.1348
B	20.8905	35.8604	19.23	31.9998	33.1813	9.55842	10.7492
C	23.2779	42.757	30.3176	37.8732	50.8194	16.0157	18.8218
C	28.3449	50.1558	35.22	43.2844	59.2564	20.3476	24.1182
C	23.6972	44.3675	31.2367	38.7438	53.2394	17.4552	20.5125
C	24.3347	48.2085	32.7719	39.941	57.1915	18.0651	20.8573
C	25.2444	38.8961	30.7169	39.5591	48.87	18.0626	17.689
C	24.77138	44.152944	31.894176	39.906922	53.339506	17.728756	19.50515
D	16.9672	41.184	27.9295	38.4362	54.3316	16.0981	20.6208
D	17.8238	40.9711	28.2078	37.9236	54.5931	17.0615	20.7315
D	33.3873	49.4475	40.4113	49.7328	60.4516	29.4274	33.183
D	21.9545	39.2197	29.7628	40.2569	48.5867	17.0924	19.9695
D	20.2569	40.0391	29.1965	41.5922	51.7466	15.4982	19.6212
D	29.8613	51.4363	40.2604	51.2904	59.4424	27.4895	32.4572
E	22.4783	52.9759	44.9863	44.6011	57.0266	27.0706	29.9821
E	21.3296	47.0544	43.519	45.2392	61.1004	25.6335	29.5364
E	36.1607	68.6471	57.9277	63.2696	73.6223	39.0162	46.8836
E	23.8327	57.2717	49.0262	48.8208	68.5917	29.3695	36.6623
E	25.4937	45.0865	40.2551	46.2749	50.6362	28.6758	28.8173
E	26.704175	54.514925	47.682	50.901125	63.48765	30.67375	35.4749

F	32.8617	44.7484	49.5895	52.1237	52.7647	46.5119	33.0182
F	33.7786	46.8466	52.5846	54.9888	55.5127	48.7095	34.8498
F	36.6812	48.5749	51.4107	56.9604	56.1191	49.0114	38.1376
F	31.3131	43.4558	51.3674	53.4749	53.593	46.5484	32.4505
F	51.0701	64.3256	65.5481	70.088	65.8942	59.206	47.4332
F	40.3364667	59.9397667	58.6868	62.7821333	65.0097333	48.9772333	43.05553

Variedad	2.52	2.56	2.6	2.64	2.68	2.72	2.76
A	96.92341	31.21492	24.43155	18.51363	9.217676	9.510526	89.4966
A	94.1273	33.2827	24.9423	16.372	9.4617	13.6316	90.292
A	91.3461	27.8084	22.9855	19.6624	10.2766	11.1807	91.5969
A	82.3168	26.1579	20.5613	17.0556	7.8412	9.63423	82.7772
A	105.884	34.4536	26.8786	18.8932	10.0572	8.83281	91.0026
A	101.479	33.6507	24.7161	16.9854	8.12594	8.1983	85.065
B	59.4457	30.1842	13.9268	9.95558	3.82079	8.47194	50.8923
B	73.9266	24.9382	16.7935	12.4898	5.60057	9.14729	64.3416
B	37.9664	61.2892	11.4892	8.46366	4.99038	11.1208	43.7153
B	31.7228	76.396	18.6776	14.0628	9.55286	9.32838	51.6965
B	86.1634	26.6002	11.8076	9.25533	4.34418	10.5966	34.0302
B	76.7816	36.9428	10.9759	7.86208	3.32146	5.85014	38.7874
C	58.7381	52.3995	25.4186	22.6346	13.3345	7.8544	87.2311
C	56.9444	63.6334	25.7477	32.2265	18.502	12.5887	93.924
C	49.1914	65.8691	27.2104	26.9609	17.2063	10.3215	92.8252
C	46.117	68.4826	22.9417	27.4633	15.7027	8.75439	85.484
C	55.5837	46.9243	27.2041	22.0011	13.5089	10.314	84.6638
C	54.54919	57.05418	25.6919	24.51366	14.46567	9.153749	87.50883
D	28.772	97.4669	27.6804	21.9482	14.8897	9.62785	77.872
D	27.852	95.7765	26.8039	21.3656	15.018	9.62816	72.2111
D	57.4468	90.0562	36.2291	32.0602	27.3195	28.6132	92.7437
D	46.8886	84.8922	22.9168	17.8833	12.2467	13.8942	85.0067
D	38.3285	80.6219	23.3728	17.5097	11.4705	8.50437	84.3342
D	45.7463	91.3169	36.0169	30.9569	26.1205	24.4584	85.5818
E	23.7364	63.9209	57.4281	25.9881	21.7656	17.1365	55.2355
E	22.5813	66.36	63.2284	26.4911	20.5466	16.7167	52.4914
E	42.1633	79.3165	72.4031	43.0819	38.7385	39.3011	79.3699
E	28.8409	69.6488	64.2428	37.1854	25.856	24.2954	59.6983
E	25.1916	67.1877	55.7342	30.2306	23.8146	20.389	50.3632
E	29.69428	70.62825	63.90213	34.24725	27.23893	25.17555	60.4807
F	31.1995	49.9032	127.913	82.6002	25.7333	33.119	47.924
F	33.1456	43.7516	143.298	94.125	26.2891	35.8652	51.9874
F	35.2758	56.3485	126.854	82.3835	31.4053	37.5814	52.2936
F	28.718	25.1665	125.506	93.0816	21.7289	30.4817	36.6696
F	44.3051	70.607	144.313	92.6118	40.0458	47.697	67.407
F	39.87133	64.55837	120.0047	76.60623	35.02447	40.95443	66.25477

Variedad	2.8	2.84	2.88	2.92	2.96	3	3.04
A	52.43668	25.7123	8.181568	-0.97474	20.16709	28.61366	1.345118
A	49.7747	29.1363	10.8843	1.14767	20.5693	30.5646	5.22785
A	49.9338	26.1435	9.99906	1.56378	20.9285	30.7196	4.43253
A	48.0493	23.828	7.59155	-1.05676	20.2305	28.7799	1.48546
A	53.7695	26.0988	8.29499	-0.83593	18.9289	26.7806	1.12642
A	58.2418	26.4711	6.75487	-2.70357	19.0048	26.6207	0.222884
B	40.5044	23.9718	12.352	-1.52331	11.7713	25.386	2.90964
B	50.4311	25.5705	13.1198	0.132057	18.8201	28.266	3.79044
B	31.5973	19.7065	6.75003	-0.667	8.47713	17.4076	1.69429
B	42.3434	22.4703	10.3233	3.31202	12.5924	20.2305	5.0378
B	23.4292	18.2698	3.5659	-1.42852	7.48507	16.5119	-0.10697
B	31.6767	19.395	4.25305	-2.24932	7.88135	19.8498	1.72956
C	64.9347	35.5592	27.1144	4.10524	22.7578	38.9092	9.8211
C	79.6229	41.545	34.4749	9.46479	31.6627	47.1149	15.4659
C	71.5716	38.1063	31.2707	7.07703	26.9468	43.8011	14.0832
C	80.1138	40.0069	32.927	7.35801	29.326	45.5898	14.2914
C	71.7509	38.681	33.8618	8.89297	29.1213	48.8479	15.5686
C	73.7118	38.84401	31.92709	6.921115	27.60973	45.33795	13.49157
D	99.6507	42.6082	33.5145	8.37275	39.5274	50.6936	16.1172
D	93.7505	40.6627	33.7574	8.32367	34.1569	48.2675	15.3076
D	93.7025	53.0729	51.7606	27.791	56.0494	71.4263	37.0834
D	85.8779	37.3365	35.611	11.0054	40.092	56.1502	18.5797
D	83.1824	41.8372	31.7511	6.78352	41.8031	53.6682	14.5733
D	103.628	55.6338	46.5939	25.6051	59.5251	68.888	33.6819
E	94.2072	42.2054	36.527	13.4071	35.6165	45.7988	20.6983
E	101.207	47.5734	37.2616	12.8701	36.1182	48.5501	20.6141
E	116.533	66.4069	51.8339	36.3042	62.3619	66.57	43.1902
E	110.039	58.5994	39.5371	20.2882	44.3913	53.3236	25.2176
E	89.2373	43.1082	30.6668	16.6366	34.691	39.0307	20.9053
E	104.2541	53.92198	39.82485	21.52478	44.3906	51.8686	27.4818
F	145.341	101.415	57.232	29.8811	50.9355	60.9373	30.6172
F	157.252	112.07	61.0169	33.0041	57.8333	66.3112	34.1113
F	148.179	92.5094	57.9073	33.6278	52.1161	58.3151	32.997
F	136.104	103.203	50.4805	25.9752	44.0204	53.3785	24.9423
F	158.998	108.756	69.7758	43.9075	59.9797	70.1517	42.1884
F	144.261	95.7443	60.87553	37.7386	60.0583	67.67763	39.82997

Variedad	3.08	3.12	3.16	3.2	3.24	3.28	3.32
A	0.886268	15.10583	17.98416	49.08135	154.5752	0	0
A	4.23556	18.8654	23.9959	55.014	163.756	0	0
A	5.41901	21.7602	24.3055	54.8601	148.865	0	0
A	1.78445	16.6053	18.5999	46.9037	139.243	0	0

A	-0.06354	12.7264	16.3208	48.3999	160.903	0	0
A	-2.18132	10.5566	13.7515	43.1488	153.87	0	0
B	0.86637	17.8068	36.7977	94.3306	154.738	0	0
B	2.19721	19.1707	33.1158	91.3465	157.055	0	0
B	2.90721	16.8289	36.5792	83.7661	138.581	0	0
B	7.00791	23.1899	44.5017	100.599	151.323	0	0
B	0.917482	13.8633	28.2784	62.1861	112.256	0	0
B	1.78292	14.6831	31.5688	68.467	130.993	0	0
C	4.12441	20.3956	28.0229	96.1522	264.103	0	0
C	9.25272	27.2747	34.6984	94.4311	257.753	0	0
C	8.3916	26.2355	34.9827	99.7575	251.182	0	0
C	7.31129	25.9121	34.5717	100.989	278.254	0	0
C	10.6169	29.9078	45.2517	99.3285	217.653	0	0
C	7.497884	25.91327	36.66774	100.7997	258.4034	0	0
D	9.43383	27.2163	33.7232	93.05	276.073	0	0
D	8.32173	25.5779	32.4018	91.5857	262.461	0	0
D	32.5424	52.606	61.9352	124.314	252.516	0	0
D	13.827	32.64	45.3378	102.8	244.502	0	0
D	7.97895	25.76	31.4099	89.3521	274.552	0	0
D	29.101	46.5549	54.3827	116.9	285.872	0	0
E	19.1751	30.2835	48.2575	114.281	298.655	0	0
E	16.4468	26.3285	40.0173	105.046	310.114	0	0
E	44.0783	54.8304	73.9177	165.362	358.934	0	0
E	20.7207	28.6758	38.7472	115.849	372.928	0	0
E	20.2063	28.4014	39.329	116.936	243.4	0	0
E	25.36303	34.55903	48.0028	125.7983	321.344	0	0
F	21.298	30.2041	35.8542	68.1884	247.576	0	0
F	25.1883	35.3154	43.1143	83.3881	272.21	0	0
F	27.5372	35.9658	45.7785	75.9087	257.238	0	0
F	16.1697	23.6021	29.4285	62.7256	259.564	0	0
F	36.0433	45.2775	54.2278	98.638	276.309	0	0
F	35.1033	45.1411	57.0866	115.796	302.4843	0	0

Variedad	3.36	3.4	3.44	3.48	3.52	3.56	3.6
A	160.1187	351.0642	751.42	771.4036	459.7194	140.714	123.633
A	183.164	307.277	782.712	693.622	520.631	161.099	133.338
A	152.797	363.699	654.271	755.506	374.629	124.149	123.611
A	145.884	334.05	653.545	719.352	379.666	117.38	110.689
A	165.026	347.628	805.523	778.519	512.993	155.851	129.375
A	163.076	325.064	798.96	716.743	534.477	140.143	117.984
B	292.13	298.62	753.085	636.378	549.624	197.671	136.727
B	251.323	299.367	728.073	618.65	528.453	174.132	129.525
B	256.117	295.971	672.059	620.535	481.363	208.827	155.176
B	286.851	458.298	674.136	789.559	491.904	244.227	239.732

B	237.991	269.141	507.127	524.713	425.7	247.834	206.821
B	250.278	260.761	591.578	547.204	485.909	286.687	209.079
C	227.878	330.797	856.228	665.862	717.2	187.442	161.171
C	223.668	294.884	693.325	571.837	643.316	199.661	173.228
C	235.3475	317.458	811.112	646.057	672.53	189.072	165.619
C	247.027	315.128	736.785	604.026	690.353	218.368	185.624
C	281.241	362.184	638.431	665.481	523.008	190.137	163.58
C	257.0896	342.7571	758.691	658.0255	656.3907	202.622	173.5275
D	222.503	416.752	1006.19	806.265	827.753	223.996	197.942
D	251.604	401.771	975.327	802.618	790.659	228.56	197.077
D	280.705	396.441	847.389	732.419	645.746	229.663	209.973
D	266.912	406.232	862.766	821.967	600.613	211.669	187.64
D	253.3655	378.325	938.322	785.585	705.962	189.99	165.166
D	239.819	442.514	940.691	786.287	762.086	244.911	243.966
E	213.665	415.897	699.744	753.919	496.247	201.061	202.35
E	219.135	349.96	811.186	717.41	592.877	220.284	198.561
E	252.621	509.134	835.271	854.4	583.59	264.182	333.014
E	225.575	433.438	956.84	715.726	828.413	248.855	255.227
E	176.305	559.369	458.401	810.994	332.138	170.629	203.233
E	218.409	462.9753	765.4245	774.6325	584.2545	225.9875	247.5088
F	179.122	191.502	450.141	323.86	523.826	202.124	184.157
F	196.548	217.397	476.293	348.829	567.146	218.737	213.338
F	191.056	222.415	439.694	381.587	508.285	224.393	215.289
F	160.197	183.479	464.654	305.884	570.345	199.891	184.811
F	210.593	259.999	488.872	421.532	539.795	237.271	242.076
F	219.9207	328.8433	600.1453	541.587	563.5103	240.0633	262.8093

Variedad	3.64	3.68	3.72	3.76	3.8	3.84	3.88
A	1037.93	1221.014	556.3375	1844.957	2700.15	2595.765	374.764
A	980.892	1234.31	544.85	1777.68	2550.74	2670.65	389.641
A	977.657	1108.8	540.415	1683.2	2520.07	2227.74	285.671
A	945.469	1084.52	515.648	1640.53	2447.24	2225.69	290.787
A	1069.93	1286.38	564.619	1941.91	2795.77	2814.63	436.91
A	1038.4	1266.79	546.29	1837.06	2729.96	2798.69	391.521
B	967.137	1277.86	721.365	1668.4	2452.76	2579.17	420.349
B	983.388	1220.06	668.463	1628.4	2451.73	2501.33	326.526
B	986.211	1204.15	703.697	1624.64	2362.94	2333	341.215
B	1162.39	1289.33	858.494	1875.76	2796.52	2402.84	510.896
B	861.719	1046.48	669.318	1332.43	1979.07	1874.87	385.261
B	927.794	1121.72	722.448	1427.21	2057.64	2124.2	376.326
C	1124.61	1482.86	652.198	1992.81	2879.02	2994.25	400.766
C	945.468	1245.25	652.271	1577.06	2378.93	2443.79	372.472
C	1067.83	1430.37	659.96	1894.17	2692.32	2800.07	365.746
C	996.669	1325.35	697.241	1675.39	2532.97	2589.6	411.779

C	883.959	1218.59	695.293	1587.8	2364.9	2211.43	485.329
C	1021.781	1369.112	695.2089	1787.04	2644.143	2650.395	441.2772
D	1354.45	1598.81	701.603	2323.58	3473.78	3455.08	494.49
D	1292.07	1566.05	700.013	2254.71	3350.35	3387.83	550.726
D	1107.2	1316.39	679.066	1892.21	2768.37	2821	538.962
D	1151.76	1370.79	712.758	2045.36	2916.55	2913.39	542.305
D	1238.25	1490.35	639.512	2163.38	3170.7	3206.4	409.805
D	1304.6	1476.87	718.087	2196.8	3236.84	3150.06	523.109
E	1209.5	1266.89	732.036	1898.1	2758.41	2455.3	462.82
E	1147.87	1420.95	692.428	1999.83	2772.2	2829.69	526.368
E	1433.36	1423.82	867.597	2283.75	3137.31	2735.96	538.204
E	1419.97	1635.98	760.127	2315.96	3463.36	3359.08	672.148
E	1095.93	1097.25	668.508	1686.47	2588.12	1997.06	439.037
E	1274.283	1394.5	747.165	2071.503	2990.248	2730.448	543.9393
F	587.327	902.05	502.487	1016.86	1481.11	1565.68	363.01
F	657.882	968.363	545.001	1099.82	1592.09	1598.69	344.495
F	646.861	904.139	574.802	1044.53	1528.79	1463.03	361.538
F	609.331	941.004	497.686	1045.08	1565.98	1629.75	349.777
F	722.559	976.95	596.651	1189.02	1667.4	1644.95	413.111
F	937.9337	1123.044	669.7497	1524.197	2132.267	1993.2	431.9367

Variedad	3.92	3.96	4	4.04	4.08	4.12	4.16
A	274.2586	148.6208	147.4188	1079.588	251.3009	106.1658	981.1734
A	274.009	149.219	140.812	1037.03	250.937	98.2497	947.38
A	225.815	118.133	123.898	986.374	219.356	76.3745	874.571
A	227.207	118.962	120.496	969.637	219.99	75.7882	869.251
A	305.334	169.622	165.754	1126.65	267.973	130.359	1035.94
A	266.003	146.582	157.442	1091.65	263.165	123.456	1001.62
B	354.321	157.598	179.592	1020.59	345.803	127.323	845.386
B	314.463	137.46	173.27	1010.39	308.776	111.677	842.743
B	311.233	132.996	175.25	967.595	331.137	134.413	789.49
B	418.574	219.766	273.642	1070.94	396.182	226.094	863.897
B	325.577	146.241	181.387	800.385	356.627	126.975	612.042
B	342.658	146.484	182.075	854.92	360.765	144.271	671.716
C	377.493	194.265	208.111	1216.84	358.013	131.529	1028.9
C	385.116	189.655	210.7	1023.13	346.298	116.897	814.19
C	374.123	186.12	205.423	1150.92	353.451	124.084	951.664
C	400.111	194.926	219.635	1069.52	363.971	123.531	847.699
C	406.185	203.447	200.943	959.523	340.51	126.513	764.693
C	402.4883	201.4969	213.7543	1103.6	361.248	129.7348	898.0393
D	457.51	240.627	241.016	1413.6	363.957	152.988	1236.61
D	497.651	278.909	269.044	1391.57	390.903	177.735	1212.44
D	486.476	303.864	292.323	1185.56	382.425	200.81	1017.3
D	480.935	285.983	279.685	1236.71	361.973	186.575	1049.83

D	391.39	197.339	206.202	1303.32	315.119	126.875	1144.43
D	492.94	298.533	312.671	1320.67	372.433	216.191	1151.88
E	407.084	240.675	247.436	1099.46	337.548	204.561	908.107
E	435.174	258.635	240.586	1146.14	366.107	204.96	968.723
E	453.786	314.702	360.103	1198.34	370.518	306.456	1018.31
E	547.996	375.898	364.836	1400.55	458.669	303.858	1235.62
E	369.704	232.277	246.719	982.505	292.336	214.282	808.807
E	451.665	295.378	303.061	1181.884	371.9075	257.389	1007.865
F	391.217	211.568	199.95	711.977	345.557	101.644	499.98
F	399.855	199.812	215.437	745.693	343.796	91.1739	504.456
F	395.675	209.111	210.017	709.733	334.379	107.355	482.695
F	406.822	201.005	212.702	757.046	358.173	98.0507	532.744
F	429.396	242.872	249.874	774.434	365.588	137.473	545.583
F	427.679	252.462	275.138	906.1557	359.9673	178.3676	689.4497

Variedad	4.2	4.24	4.28	4.32	4.36	4.4	4.44
A	88.35031	68.18883	73.29784	51.48192	34.69102	29.47649	22.67215
A	85.1372	60.145	64.1172	43.0941	26.4298	22.167	15.6996
A	56.8628	49.3954	60.744	38.4622	24.8141	20.9528	15.6714
A	62.523	51.8605	59.7868	39.9035	26.3615	22.5881	17.2567
A	109.031	80.545	82.5391	60.0614	40.9997	34.6478	26.7669
A	103.628	68.0945	72.3358	58.7109	36.8962	31.7477	24.4709
B	81.0619	60.0003	58.1665	41.7091	24.3771	19.379	16.4755
B	59.9237	51.5429	58.073	42.5045	22.8918	18.4408	15.8971
B	62.0624	58.0712	58.4837	39.5935	27.1185	23.0758	20.1052
B	113.772	96.8219	83.8043	64.2291	46.7394	37.9614	33.0217
B	82.8627	65.7533	58.1897	39.4859	31.5769	26.5738	24.2343
B	73.2969	56.0547	51.7886	35.3381	22.9716	19.5733	17.9765
C	72.9454	71.9926	70.8402	75.6498	38.3727	30.7403	23.61
C	73.508	69.5253	70.7967	80.029	39.6616	30.8185	23.4834
C	58.0959	64.6849	64.5942	73.5926	33.6958	27.0795	20.7311
C	76.2884	65.9797	61.963	77.5212	35.1341	26.4684	19.4887
C	86.9533	73.9928	71.1468	53.4932	31.1923	23.231	17.2494
C	80.30361	72.06813	69.343	70.26583	35.59769	27.3495	20.51835
D	102.766	87.045	71.6921	98.1166	39.1142	29.506	23.6436
D	133.005	110.845	90.9138	113.738	53.833	41.8995	33.7047
D	160.294	141.641	129.373	130.812	82.5498	69.4041	58.7
D	133.943	115.7	113.157	100.053	58.17	45.9164	36.6612
D	79.4862	70.4157	65.0403	75.9811	31.4589	24.071	19.0521
D	138.694	123.509	106.843	117.104	65.0649	52.9665	44.4545
E	104.182	90.7812	67.5017	102.192	49.3286	40.5757	35.856
E	127.582	95.1711	64.1539	105.156	45.7763	37.263	31.5534
E	147.624	117.566	89.2776	125.274	62.0547	49.5658	43.6816
E	215.39	169.844	136.215	180.128	108.643	92.3781	82.7074

E	128.529	101.67	75.1856	111.228	56.6405	42.3886	36.5199
E	154.7813	121.0628	91.20803	130.4465	68.27863	55.39888	48.61558
F	103.591	95.6898	63.1649	168.69	74.8051	50.3893	33.6889
F	81.7087	85.1617	54.3491	170.314	67.0984	41.0258	26.3598
F	96.9665	91.8416	59.7102	158.793	68.96	46.0772	31.4115
F	98.7345	102.949	67.5994	147.772	106.211	55.4489	36.6538
F	118.601	115.44	79.1394	184.728	87.8733	61.1626	43.7848
F	115.9779	106.0559	74.25537	160.1053	72.34213	50.58473	37.94207

Variedad	4.48	4.52	4.56	4.6	4.64	4.68	4.72
A	40.43543	16.36443	41.11343	20.5967	14.59829	9.302754	3.106985
A	33.5979	11.6106	37.4613	18.1162	11.5431	8.58713	1.94366
A	32.9963	10.9029	39.129	14.549	10.9236	6.53803	1.87407
A	34.2982	12.0125	37.5501	15.5797	11.4722	7.1297	2.23821
A	44.2172	19.7631	42.2818	24.4139	16.874	10.9339	3.79477
A	42.0907	18.5647	38.8719	22.4792	15.5981	9.66712	3.52744
B	28.8127	13.1848	79.5969	23.2878	12.2395	8.8347	2.65594
B	27.7918	12.811	71.3964	21.6625	10.7465	7.09131	2.24982
B	31.4165	14.1455	75.1985	21.4326	12.5443	7.28401	1.98574
B	43.6916	26.2046	88.6205	28.6874	18.5546	11.4482	4.19204
B	34.2056	17.5469	60.7	19.294	12.7324	6.53777	2.21608
B	31.5833	13.4972	56.4297	17.8111	11.1607	5.51434	1.13069
C	38.831	17.8855	74.4819	33.5099	18.248	8.11902	3.03806
C	38.9386	19.749	72.2966	30.8591	19.4889	8.95389	3.93812
C	35.841	15.7928	72.5915	28.4399	16.2519	6.75313	2.45842
C	36.1886	17.1351	73.444	31.257	17.4752	7.1323	2.45627
C	30.2307	13.7165	81.4112	22.1121	13.3098	10.8903	3.11229
C	35.7851	16.57061	77.97461	29.53886	16.67122	8.888151	2.926251
D	44.9092	18.2169	63.5838	29.2183	17.4928	10.0084	3.1048
D	52.4368	25.4476	70.1334	33.996	21.4488	11.5367	4.21804
D	70.5348	46.1289	96.2347	44.073	30.7243	35.7215	11.9517
D	50.687	27.5601	82.2398	30.2933	19.4532	28.6373	6.65067
D	41.208	14.4313	57.2593	27.6962	14.3093	10.1606	2.45534
D	59.9349	33.5907	71.2741	39.8557	23.5292	16.303	3.06508
E	55.6318	24.7887	71.7424	34.1422	23.0692	13.2326	4.50903
E	53.6842	22.4218	61.8006	34.9349	21.1308	10.6954	3.4681
E	58.4942	27.097	60.4526	30.1904	8.55949	-8.08774	-21.7471
E	101.628	63.6273	97.9208	73.6759	44.8755	23.8672	8.90517
E	51.0099	22.8075	59.0053	22.9827	12.5773	-1.77012	-11.2118
E	66.20408	33.9884	69.79483	40.44598	21.78577	6.176185	-5.14641
F	55.1956	32.732	62.6676	26.1351	37.9035	15.7096	7.73068
F	50.7282	27.891	62.8839	20.8183	34.0823	10.6988	4.00163
F	53.8971	32.0459	61.9099	24.7462	37.5783	13.6581	6.34103
F	62.1385	36.2284	67.0031	28.3525	41.6808	17.2892	8.46596

F	66.1066	42.8366	76.0584	33.4245	44.8325	19.2971	10.3728
F	58.443	32.6082	66.46497	28.1444	29.1581	7.30272	-2.45756

Variedad	4.76	4.8	4.84	4.88	4.92	4.96	5
A	-0.20834	-0.99867	-0.42809	2.244509	8.148562	5.21542	4.092139
A	-0.74441	-0.94069	-0.2833	2.16527	8.52897	5.38053	4.26296
A	-0.42136	-0.72145	-0.10358	2.1064	7.0264	4.17516	3.13645
A	-0.2276	-0.62961	-0.16604	2.09034	7.08372	4.05439	2.93397
A	-0.17695	-1.30955	-0.6652	2.26793	8.73873	6.07264	5.01193
A	-0.05341	-0.85512	-0.19196	2.29486	8.14135	5.26302	3.41189
B	-0.25542	-0.7285	-0.36116	2.18288	11.0613	4.37713	4.11844
B	-0.35567	-0.84034	-0.31577	2.02741	10.2663	3.41379	2.91564
B	-0.57516	-0.87801	-0.32593	2.74102	10.3304	3.61906	4.40891
B	0.039141	-1.20308	-0.13924	4.47874	12.264	6.36808	7.68283
B	0.004354	-0.35466	0.238504	5.03436	14.9856	5.88109	7.8295
B	-0.70334	-0.9074	-0.0749	5.71629	19.5361	5.97109	7.94795
C	-0.70761	-1.75406	-1.0229	1.38867	8.72394	5.80059	3.35181
C	0.044083	-0.76815	0.053126	2.63015	9.40865	6.76471	5.07098
C	-0.53718	-1.12678	-0.45383	1.68238	8.58169	5.2965	3.3149
C	-0.87059	-1.20828	-0.38144	2.30297	9.25452	6.58255	4.87622
C	-0.68007	-1.03709	-0.75136	1.81027	7.9362	6.17051	5.27349
C	-0.76781	-1.35981	-0.73294	1.870649	8.810984	6.308241	4.590517
D	-0.98061	-1.50443	-0.77848	1.86153	9.64503	7.00598	6.58088
D	-0.93109	-1.79777	-0.71711	2.19178	9.90979	7.74822	7.46686
D	-0.00797	-2.16604	-0.21915	4.88334	13.0933	13.1478	13.2215
D	-1.05584	-1.83549	-0.26073	2.54543	8.30336	7.06731	6.45144
D	-1.15935	-1.51182	-0.93038	1.98682	10.6411	6.60867	4.74014
D	-5.1896	-6.77414	-4.33669	2.13301	12.5376	9.95959	9.57421
E	-0.70605	-1.55405	-0.48062	2.70603	8.19418	8.67927	8.17562
E	-1.00547	-1.73082	-0.71705	2.11073	7.83674	9.16059	8.26987
E	-31.1828	-31.8365	-26.7759	-17.8478	-7.91071	-2.88588	-1.12125
E	-1.20895	-3.10687	-0.78479	5.90981	15.2058	20.0292	19.8655
E	-18.868	-19.9468	-16.4142	-10.2562	-3.70006	-1.58059	-0.66772
E	-13.0663	-14.1552	-11.173	-5.02087	2.857943	6.18083	6.5866
F	0.783749	-0.79942	1.08681	5.2638	9.99045	13.6753	10.1446
F	-1.74191	-2.32342	0.134742	3.74011	7.62962	11.1713	7.75643
F	-0.28882	-0.98134	1.31231	5.58923	11.247	16.2054	13.8046
F	1.30236	-0.60784	1.34954	4.78236	8.15441	12.3348	9.00729
F	1.22955	-0.73817	1.4928	6.33532	12.8522	19.54	16.6671
F	-10.5651	-11.6327	-8.38279	-2.59079	4.19037	9.27514	7.767427

Variedad	5.04	5.08	5.12	5.16	5.2	5.24	5.28
A	4.167488	3.04125	5.828662	18.81331	2.444339	3.559258	1.979269
A	4.41525	3.41193	6.48517	21.7178	4.49454	6.33802	5.26128

A	3.28691	2.43227	5.683	20.135	2.30473	4.91723	3.38162
A	2.89709	2.02323	4.96165	18.0583	1.66897	3.37759	2.43607
A	5.19512	3.88211	6.35614	18.4724	3.07732	3.53359	1.40717
A	3.26294	1.92399	4.39671	16.5167	2.07151	2.27481	1.16418
B	3.10037	2.43361	7.57124	60.6079	7.69709	10.2296	3.5211
B	1.93678	1.35293	6.4354	54.1474	5.37784	7.7354	2.55529
B	2.1196	1.77848	7.61143	59.1443	5.07526	8.34199	2.6051
B	6.03593	6.77808	14.3703	67.3247	12.0099	16.3147	10.0026
B	4.4274	3.45597	8.32937	44.5839	6.98802	7.8527	3.15285
B	3.86812	3.12104	8.80977	48.1835	6.36565	7.73286	4.94552
C	4.27129	6.36915	9.5558	41.9407	7.00909	13.1307	3.75785
C	6.27108	6.56415	11.8355	41.5251	9.27518	17.1424	4.40454
C	4.2614	6.14977	10.0164	43.8374	7.23384	13.5534	3.83499
C	6.04044	6.57766	12.2741	43.5973	9.6188	17.965	6.2422
C	5.51011	7.98608	11.4302	48.0849	11.2635	23.4148	7.42195
C	5.379426	7.117183	11.30843	45.43179	9.483073	18.53357	5.92348
D	8.35921	8.95656	13.51	40.1568	9.65698	12.7369	9.20664
D	9.40314	10.1758	14.9743	41.3476	11.9614	14.6344	10.162
D	14.7467	16.5851	19.6525	55.5608	21.0733	24.9236	17.177
D	7.9644	10.3932	13.8799	50.5103	13.6856	19.8282	12.6798
D	5.68991	6.98159	9.20877	34.6178	6.17622	10.6076	6.877
D	11.2156	13.2351	16.427	42.0279	15.6324	19.1651	16.9881
E	9.32554	9.12849	13.0919	38.9688	7.38353	5.92944	8.84684
E	10.5153	9.59659	12.9621	36.2959	7.91783	4.95608	6.99289
E	3.12344	6.03507	11.3038	30.4134	9.00986	9.59234	16.1056
E	23.5845	24.6318	28.5916	47.538	27.048	22.3977	25.6823
E	1.78777	3.34754	6.85863	24.6972	4.37153	4.88525	8.4079
E	9.752753	10.90275	14.92903	34.73613	12.08681	10.45784	14.29717
F	12.2007	8.39304	14.6536	30.9463	8.27754	5.75089	4.82176
F	10.2982	6.96495	14.8391	35.1861	6.54778	5.63896	6.05003
F	15.3382	11.734	18.2696	34.9407	8.9977	7.42949	7.14261
F	11.4957	8.27922	15.3048	32.3389	7.84841	6.01964	5.22481
F	19.2536	15.127	22.796	42.019	13.2022	10.3236	8.58319
F	10.89175	9.375673	16.31297	35.87283	9.586613	8.5183	10.24627

Variedad	5.32	5.36	5.4	5.44	5.48	5.52	5.56
A	3.951173	21.12437	631.8628	329.7566	31.13118	17.1443	6.351634
A	9.60572	32.9259	567.297	365.775	28.9887	14.6678	4.12052
A	6.48642	26.4707	636.74	231.243	18.4637	10.6798	2.94569
A	4.49334	21.6087	624.88	228.784	19.4286	11.0036	3.20141
A	3.17884	19.4095	602.038	411.52	41.0203	22.2863	9.13186
A	3.9551	25.8395	577.143	423.068	30.6269	14.7306	5.32581
B	4.83761	22.6677	526.277	287.641	23.021	12.2168	3.28397
B	4.40356	25.5355	526.892	290.167	13.2001	9.8861	2.63942

B	3.71667	20.1971	509.19	246.003	14.346	10.0505	2.96655
B	12.8792	44.9964	601.357	249.645	42.3619	28.6615	16.0938
B	4.38838	18.9795	397.669	186.275	22.5862	13.8161	5.28853
B	9.81007	38.4583	433.883	210.563	14.9133	9.10615	1.91754
C	6.21747	28.4059	570.13	398.305	15.8713	12.0192	4.17445
C	6.12919	31.1713	461.128	304.483	17.8727	12.2711	5.44697
C	6.59188	29.9769	514.585	378	12.0333	10.4522	3.82455
C	10.1625	39.7161	516.428	294.914	15.1851	8.79374	2.84308
C	9.07433	32.6873	491.401	237.673	31.0425	17.5754	5.37336
C	8.654462	34.27516	536.5061	316.5033	21.11363	13.05204	4.212903
D	13.4284	42.3469	772.63	415.092	32.427	22.0437	10.2492
D	13.1432	38.2014	719.802	429.879	44.8525	31.0837	17.7853
D	18.1238	35.7011	548.348	402.14	63.5899	47.5661	33.8545
D	15.7293	39.9129	656.672	346.365	49.0089	35.8555	22.108
D	11.2708	38.6863	718.907	382.208	20.6738	13.8844	4.68252
D	22.2115	52.9598	688.667	410.656	45.7402	37.2424	24.9482
E	13.6016	44.8939	621.737	229.153	30.5752	22.5259	12.3632
E	11.9813	40.7236	538.356	362.741	34.2143	22.449	11.2504
E	28.6161	84.3422	659.719	326.212	47.6062	37.6282	26.0851
E	32.9744	70.6494	695.741	438.902	63.6969	51.9983	39.3321
E	13.3596	35.0281	612.665	158.023	33.7185	26.7823	17.1361
E	21.73285	57.68583	626.6203	321.4695	44.80898	34.71445	23.45093
F	5.78665	16.3799	215.01	211.644	17.1317	12.1565	9.34685
F	9.43329	25.9946	256.214	184.257	6.88538	7.54648	6.34992
F	8.58577	20.9855	295.988	120.737	16.8234	11.7354	7.93003
F	7.11371	23.2275	230.406	219.277	14.2503	12.5885	10.0689
F	9.31688	21.876	261.303	206.958	25.7527	18.2774	13.3116
F	15.78876	44.07093	392.412	239.1423	26.74809	21.15069	15.24887

Variedad	5.6	5.64	5.68	5.72	5.76	5.8	5.84
A	2.824904	4.29699	0.463862	0.683743	0.096169	0.196599	0.088066
A	1.30078	2.95513	-0.039	0.457662	0.038157	0.122398	0.164849
A	0.934567	3.31176	-0.05111	0.482017	0.04774	0.384984	0.107549
A	1.05116	3.22564	0.047529	0.485945	0.063479	0.262898	0.093488
A	4.43409	5.11803	0.853174	0.841711	0.123257	0.118847	0.077514
A	2.39547	4.02005	0.315625	0.708572	0.17656	0.161143	0.209107
B	0.838197	2.82784	-0.04774	0.795627	0.090112	0.159913	0.221834
B	0.784705	2.79185	-0.01381	0.841714	0.125642	0.174963	0.239647
B	0.909404	3.5851	-0.01833	1.11314	0.045626	0.160704	0.159761
B	10.7451	10.5284	5.26924	4.79593	2.57667	1.83136	0.790664
B	2.59942	4.34857	0.589194	1.5838	0.113236	0.213232	0.18682
B	0.31123	3.19191	-0.1423	1.41424	-0.05162	0.10345	0.158347
C	0.997932	3.25329	0.012604	1.10851	0.398311	0.214583	0.31783
C	1.84883	3.82431	0.254317	1.24418	0.517465	0.172266	0.258308

C	0.767961	3.28507	-0.00959	1.087	0.383749	0.196583	0.305021
C	0.091446	2.92124	-0.18786	1.13697	0.441739	0.194763	0.262756
C	1.54029	2.18657	-0.0995	0.651809	0.178553	0.410547	0.046901
C	0.894087	2.842774	-0.09342	0.985078	0.346325	0.278764	0.213345
D	3.97357	5.27868	0.605067	1.0662	0.277754	-0.00331	0.083008
D	9.85588	9.73526	3.86977	3.22829	1.60483	0.578567	0.269274
D	25.3077	22.209	16.4191	13.633	10.2046	7.25114	4.61841
D	15.0844	12.9838	7.93068	6.35581	4.12302	2.57355	1.34416
D	0.64415	2.64163	-0.2504	0.896273	0.241804	0.064971	0.127756
D	17.076	15.7328	10.6422	9.60689	7.36407	5.75369	4.61604
E	6.90087	8.78106	2.75357	2.84232	1.42065	0.943435	0.280435
E	4.86351	6.74114	0.944614	1.23992	0.39494	0.267306	0.099988
E	19.9103	19.4018	13.2945	12.1005	9.68537	8.12611	6.48805
E	31.7542	30.9433	24.124	22.4846	19.5835	17.4557	15.4344
E	12.0238	12.5491	6.94254	6.49159	4.51937	3.68512	2.21033
E	17.13795	17.40884	11.32641	10.57915	8.545795	7.383559	6.058192
F	1.8216	3.1402	0.07193	1.7738	1.31972	1.69067	2.33945
F	-0.10537	2.37003	-0.29609	2.06749	1.2503	2.1992	2.46703
F	1.61837	3.04927	0.123956	2.25355	1.03747	2.12552	2.51917
F	2.45931	4.39375	0.63575	2.38778	1.57809	2.26038	2.82012
F	4.42722	5.0422	0.965743	2.87473	1.7022	1.88417	2.05994
F	8.077383	8.93801	4.654716	5.680907	4.212623	4.069827	3.671673

Variedad	5.88	5.92	5.96	6	6.04	6.08	6.12
A	-0.04576	0.454157	-0.03	0.685517	0.015864	-0.13235	0.437175
A	-0.06717	0.598451	0.033118	0.749102	0.089394	-0.08827	0.433352
A	0.075662	0.509505	0.031235	0.810555	0.087801	-0.03692	0.44372
A	0.02338	0.447956	0.030688	0.717959	0.02566	-0.08194	0.414209
A	-0.11224	0.433902	-0.08893	0.613141	0.005143	-0.17505	0.434675
A	-0.03078	0.622777	0.003334	0.657781	0.124149	-0.08581	0.402018
B	0.118017	0.582481	0.017733	0.640831	0.130021	-0.03707	0.321325
B	0.188487	0.603416	0.057474	0.648275	0.156756	-0.04073	0.312921
B	0.140372	0.479309	-0.01323	0.553652	-0.0125	-0.16454	0.071793
B	0.538938	0.556966	0.024981	0.573359	0.022004	-0.11026	0.269687
B	0.309357	0.410372	-0.01796	0.410659	0.096871	-0.0458	0.205272
B	0.19088	0.458103	0.05	0.589529	0.210094	-0.03866	0.229925
C	-0.06167	0.93564	0.121438	0.954076	0.209604	-0.07956	0.641866
C	-0.03869	0.823584	0.113075	0.8921	0.208027	-0.06544	0.48352
C	-0.09638	0.865071	0.108812	0.988491	0.256239	-0.06158	0.562319
C	-0.00877	0.832692	0.128625	1.1194	0.273306	-0.14359	0.455052
C	-0.00494	0.529236	0.084721	1.28793	0.121453	-0.06737	0.324206
C	-0.02563	0.781173	0.113827	1.142878	0.205483	-0.09878	0.483182
D	-0.07934	0.585826	0.213153	0.680854	0.093724	-0.07688	0.646162
D	-0.04349	0.544856	0.143958	0.583929	0.041005	-0.09621	0.614503

D	2.92801	2.85947	1.90494	1.7299	0.659833	0.17231	0.593346
D	0.585405	0.709246	0.285511	0.755205	-0.03499	-0.07424	0.490293
D	-0.02489	0.700608	0.338521	0.814109	0.068372	-0.02395	0.787936
D	3.4437	3.19932	2.06491	1.74952	0.482144	0.097092	0.740279
E	0.152412	0.635751	-0.04895	0.962635	0.021414	-0.11847	0.424845
E	-0.02609	0.737631	0.020103	0.971539	0.15645	-0.07292	0.494168
E	5.20079	4.64427	2.93657	2.78045	0.879643	0.310223	0.83846
E	13.2617	12.7812	10.148	9.48696	7.05479	5.18377	4.56225
E	1.7295	1.67259	0.723805	1.18342	-0.03742	-0.29651	0.208197
E	5.041475	4.958923	3.45712	3.605592	2.013367	1.281142	1.525769
F	1.3731	4.74314	0.121546	2.03244	1.42724	-0.17912	-0.11702
F	1.59489	5.04141	0.134876	2.5088	1.41519	-0.13107	0.213685
F	1.26297	4.7853	0.099697	2.73145	0.554991	-0.21348	0.01194
F	1.59282	5.78418	0.23602	2.39534	1.91855	-0.03351	0.186438
F	1.34946	4.44663	0.124288	2.43415	1.15071	-0.16672	0.090657
F	2.715047	4.71077	1.065245	2.574467	1.148514	0.004146	0.380934

Variedad	6.16	6.2	6.24	6.28	6.32	6.36	6.4
A	0.439483	0.043571	-0.06034	0.375257	2.572286	0.751136	2.475178
A	0.511665	0.074594	-0.05855	0.374352	2.586	0.966472	2.30579
A	0.426461	0.040452	-0.093	0.403464	2.53685	0.60839	2.3867
A	0.446535	0.043859	-0.04918	0.375048	2.21241	0.419257	2.10574
A	0.406831	0.040745	-0.06799	0.353606	2.78232	1.03926	2.70043
A	0.421143	0.046268	-0.05679	0.464363	2.91657	1.02747	2.60583
B	0.110787	0.071657	-0.02228	0.39491	2.1236	1.03662	2.35134
B	0.05534	0.019099	-0.04064	0.410572	2.12267	0.85059	2.0715
B	0.03683	-0.00186	-0.05483	0.376344	2.42566	1.12486	2.60045
B	0.23751	0.08173	-0.03416	0.434223	2.77487	1.36375	2.7183
B	0.155037	-0.00364	-0.04452	0.458767	1.98031	1.03988	2.47345
B	0.240775	0.062849	-0.0609	0.34403	1.8877	0.623858	2.11501
C	0.153197	0.036268	-0.03122	0.524218	3.62075	1.47778	3.13124
C	0.061776	-0.00813	-0.01118	0.381654	3.60948	1.41954	3.15709
C	0.088574	-0.07836	-0.11447	0.223652	3.13558	1.09921	2.59418
C	0.067039	0.011219	-0.01192	0.515419	3.88529	1.59975	3.32672
C	0.068453	-0.02617	-0.06691	0.318424	2.94729	0.78018	1.99498
C	0.098154	0.007247	-0.03742	0.461741	3.554132	1.311621	2.874
D	0.094504	0.004654	-0.00972	0.610165	3.69599	1.52993	3.65916
D	0.056435	-0.01351	-0.05897	0.508496	3.32019	1.18412	3.47833
D	0.04248	-0.0991	-0.15359	0.204059	2.59151	1.06707	2.09473
D	0.009941	-0.0405	-0.08127	0.329305	2.88804	0.826993	2.16612
D	0.078895	0.07576	0.095185	0.886676	3.92504	1.50907	3.28616
D	0.087989	-0.04944	-0.03914	0.58196	3.2611	1.25941	2.81461
E	0.200934	-0.06796	0.002543	0.718829	3.14721	1.57505	4.36909
E	0.269013	-0.0148	-0.01786	0.772857	2.95351	1.74178	4.3265

E	0.314899	-0.04067	-0.02736	0.776717	2.55913	1.50791	3.60818
E	2.65582	0.980186	0.387043	1.06795	2.66585	2.05302	4.02598
E	-0.29265	-0.64885	-0.53567	0.377301	2.6101	1.00328	3.48132
E	0.73677	0.068967	-0.04846	0.748706	2.697148	1.576498	3.860495
F	0.354625	-0.30544	0.038159	1.32247	4.19901	4.0101	6.36438
F	0.68304	0.019491	0.426807	1.86283	4.77532	3.58171	6.22428
F	0.363753	-0.25794	0.150945	1.67637	4.89092	3.58805	6.73173
F	1.10928	0.400065	0.948235	2.48642	5.15939	5.41221	7.56278
F	0.558078	-0.33774	0.152054	2.01836	5.63468	4.90054	8.51402
F	0.518672	-0.11964	0.183835	1.552636	4.323043	3.330053	6.115493

Variedad	6.44	6.48	6.52	6.56	6.6	6.64	6.68
A	-0.06394	0.41882	0.334463	0.060865	0.808456	-0.12785	0.020971
A	-0.05726	0.365514	0.288391	0.069984	1.03265	-0.24608	-0.10814
A	-0.03946	0.451554	0.269678	0.058334	0.735024	-0.10032	0.149185
A	-0.08836	0.435882	0.336062	0.126066	0.727964	-0.07544	0.111594
A	-0.0358	0.37736	0.31338	-0.00788	0.841853	-0.17282	-0.07087
A	0.098641	0.46448	0.365399	0.056588	0.876883	-0.07967	0.056164
B	0.152439	0.243619	0.115272	0.025375	0.730918	0.125425	-0.00369
B	0.095684	0.193281	0.08652	-0.02106	0.933945	0.021922	-0.003
B	0.041004	0.133907	-0.02442	-0.10196	0.003556	0.586538	-0.04443
B	0.261155	0.436446	0.073114	-0.01964	-0.02809	0.516524	-0.07537
B	0.180988	0.380932	0.072025	-0.02782	0.249458	-0.09615	-0.05372
B	-0.25263	0.017132	-0.13801	-0.16024	0.051628	0.100888	-0.22925
C	0.065903	0.357915	0.077266	-0.05288	-0.30873	-0.68874	-1.15736
C	0.07429	0.425366	0.164178	-0.01242	0.051331	0.099189	-0.11992
C	-0.43671	-0.11399	-0.28573	-0.23965	-0.16004	-0.21688	-0.48729
C	-0.14445	0.041551	-0.66481	-1.11457	-2.24736	-3.01043	-3.93348
C	-0.14644	0.449671	-0.02985	0.244916	0.051097	0.26824	0.046361
C	-0.07649	0.288707	-0.20992	-0.31366	-0.8517	-1.16652	-1.71512
D	0.287541	0.221786	0.175238	-0.23613	-0.16225	0.215148	-0.40732
D	0.238462	0.273956	0.199836	-0.11319	-0.1287	0.2085	-0.74128
D	0.118519	0.10472	0.024464	-0.12222	-0.01446	0.892595	0.022109
D	0.037037	0.23552	0.028887	-0.06544	-0.0408	0.781082	-0.0865
D	0.166971	0.243558	0.081801	-0.21742	-0.10674	0.381798	-0.32106
D	0.135429	0.127333	0.049368	-0.16732	-0.10777	0.232732	-0.77358
E	-0.08004	-0.04924	-0.2082	-0.27847	-0.17095	-0.45992	-0.31556
E	0.033452	-0.14273	-0.13682	-0.3246	-0.23261	-0.58593	-0.16174
E	-0.0651	-0.01799	0.036482	-0.09786	-0.15446	-0.46703	-0.09871
E	0.194487	-0.26905	-0.09015	-0.21914	-0.12124	-0.51243	-0.01783
E	-0.65207	-0.2924	-0.71386	-0.43433	-0.32181	-0.63491	-0.09742
E	-0.12231	-0.18054	-0.22609	-0.26898	-0.20753	-0.55008	-0.09393
F	1.30442	-0.22588	0.898433	-0.2258	0.026295	-0.30312	0.1098
F	-0.25248	-1.49663	-0.39655	-1.83167	-2.01317	-2.77307	-2.64482

F	0.555462	-0.44794	0.439527	-0.61614	-0.30486	-0.84732	-0.70113
F	1.8105	-0.21055	1.03055	-0.64811	-0.41839	-0.80788	-0.2594
F	1.5848	-0.04399	0.837211	-0.32288	0.196844	0.120982	0.723837
F	0.422407	-0.51954	0.159048	-0.7508	-0.65693	-1.03971	-0.67323

Variedad	6.72	6.76	6.8	6.84	6.88	6.92	6.96
A	-0.24961	0.249027	0.573652	3.761622	6.37724	11.37527	41.62472
A	-0.4855	-0.1798	-0.06076	3.28006	5.16761	9.55204	39.9674
A	-0.17189	0.298307	0.725191	3.4094	6.46344	11.2566	34.4717
A	-0.21036	0.258116	0.664595	3.46475	5.89207	10.518	34.5401
A	-0.27432	0.225432	0.449292	3.83937	6.49092	11.5699	46.2846
A	-0.07423	0.392171	0.618846	4.16615	6.64384	11.3682	41.8233
B	-0.14224	0.187113	0.077544	1.52715	5.4071	9.53177	44.0559
B	-0.13796	0.264482	0.324869	1.90836	5.98277	9.97189	46.5894
B	-0.17416	0.556685	0.875832	1.92693	6.99367	14.3364	41.9702
B	-0.2603	0.452417	0.808069	2.27079	7.55921	16.6303	44.8277
B	-0.15846	0.694164	1.13456	2.06873	6.63094	14.3118	26.9097
B	-0.3806	0.564377	0.756601	2.01903	6.97548	15.6027	31.7117
C	-1.33811	-0.91387	-0.90643	4.21856	4.47714	7.75795	67.1226
C	-0.10273	0.143159	0.047507	4.49048	6.07008	9.01172	55.6615
C	-0.56813	-0.30326	-0.21781	4.48703	5.04849	8.3741	57.4337
C	-4.57666	-4.28457	-4.17204	0.817704	2.44532	6.90324	60.1099
C	-0.24702	0.042152	0.673611	3.66596	4.76495	7.96738	43.1222
C	-2.09501	-1.75314	-1.49765	2.958756	3.973719	7.693714	57.9206
D	-0.70089	-0.14752	-0.4403	3.00897	7.00721	10.4661	65.7679
D	-1.51876	-1.39585	-1.94277	1.5806	6.22164	9.39776	63.6724
D	0.031642	0.670564	0.833941	4.58053	6.83352	8.60313	41.3517
D	-0.30713	-0.06516	-0.20328	3.19281	5.37187	8.35097	52.9897
D	-0.72772	-0.53572	-1.03001	2.9206	6.22008	9.80149	67.5022
D	-1.42259	-1.17834	-1.40851	2.44561	5.59465	9.97495	65.6092
E	-0.65871	-0.02417	1.17734	5.98142	8.92114	16.6262	75.3359
E	-0.88479	-0.30928	-0.16377	5.59249	7.76786	13.3044	78.2074
E	-0.54591	0.404396	1.60389	7.93629	9.66111	21.5115	91.948
E	-0.59248	0.480719	1.16897	9.24882	8.79812	17.0851	104.645
E	-0.61408	0.140501	1.74705	4.47214	8.23822	18.465	67.8582
E	-0.65931	0.179084	1.089034	6.812435	8.616328	17.5915	85.66465
F	-0.05745	1.89272	1.85729	6.07635	11.0324	14.8737	13.5109
F	-2.92209	-0.92478	-0.9482	3.08211	9.09862	11.7275	8.73492
F	-1.0575	0.689211	0.574113	3.8254	9.90674	12.065	9.17056
F	-0.43531	1.82392	1.61315	6.36082	12.347	16.0124	14.4633
F	0.890751	3.20743	3.52138	7.42789	14.8575	18.8036	15.8217
F	-0.85908	0.895683	1.392357	6.148763	11.20574	17.34753	38.83487

Variedad	7	7.04	7.08	7.12	7.16	7.2	7.24

A	12.63898	14.92156	4.894313	4.641726	2.23906	3.40674	8.474155
A	11.9355	13.7835	2.71411	3.0718	0.616475	2.13924	6.84333
A	11.2525	15.5524	3.92767	3.90913	1.70466	3.0345	8.02542
A	10.8017	14.4113	3.86714	3.88329	1.75276	2.9148	7.61076
A	13.74	14.5626	5.63638	5.12977	2.59493	3.70023	8.84391
A	13.7441	14.7609	4.99182	4.65463	2.92993	3.63294	9.06301
B	15.6366	33.0222	3.6387	4.10526	1.04323	1.87196	7.28814
B	14.4803	31.0024	3.57072	4.34258	1.95785	2.67142	8.09713
B	17.3209	32.7919	5.01291	5.72801	2.59048	2.90873	11.1197
B	20.3424	32.1835	7.83088	7.45139	4.01862	4.13798	12.0835
B	18.2786	30.4096	6.74814	6.60942	3.10922	3.58996	10.6322
B	18.5508	33.0767	3.77964	4.05301	1.33569	2.19028	10.7883
C	7.62066	20.9651	3.00221	5.78122	2.52718	3.07848	8.90498
C	8.47841	22.8302	4.99492	7.21212	4.152	4.49299	9.76643
C	7.70708	22.9101	3.50574	6.43225	3.39468	4.00199	9.37361
C	4.64941	18.5156	-0.62306	1.68693	-1.38193	-0.77249	5.32098
C	18.3779	23.7868	4.84357	5.44781	3.52246	4.03777	6.9239
C	10.42031	21.51095	2.455724	4.391426	1.587021	2.156877	7.190952
D	13.3199	21.5136	2.58554	4.61197	0.948855	3.05149	8.44933
D	12.1751	23.3337	3.55957	5.52523	1.5144	3.4491	8.72547
D	43.9935	29.3204	10.3505	11.8612	9.28203	8.97192	9.94621
D	33.941	22.2585	5.7703	7.0913	5.76004	5.60044	7.4036
D	14.3134	19.5328	1.60464	4.15108	2.4248	2.91577	7.67692
D	19.3222	20.3246	3.91577	5.98402	3.42633	5.08067	8.58572
E	21.5616	28.1981	7.11852	9.4386	5.83069	8.55589	15.8484
E	18.299	26.9055	3.82711	6.20731	1.86508	4.51845	11.5441
E	19.3415	21.4788	7.49096	9.41793	7.18387	10.0457	16.3655
E	19.8375	24.1131	7.32787	9.75072	7.19697	9.64488	15.6967
E	15.2542	14.9218	6.17441	7.8207	5.62253	7.608	14.4452
E	18.18305	21.8548	6.205088	8.299165	5.467113	7.954258	14.51288
F	4.7387	9.80086	7.99267	12.3904	7.29536	11.6058	15.7456
F	-0.01734	5.01141	3.35314	7.76628	2.22727	6.79357	10.6425
F	1.95733	5.51865	5.29316	9.05905	4.25134	8.22142	12.0567
F	4.10599	9.22491	8.07054	12.6215	7.54509	12.2433	17.2198
F	7.69249	11.8145	11.8179	17.1558	11.1455	16.0801	21.6449
F	9.005551	12.76824	7.554	11.44667	6.852213	10.97312	16.21763

Variedad	7.28	7.32	7.36	7.4	7.44	7.48	7.52
A	5.786525	29.59633	23.52026	10.12861	11.91828	9.901251	1.059964
A	4.79732	30.5433	22.5726	9.23398	10.3513	10.5953	0.596693
A	5.5165	24.7964	19.6363	8.96783	13.1512	9.94722	0.935718
A	5.11564	24.602	19.485	8.57881	11.8571	8.80193	0.514422
A	6.12033	32.8666	26.1854	11.0884	11.2852	10.4238	1.54376
A	6.33933	30.2194	24.4345	10.5979	11.3138	10.5698	1.5014

B	3.96546	34.2443	21.8567	6.62985	15.4272	23.958	1.81595
B	4.42668	35.3917	22.6299	6.45197	14.7939	22.2861	1.41204
B	6.33369	31.7828	19.4277	7.09982	16.4169	23.4887	1.81524
B	7.77628	34.5017	20.4067	8.98051	19.0741	21.7122	2.69211
B	8.073	19.6963	13.5177	7.84396	17.7843	20.2945	2.5042
B	7.58928	23.7965	13.9782	7.65281	18.0554	22.6892	1.49985
C	3.13994	47.2908	34.8053	10.5588	12.7557	16.9447	0.864859
C	4.14507	38.2102	31.6594	10.6951	13.3466	17.7399	1.73054
C	4.07347	40.4408	32.3212	10.3553	13.2416	18.4152	1.33357
C	-0.24307	42.4971	26.9208	5.49064	9.35005	12.3128	-3.96098
C	3.79274	40.3998	24.7759	9.8408	14.4189	19.1315	1.80467
C	2.274466	44.26382	29.41068	8.802682	12.41838	16.45226	-0.43909
D	3.73116	52.5076	29.6597	9.79783	13.6117	15.6739	0.27184
D	3.35044	47.8797	31.0237	10.4779	14.3425	17.4063	1.12497
D	6.22223	59.7554	31.7777	15.4898	17.2529	20.8474	4.44847
D	5.53871	65.7221	29.5214	12.7203	15.6395	16.4833	1.92552
D	3.99511	56.8747	31.388	9.38608	13.3743	14.575	-0.63135
D	5.53399	57.923	33.3896	11.9278	14.7986	15.5117	1.27979
E	9.37852	69.4905	43.6345	17.21	18.974	20.4985	2.30012
E	4.49036	61.3983	44.2867	12.5887	11.9985	15.1998	-4.24428
E	12.8292	83.2184	51.4661	19.3329	16.8692	15.5675	2.74276
E	9.50701	91.2213	51.6512	17.8027	15.9716	14.2118	-0.66333
E	9.02209	63.6167	35.345	12.4608	14.2359	9.45289	1.10938
E	8.962165	74.86368	45.68725	15.54628	14.7688	13.608	-0.26387
F	10.5157	14.2739	25.2828	12.8958	14.972	9.87129	1.89116
F	5.19141	9.38946	20.2391	5.46652	8.46267	1.80319	-5.71444
F	7.2347	10.8823	20.8437	7.37474	10.713	3.80418	-2.66741
F	10.3852	15.3578	26.8575	12.7271	14.8643	8.49607	1.5346
F	15.2605	19.2205	30.7082	16.7704	20.2685	13.6839	5.88827
F	11.0937	37.27612	34.1378	13.85661	15.20012	10.35153	0.972197

Variedad	7.56	7.6	7.64	7.68	7.72	7.76	7.8
A	0.191828	-0.03617	-0.38269	-0.40021	0.412071	0.298303	-0.44732
A	-0.06739	-0.00647	-0.2107	-0.08707	0.867934	0.661799	-0.06467
A	0.338112	0.075954	-0.14478	-0.06753	0.766085	0.622981	0.018989
A	-0.02436	-0.18208	-0.29105	-0.20446	0.59714	0.531862	-0.09888
A	0.396839	0.111853	-0.45203	-0.57265	0.202998	0.047367	-0.7697
A	0.379484	0.274817	-0.2506	-0.25407	0.680531	0.776246	-0.0554
B	0.447473	0.1941	-0.00386	-0.10692	0.803998	0.54955	-0.04456
B	0.300776	0.116194	-0.03065	-0.05781	0.865495	0.748549	-0.02883
B	0.627416	0.320647	0.134263	-0.06442	0.791136	0.289085	-0.15725
B	0.943684	0.165089	0.036897	-0.17018	0.696384	0.308478	-0.1502
B	0.883391	0.096009	-0.05248	-0.07893	0.455571	0.175576	-0.25158
B	0.05188	-0.28419	-0.41243	-0.47684	0.42566	0.186609	-0.18854

C	-0.18036	0.075062	-0.04235	-0.1267	1.47779	1.18103	-0.08373
C	0.366096	0.334481	0.02673	-0.17595	1.41573	1.23473	0.048633
C	0.142525	0.236616	0.092336	-0.11742	1.43197	1.13469	0.011652
C	-4.67394	-4.1491	-3.82892	-3.48053	-1.10876	-0.87855	-1.62223
C	0.427096	0.272731	-0.07745	-0.17785	1.37648	0.91382	-0.11464
C	-1.50525	-1.29244	-1.34257	-1.28693	0.593473	0.413541	-0.61901
D	-0.6189	-0.43457	-0.2574	-0.38469	1.21651	1.45293	-0.02293
D	-0.10185	-0.19006	-0.21378	-0.42124	1.16984	1.31876	0.025888
D	2.19365	1.15382	0.403686	-0.1368	2.05988	1.62645	0.243506
D	0.554989	0.31821	0.139612	-0.19278	2.24301	1.49553	0.060655
D	-1.19196	-0.76665	-0.50499	-0.59513	1.95988	1.60472	0.071136
D	0.178048	0.077663	0.028961	-0.256	1.79874	1.61723	-0.02698
E	0.683227	-0.11581	-0.24595	-0.46405	0.50487	0.709498	-0.82752
E	-6.25258	-7.12721	-7.4725	-1.61637	0.28818	-1.18073	-6.19909
E	0.969278	0.202883	-0.042	5.72594	6.82795	4.84713	0.264225
E	-2.92726	-3.76443	-4.39982	-0.17187	2.65509	0.308407	-4.20127
E	0.014817	-0.49463	-0.60976	9.06161	7.84309	4.19267	-0.698
E	-2.04894	-2.79585	-3.13102	3.249827	4.403578	2.041869	-2.70853
F	0.181215	-0.27697	-0.95365	4.79244	8.39474	7.25158	1.25766
F	-7.02284	-7.03163	-7.11447	-0.50958	1.72455	-0.16135	-4.60753
F	-3.93475	-4.23553	-4.52933	2.89297	4.22082	2.16619	-2.33723
F	-0.65696	-1.22171	-1.92698	3.12362	5.50544	4.3786	-0.04775
F	3.77211	3.09008	2.15295	8.07222	10.6283	9.4719	4.0805
F	-0.76048	-1.24622	-1.66784	4.429527	6.3936	4.719225	-0.0876

Variedad	7.84	7.88	7.92	7.96	8	8.04	8.08
A	-0.4132	0.161781	0.810116	1.270114	0.873549	0.250669	1.332599
A	-0.0904	0.530924	0.871906	1.82483	0.933864	0.491883	1.3358
A	0.111818	0.550463	1.31514	1.10667	0.986172	0.32917	1.40121
A	0.047744	0.497052	1.29226	1.14268	0.912354	0.32496	1.38525
A	-0.85007	-0.18291	0.28078	1.32356	0.783858	0.161776	1.20232
A	-0.13296	0.381263	0.857446	1.53053	1.31273	0.412019	1.37992
B	-0.07387	0.758163	0.5649	1.34183	0.753371	0.237221	1.02275
B	-0.02142	0.730921	0.790617	1.41287	0.947647	0.40042	1.09292
B	-0.08219	0.318974	0.241441	2.21472	0.998645	0.234701	1.09405
B	-0.17204	0.196081	0.050787	2.38356	0.929374	0.291384	1.34893
B	-0.30041	0.180425	0.962683	2.15194	0.551073	0.090576	0.953265
B	-0.0254	0.492207	1.32686	3.01692	0.860139	0.40148	1.1552
C	-0.09491	0.97275	0.519486	2.48972	0.860975	1.28971	1.64895
C	-0.05149	0.987707	0.353125	1.72778	0.972098	0.97037	1.92098
C	-0.08026	1.14425	0.425664	2.94831	1.14481	1.49112	1.78618
C	-1.19007	0.211393	-0.31088	1.34283	0.612027	0.557891	2.19567
C	-0.09141	1.33806	0.351339	1.41217	1.90969	0.145349	1.35106
C	-0.46797	0.857549	0.19038	1.783205	1.150115	0.677603	1.766531

D	-0.14009	1.1511	0.356309	1.91868	1.04422	0.966569	2.61057
D	-0.15164	1.06149	0.236836	1.73858	0.755754	0.572139	2.15048
D	-0.09822	0.960367	0.115529	1.38471	0.443049	1.06874	0.980376
D	-0.0968	1.05112	0.443265	1.33421	1.11204	1.35446	1.30816
D	-0.01903	1.12421	0.530413	2.23873	0.851642	1.33795	2.86208
D	-0.22651	0.725235	0.082079	1.6158	0.481781	0.682072	2.49147
E	-1.18042	-0.13377	-0.87534	2.04376	0.747352	0.535374	3.02882
E	-6.30606	-5.00614	-5.59189	-2.2177	-2.99639	-2.7957	-0.29404
E	0.023679	0.719324	-0.09413	2.17528	0.862989	1.09991	3.11989
E	-4.46578	-3.49099	-4.57574	-1.03093	-2.41629	-1.52896	0.96847
E	-1.05813	-0.67007	-0.6536	0.856939	0.164505	0.455363	3.50406
E	-2.95157	-2.11197	-2.72884	-0.0541	-1.0963	-0.69235	1.824595
F	0.228518	1.23732	-0.76757	1.95143	5.38735	0.905318	5.01594
F	-4.86454	-3.37729	-4.95569	-0.74289	1.87271	-1.80784	3.10547
F	-2.7758	-1.9392	-3.37396	0.715229	2.68008	-0.6339	4.30285
F	-1.20745	-0.24549	-2.35788	0.352482	4.53748	-1.02856	4.09489
F	2.96557	3.69356	1.32628	3.48535	7.59267	2.90863	7.25741
F	-0.6251	0.345198	-1.24118	1.639248	3.44279	0.733567	4.494257

Variedad	8.12	8.16	8.2	8.24	8.28	8.32	8.36
A	5.186946	0.102313	0.439059	1.029813	-0.06137	0.278203	0.694351
A	5.32943	0.190883	0.581574	1.07	-0.01908	0.3185	0.706319
A	4.59823	0.001788	0.378575	0.861253	-0.03645	0.243182	0.706795
A	4.62702	0.078227	0.448295	0.905776	-0.06137	0.232688	0.649376
A	5.44472	0.120439	0.404246	1.09386	-0.0578	0.307512	0.698878
A	5.72544	0.22733	0.406767	1.09067	-0.0764	0.203588	0.651386
B	3.86772	0.170181	0.319165	0.751558	-0.05923	0.194956	0.545555
B	3.82114	0.084044	0.25391	0.710899	-0.03491	0.138621	0.611494
B	3.96128	0.241504	0.53552	0.770105	-0.0669	0.309894	0.611403
B	4.00303	0.318175	0.534784	0.668011	-0.0395	0.299118	0.671146
B	3.6242	0.207578	0.532125	0.643747	-0.09515	0.114099	0.376861
B	4.31264	0.228586	0.625584	0.712682	-0.06151	0.323323	0.544856
C	4.86562	0.010203	0.205902	1.0051	-0.05012	0.494912	0.477484
C	4.91561	0.08715	0.162312	0.804781	-0.09629	0.395843	0.459321
C	4.89514	0.052233	0.229715	1.00825	-0.10276	0.488962	0.534307
C	4.7979	-0.19903	0.043497	0.704794	-0.10918	0.404637	0.577538
C	4.05794	0.034291	0.157416	0.844863	-0.03705	0.191417	0.613595
C	4.665296	-0.05254	0.138317	0.868617	-0.06676	0.370928	0.56733
D	7.81427	0.195985	0.374516	1.01037	-0.07567	0.349922	0.742728
D	7.22889	0.104783	0.234324	0.951131	-0.09378	0.331275	0.657202
D	5.88015	0.205683	-0.01606	0.714005	-0.1019	0.198424	0.508125
D	5.97255	0.154601	0.010285	0.740879	-0.14372	0.157837	0.405203
D	7.22495	0.049727	0.069029	0.862767	-0.1379	0.358847	0.47451
D	6.61536	0.07506	0.095691	0.80616	-0.16086	0.266302	0.540933

E	6.04677	0.258472	0.411258	1.4783	-0.13063	0.288264	0.74004
E	4.93162	-1.43466	-0.90501	0.660262	-0.37508	-0.02933	0.627961
E	6.60609	-0.10076	-0.2138	0.143893	-0.79853	-0.82983	-0.37636
E	6.36803	-1.11259	-0.66744	0.829512	-0.54088	0.625374	0.426755
E	4.56637	0.050478	0.570015	0.77012	-0.14602	0.298584	0.473786
E	5.618028	-0.64938	-0.30406	0.600947	-0.46513	0.0162	0.288035
F	5.01915	0.650084	0.46548	2.88149	-0.01146	0.271964	3.32113
F	2.71583	-1.44056	-0.47743	1.92696	-0.57018	0.13938	3.48735
F	3.31086	-0.55941	-0.21517	1.83494	-0.48283	-0.07219	3.04857
F	3.72169	-1.50414	-0.95652	1.34847	-1.7291	-1.47412	2.5526
F	6.96033	2.04212	1.69926	3.5437	0.535632	0.592054	3.70973
F	5.427417	0.166932	0.33601	1.871518	-0.27769	-0.0328	2.273573

Variedad	8.4	8.44	8.48	8.52	8.56	8.6	8.64
A	0.328685	0.321385	1.011686	5.842248	0.992962	0.257053	0.347949
A	0.266779	0.25152	1.34862	4.4303	0.662928	0.056723	0.196173
A	0.336431	0.304678	0.328285	5.78469	0.714889	0.09358	0.301698
A	0.278452	0.277496	0.436808	5.39828	0.649472	0.077956	0.238246
A	0.359772	0.346552	1.52763	5.94589	1.27861	0.421177	0.437384
A	0.242577	0.26887	5.00052	2.6867	0.978931	0.188613	0.305002
B	0.14402	0.207107	3.52301	0.913818	0.729855	0.156281	0.270318
B	0.143751	0.227964	3.9392	0.949164	0.586843	0.026582	0.247476
B	0.231095	0.307318	3.90164	0.902001	0.974603	0.292994	0.369277
B	0.241597	0.372917	4.65626	1.08999	1.18119	0.404947	0.39716
B	0.240236	0.487149	3.39243	2.59819	1.7814	0.43481	0.644948
B	0.307587	0.529961	6.6089	0.847931	1.56519	0.326649	0.574547
C	0.191093	0.141196	6.81502	1.22065	1.0356	0.316024	0.18366
C	0.157179	0.126782	7.87467	1.11949	0.831871	0.166055	0.188923
C	0.183216	0.137706	6.85045	0.976839	0.942858	0.321692	0.177943
C	0.203393	0.252415	8.62063	0.879565	0.946044	0.225929	0.182934
C	0.131231	0.071661	3.26659	1.25463	0.529278	0.186027	0.124687
C	0.178744	0.158192	6.358762	1.140647	0.853713	0.247513	0.167036
D	0.328294	0.330419	6.77216	0.507359	0.993422	0.204438	0.198707
D	0.262865	0.257258	6.51638	0.682429	1.03841	0.248853	0.242303
D	0.077379	0.05838	3.88918	0.963217	0.71367	0.29995	0.12781
D	0.11514	0.036351	4.13384	0.723086	0.739444	0.240003	0.167442
D	0.285566	0.273835	5.66068	0.374885	1.00864	0.162199	0.163424
D	0.222646	0.338623	5.30866	0.700971	1.21025	0.414443	0.25666
E	0.370955	0.402895	5.71217	0.293499	0.971064	0.539847	0.385699
E	0.209384	0.250376	6.05312	0.14551	0.809087	0.479202	0.340752
E	-0.53475	0.00775	6.28286	-0.11494	0.661243	0.330813	0.206522
E	0.015094	0.523634	8.69402	0.069811	0.718111	0.343531	0.283555
E	0.341966	0.294595	5.78896	0.105013	0.64111	0.260449	0.171158
E	0.007924	0.269089	6.70474	0.051348	0.707388	0.353499	0.250497

F	1.64894	7.06293	1.11789	0.594942	0.607614	0.18063	0.75782
F	1.8262	7.52515	0.167104	0.351002	0.476294	0.123638	0.880171
F	1.44646	7.2249	0.551351	0.360441	0.380681	0.154067	0.677407
F	0.136496	8.94329	-0.25618	0.070871	0.336662	-0.13374	0.835342
F	1.99276	6.92816	1.47028	0.913148	0.718981	0.219566	0.730579
F	1.094738	4.820353	2.640081	0.383069	0.618839	0.224672	0.605757

Variedad	8.68	8.72	8.76	8.8	8.84	8.88	8.92
A	-0.0014	0.094347	0.295126	0.15048	-0.08244	4.87223	5.07739
A	-0.05173	0.098197	0.237096	0.128487	-0.02146	4.86296	4.82344
A	-0.03016	0.111451	0.272025	0.155877	-0.07268	4.50748	4.56992
A	-0.02805	0.080852	0.236105	0.117721	-0.1129	4.42195	4.53759
A	0.025337	0.102346	0.336955	0.174474	-0.04718	5.03869	5.32142
A	-0.02648	0.084086	0.263267	0.146107	-0.02579	5.33065	5.47974
B	0.021587	0.083385	0.349241	0.240814	-0.0328	3.45912	3.61426
B	-0.02796	0.087723	0.299882	0.189549	-0.0355	3.46097	3.49985
B	0.071473	0.131957	0.557059	0.363351	-0.00019	3.49677	3.5561
B	0.038312	0.114158	0.489281	0.247245	-0.00909	3.602	3.7745
B	0.166088	0.068371	0.935627	0.662411	0.02516	3.35491	3.64548
B	0.093363	0.103766	0.93254	0.702557	0.082163	4.0414	3.93421
C	-0.04285	0.224187	0.137555	0.147027	-0.01505	4.72127	4.66711
C	-0.0581	0.150212	0.189633	0.175346	-0.07686	4.71893	4.79678
C	-0.03406	0.181652	0.194652	0.177559	-0.0384	4.56759	4.53152
C	-0.07109	0.153179	0.211633	0.181686	0.070747	5.23731	4.81284
C	-0.03317	0.15279	0.102184	0.071068	-0.06007	4.07206	4.23045
C	-0.05002	0.180253	0.153466	0.135926	-0.00148	4.770418	4.661536
D	-0.06677	0.073954	0.206176	0.206382	0.018139	6.63999	6.38606
D	-0.06933	0.047403	0.195915	0.13375	-0.07895	6.24699	6.29113
D	-0.03595	0.079835	0.114555	0.089952	-0.211	5.26442	5.84941
D	-0.05407	0.071581	0.089561	0.045987	-0.08782	5.67202	5.6057
D	-0.10203	0.118236	0.222254	0.086686	0.030712	7.09437	6.55328
D	-0.04332	0.043927	0.136436	0.008296	-0.11716	6.32585	5.98272
E	-0.02729	0.177039	0.280651	0.289587	-0.03871	5.74743	6.06378
E	-0.04412	0.179902	0.20561	0.282314	-0.04162	6.32477	6.74982
E	-0.08417	0.138131	0.120461	0.119387	0.15612	6.47117	6.47
E	-0.11507	0.18319	0.213706	0.246337	0.08182	7.60188	7.70313
E	-0.11978	0.087713	0.090065	0.14787	-0.03385	4.81225	5.02218
E	-0.09078	0.147234	0.157461	0.198977	0.040619	6.302518	6.486283
F	0.055256	-0.05276	0.224496	0.156233	-0.02088	3.44956	4.14705
F	-0.0188	-0.01112	0.255221	0.191591	0.109875	3.98925	4.09213
F	-0.01167	-0.05778	0.27363	0.174554	0.011374	3.74807	4.15738
F	-0.0688	-0.06697	0.260224	0.205101	0.054656	4.04449	4.89798
F	0.080501	-0.03079	0.182601	0.134597	-0.05123	3.91005	4.70806
F	-0.00749	0.032071	0.186094	0.148525	0.071588	4.790157	5.090063

Variedad	8.96	9	9.04	9.08	9.12	9.16	9.2
A	0.207222	0.255631	0.021463	-0.01616	-0.03058	-0.08393	4.606783
A	0.11037	0.196815	0.023351	-0.02646	-0.0168	-0.00212	4.38483
A	0.093776	0.236305	0.076401	0.0054	-0.01637	-0.08835	4.20861
A	0.167526	0.24711	0.018881	-0.00366	-0.01888	-0.07669	4.18316
A	0.234846	0.24926	0.022795	-0.02771	-0.04051	-0.08627	4.76205
A	0.245218	0.257654	0.032624	-0.03094	-0.04033	-0.01822	4.79235
B	0.131049	0.22483	0.069725	-0.02629	-5.34E-05	-0.06315	3.17221
B	0.095747	0.22398	0.100452	-0.00692	-0.00985	-0.03149	3.11144
B	0.095621	0.183248	0.095804	-0.00528	-0.01551	-0.08846	3.16389
B	0.165759	0.194824	0.091922	-0.03288	-0.03546	-0.08797	3.2403
B	0.194314	0.197677	0.112293	-0.01677	-0.01664	-0.10764	2.96057
B	0.101255	0.289631	0.163368	0.004517	0.006662	0.074766	3.28288
C	0.092209	0.330195	0.081326	-0.00992	-0.02023	-0.05241	4.28459
C	0.153878	0.325208	0.074756	-0.01407	-0.02212	-0.05027	4.31309
C	0.068252	0.271915	0.069473	-0.03334	-0.01027	-0.07353	4.18852
C	0.042208	0.259813	-4.84E-05	-0.02009	-0.04158	0.199344	4.34892
C	0.169028	0.213994	0.080513	0.015389	-0.01418	-0.09886	3.74813
C	0.103171	0.273361	0.055009	-0.00497	-0.02584	0.016345	4.209758
D	0.135631	0.296131	0.074601	0.001719	-0.02797	0.070338	5.81728
D	0.210617	0.299685	0.042638	-0.03138	-0.04654	-0.0228	5.65571
D	0.437924	0.218989	0.046437	-0.01989	-0.04308	-0.27543	5.23013
D	0.176988	0.204621	0.044814	0.014129	-0.03625	-0.04155	5.21229
D	0.065029	0.271294	0.061238	0.012757	-0.04468	0.12028	6.14338
D	0.124739	0.240598	0.029811	-0.06611	-0.08254	0.106257	5.57381
E	0.224322	0.315035	0.068075	-0.01979	-0.0292	-0.0779	5.31783
E	0.31861	0.29173	0.061716	-0.02033	-0.02964	-0.10862	5.94459
E	0.453225	0.346567	0.041859	-0.08025	-0.08375	0.219279	5.60536
E	0.610584	0.561594	0.146403	-0.02607	-0.05897	0.191722	6.84561
E	0.254686	0.209326	0.01442	-0.04326	-0.0343	-0.01481	4.40305
E	0.409276	0.352304	0.0661	-0.04248	-0.05166	0.071893	5.699653
F	0.259795	0.181366	0.041019	-0.01805	-0.03262	-0.15703	3.49797
F	0.094559	0.188058	0.035383	-0.05232	-0.05652	0.061861	3.45295
F	0.378636	0.202407	0.055272	-0.01086	-0.08451	-0.02337	3.25954
F	0.345974	0.301871	0.112506	0.001251	-0.04044	-0.18883	3.95772
F	0.480555	0.193093	0.034192	0.01277	-0.08437	-0.13409	3.90522
F	0.34278	0.242573	0.037145	-0.03993	-0.07488	0.049018	4.321177

Variedad	9.24	9.28	9.32	9.36	9.4	9.44	9.48
A	0.060131	-0.04403	0.71152	1.745701	1.919034	1.831124	0.138839
A	-0.01337	-0.04105	0.866678	1.69038	1.86699	1.53113	0.047106
A	-0.00553	-0.04091	0.592991	1.41102	1.55944	1.57485	0.059206
A	0.027074	-0.04281	0.58211	1.38702	1.48942	1.52266	0.069039

A	0.089685	-0.04268	0.799482	2.00269	2.23686	2.03292	0.200552
A	0.034416	-0.0566	0.918127	1.84849	2.09685	1.69137	0.065932
B	0.020046	-0.03423	0.756459	1.38238	1.25261	1.70974	0.14612
B	0.001807	-0.03492	0.807589	1.24649	1.19936	1.47918	0.073301
B	0.008712	-0.05298	0.519477	1.43725	1.42804	2.29972	0.21217
B	0.032041	-0.04095	0.536569	1.74308	1.80314	2.50598	0.533783
B	0.039578	-0.05711	0.404568	1.20125	1.30287	2.20415	0.287611
B	-0.0183	-0.03541	0.539175	1.18332	1.38426	1.92568	0.090814
C	0.000146	0.040041	2.06232	3.14831	2.48582	2.14823	0.302652
C	0.029832	-0.0345	2.07928	2.98758	2.39185	2.1269	0.310241
C	-0.01735	-0.04879	1.6376	2.55734	1.89432	1.86527	0.155077
C	-0.00894	0.142368	2.57285	2.98493	2.62581	2.18258	0.305045
C	0.037092	-0.05323	1.0567	2.13009	1.53793	1.16645	0.050758
C	0.009622	0.04392	1.935236	2.809532	2.26085	1.869068	0.223875
D	-0.01072	0.054954	2.09272	2.47501	2.40705	2.15986	0.249008
D	0.02011	0.011108	1.90174	2.46534	2.32796	2.27653	0.280273
D	0.133201	-0.0414	0.96248	1.76528	1.46946	1.18731	0.094905
D	0.070018	-0.01714	1.29909	2.02755	1.85603	1.46222	0.228818
D	-0.04019	0.035971	2.00262	2.46604	2.39441	1.85305	0.193786
D	-0.00708	0.018395	1.66536	2.16908	2.01712	1.50029	0.037201
E	0.022856	0.075923	1.77059	3.03209	2.41392	3.15434	0.735117
E	0.070203	0.052327	1.76753	3.03548	2.3348	3.0804	0.664952
E	0.010495	0.035501	1.69002	2.64641	2.13125	2.4537	0.566223
E	0.05741	0.122703	2.3262	2.79318	2.36829	2.57726	0.522943
E	0.017007	0.031923	1.62917	3.23074	2.31603	2.66776	0.736042
E	0.038779	0.060614	1.85323	2.926453	2.287593	2.69478	0.62254
F	0.068314	0.187861	3.46939	5.88584	3.99042	2.87305	1.01637
F	-0.03604	0.454179	4.92909	5.61184	3.81534	2.58092	0.680987
F	0.00627	0.349135	4.93697	5.19835	4.01377	2.82958	0.940115
F	0.015095	0.214328	4.21262	6.33848	4.46539	3.24402	1.19205
F	0.147533	0.164143	4.28823	7.84586	5.1426	3.89513	1.81443
F	0.040664	0.217941	3.63578	5.368037	3.696397	2.976583	1.020547

Variedad	9.52	9.56	9.6	9.64	9.68	9.72	9.76
A	0.017677	-0.02694	0.037668	0.014135	0.023364	0.052109	0.024188
A	0.025642	0.009629	0.020448	0.038643	0.068124	0.081224	0.033998
A	-0.01113	0.01916	0.026917	0.025927	0.033711	0.027994	0.037666
A	-0.01857	-0.03969	0.020447	0.013893	0.021672	0.061035	0.021729
A	0.052894	-0.01263	0.052695	0.013553	0.023694	0.040147	0.025239
A	-0.03143	0.001269	0.044891	0.01265	0.021241	0.041572	0.008645
B	-0.01291	0.003232	0.028233	0.010855	0.036912	0.055003	0.011876
B	-0.0063	0.024959	0.052996	0.03127	0.053859	0.063639	0.011509
B	0.008025	0.013484	0.036092	0.018517	0.018304	0.006056	0.00834
B	0.095134	0.017865	0.032186	0.019674	0.020085	0.039494	0.024945

B	0.024525	-0.01381	0.037161	-0.01227	0.022872	0.020689	0.017273
B	-0.02165	-0.00176	0.031335	0.004994	0.032522	0.048501	0.030943
C	0.058102	0.05614	0.076681	0.060737	0.065796	0.060486	0.037115
C	0.071001	0.006109	0.005834	0.033179	0.042779	0.053514	0.030527
C	0.048913	0.029616	0.054085	0.038785	0.04242	0.042257	0.034021
C	0.110919	0.053424	0.062108	0.03158	0.03532	0.056898	0.032297
C	-0.01139	0.030013	0.035953	-0.00983	0.05654	0.040418	0.017661
C	0.053593	0.047456	0.059412	0.028046	0.053603	0.053653	0.029605
D	0.061346	0.057732	0.095914	0.055665	0.054807	0.053844	0.006842
D	0.051189	0.027198	0.047882	0.039231	0.046816	0.07449	0.011114
D	-0.0194	-0.01342	0.01764	0.0198	0.000648	0.015064	3.59E-05
D	0.018539	0.020772	0.077226	0.034107	0.046987	0.05731	0.036421
D	0.050972	0.008452	0.060987	0.016289	0.078763	0.071439	0.032195
D	-0.01974	-0.009	0.059456	0.07703	0.072507	0.084189	0.034342
E	0.26516	0.023132	0.025409	-0.02159	0.029668	0.021085	0.021055
E	0.225018	0.07153	0.061013	0.073618	0.077217	0.051433	0.033833
E	0.206943	0.04003	0.055819	0.069198	0.042654	0.051544	0.022601
E	0.187912	0.018777	0.067532	0.067874	0.059345	0.063404	0.023384
E	0.243681	0.059203	0.061738	0.041449	0.020968	0.03346	0.025593
E	0.215889	0.047385	0.061525	0.063035	0.050046	0.04996	0.026353
F	0.354169	0.007094	0.009523	-0.02091	0.01158	0.008559	0.023504
F	0.242777	-0.02174	0.011267	-0.00028	0.036703	0.050858	0.047043
F	0.370146	0.00548	0.020625	0.02988	0.037858	0.035032	0.047649
F	0.497632	0.004911	0.017871	-0.01154	0.010163	0.009082	0.008906
F	0.857191	0.166343	0.02565	-0.00687	0.006253	-0.01072	0.012524
F	0.435637	0.061545	0.030912	0.020686	0.028537	0.03056	0.027389

Variedad	9.8	9.84	9.88	9.92	9.96	10
A	0.011879	0.137146	0.038672	0.038998	0.053492	0.042626
A	0.018769	0.139547	0.030875	0.062629	0.045134	0.055051
A	-0.00136	0.095219	0.035284	0.014612	0.021974	0.028957
A	0.017313	0.123748	0.027228	0.04846	0.060388	0.033019
A	0.005752	0.142555	0.047863	0.027265	0.04348	0.049751
A	0.004481	0.129101	0.034142	0.054812	0.057004	0.036846
B	0.008231	0.103547	0.041442	0.053865	0.040469	0.04733
B	0.004611	0.110619	0.017811	0.059573	0.033495	0.037577
B	0.007416	0.130827	0.039228	0.039891	0.032963	0.035852
B	-0.0027	0.098376	0.048858	0.024038	0.034269	0.026543
B	0.009424	0.105939	0.041851	0.028436	0.03651	0.026568
B	0.00835	0.167917	0.055301	0.078916	0.035766	0.05522
C	0.028517	0.122396	0.062871	0.054531	0.049339	0.057071
C	-0.0109	0.084767	0.026719	0.026349	0.021824	0.028132
C	0.000147	0.077713	0.056473	0.063598	0.066773	0.064684
C	0.001589	0.13821	0.050383	0.01596	0.048844	0.066225

C	0.007687	0.068159	0.073441	0.060102	0.060356	0.049393
C	0.01285	0.11178	0.063476	0.044402	0.053903	0.058714
D	0.031319	0.125016	0.07997	0.05694	0.044217	0.037743
D	0.013543	0.096429	0.064145	0.084157	0.073985	0.086295
D	-0.01351	0.068966	0.007077	0.019226	0.028539	0.016669
D	0.005494	0.115309	0.072865	0.06881	0.04722	0.076247
D	0.044026	0.114636	0.099347	0.10032	0.082236	0.090405
D	0.00199	0.082877	-0.0059	-0.00623	0.045976	0.083242
E	0.004891	0.097754	0.061711	0.050922	0.031612	0.035116
E	-0.01667	0.073308	0.010793	0.016952	-0.01608	0.092854
E	0.0198	0.107718	0.077823	0.076442	0.073535	0.072329
E	0.010152	0.094818	0.028195	0.076463	0.087662	0.085534
E	0.005487	0.076738	0.060197	0.039277	0.059547	0.047418
E	0.004693	0.088145	0.044252	0.052283	0.051165	0.074534
F	-0.01333	0.051874	0.002545	0.027498	0.000196	0.035068
F	-0.00374	0.073858	0.064476	0.059939	0.077021	0.078451
F	-0.00182	0.065377	0.014322	0.052371	0.048151	0.032838
F	0.023333	0.036879	0.047106	0.038085	0.024685	0.039797
F	0.005229	0.030955	0.017906	0.010212	0.008957	0.00528
F	0.007097	0.070844	0.053402	0.048864	0.053171	0.05202

ANEXO 4: ZONA GEOGRÁFICA DE COLECTA DE LOS CULTIVARES

Tabla 7.

Zona Geográfica de Colecta de los Cultivares

Variedad	Zona	0.56	0.6	0.64	0.68	0.72	0.76	0.8	0.84
A	I	-0.00047	8.652742	4.8422	-0.33242	0.406581	-0.84875	0.380306	2.615335
A	I	-0.10165	8.06412	5.00621	-0.61814	0.181003	-0.87877	0.189217	1.65491
A	I	0.00537	8.42622	4.7344	-0.14708	1.00844	-0.26215	1.0905	3.72333
A	I	-0.00875	8.42908	4.82966	-0.16929	0.919336	-0.20143	0.908929	3.0472
A	I	0.007846	8.37236	4.57267	-0.47618	-0.12986	-1.44663	-0.17047	2.03112
A	I	0.004442	8.69615	5.08876	-0.18354	0.546638	-0.361	0.684433	2.54074
B	I	-0.01629	9.09053	5.06899	-0.0872	0.589494	-0.63779	-0.07123	2.47534
B	I	0.089607	9.82343	4.90562	-0.04389	0.683882	-0.2966	0.693579	3.7067
B	I	0.091566	9.4536	4.63728	0.068776	0.657776	-0.16418	1.12459	5.34832
B	I	0.059191	8.25769	2.92126	-0.10341	0.614492	-0.24109	2.38157	8.99037
B	I	-0.11632	8.78643	3.60862	-0.58985	-0.50815	-1.06188	0.71635	6.91392
B	I	-0.03104	9.66818	5.16228	0.847947	0.380463	-0.49886	0.558708	6.74895
C	I	0.045513	9.34559	5.15412	-0.33235	0.601366	-0.45498	0.495245	2.01078

C	I	0.08803	9.77834	4.94608	-0.25915	0.906162	-0.02863	1.51355	4.46492
C	I	0.064684	9.04378	4.89903	-0.62326	0.088157	-1.10162	0.22637	2.14061
C	I	-0.13391	8.78628	4.7761	-1.32561	-1.26811	-3.00888	-2.194	-0.16234
C	I	-0.09739	7.26915	4.19846	-0.64815	0.39065	-1.34069	0.066007	3.4278
C	I	-0.06317	8.636347	4.803751	-0.78408	-0.09387	-1.63355	-0.55513	1.793922
D	II	-0.06016	8.91787	4.68872	-0.25835	0.493732	-0.84115	-0.73035	1.58234
D	II	0.086295	8.52533	4.42038	-0.34875	0.362177	-1.22103	-1.04585	1.55195
D	II	0.251172	8.5956	3.51542	0.431947	2.00375	2.19838	4.31854	8.54907
D	II	0.018525	7.97652	3.95901	-0.18116	0.849094	-0.51978	0.164694	3.57882
D	II	0.090405	8.93058	5.02479	-0.22514	0.528357	-1.07901	-1.16037	0.956035
D	II	0.065364	8.29262	3.89615	-0.3259	0.205791	-0.81092	0.346684	3.65278
E	II	0.017581	8.64426	3.51511	-0.1642	1.43229	0.260417	2.95628	6.68158
E	II	-0.08225	7.9199	4.24992	-0.42681	0.963608	-0.25316	2.45343	6.59951
E	II	1.2403	9.30935	4.64052	2.45724	4.94342	5.60454	10.5027	19.7944
E	II	-0.07109	7.70746	3.1607	-0.94694	-0.79283	-1.69079	0.113813	3.64869
E	II	0.003549	6.76264	3.28151	-0.22848	0.98755	0.57369	3.01213	7.03288
E	II	0.272627	7.924838	3.833163	0.213753	1.525438	1.058569	4.020518	9.26887
F	III	0.12273	8.67158	4.75647	-0.19013	1.7741	2.3139	5.48054	12.1413
F	III	-0.05488	8.41583	4.76062	-0.7175	0.956927	0.857123	3.41042	9.04807
F	III	-0.10937	8.31082	3.72074	-0.38071	1.631	2.33811	5.09447	11.6654
F	III	0.04516	8.83988	4.81034	-0.25915	1.88921	2.18391	4.88926	10.8692
F	III	2.32107	11.7933	6.98876	4.69626	8.12251	10.3599	14.9708	24.6736
F	III	1.16883	9.839493	5.4633	2.145334	4.674286	5.607188	9.627973	17.83869

Variedad	Zona	0.88	0.92	0.96	1	1.04	1.08	1.12	1.16
A	I	20.65392	29.45398	21.70086	24.404	43.38159	38.1547	30.29688	95.77738
A	I	21.0858	32.2534	21.804	24.9922	42.579	38.169	25.6602	90.9403
A	I	22.1699	30.2651	20.8381	23.0752	40.065	35.5746	30.2646	90.2316
A	I	19.9049	27.7685	19.4257	22.202	39.8047	35.0581	28.4095	88.6558
A	I	20.1998	29.4237	22.7119	25.1844	44.4314	39.0287	30.4194	97.3197
A	I	23.2723	32.3745	22.7389	25.0879	43.0042	37.8671	27.7038	94.4189
B	I	18.6043	24.2013	14.2145	20.5349	25.4801	24.7324	42.3631	156.431
B	I	23.209	26.5335	15.9679	21.5416	26.6607	25.5215	45.4292	155.546
B	I	23.4231	28.885	18.3834	22.0708	26.001	29.4407	91.9697	324.331
B	I	36.6069	38.3707	25.1107	27.7092	33.2518	39.5355	128.646	317.944
B	I	25.3987	31.7216	24.2194	29.3855	37.2088	45.2438	183.055	615.819

B	I	34.5411	41.3941	25.2088	27.9886	32.5283	40.276	157.614	724.862
C	I	20.281	29.8749	25.3346	40.2947	57.8151	51.3362	21.0795	11.3705
C	I	25.4364	33.6169	29.7423	46.2436	61.2476	52.7012	27.5547	27.4318
C	I	21.3519	30.8523	25.1094	40.6707	55.5542	49.9958	21.6711	11.2261
C	I	20.2835	30.7254	25.4505	43.3323	59.1068	51.1023	24.6273	24.4023
C	I	22.729	33.6056	25.4564	42.6875	54.7599	50.5079	25.5923	13.5696
C	I	21.51979	32.03001	25.92211	42.94693	58.37181	52.00178	24.24169	16.77642
D	II	21.879	29.2947	22.9488	35.422	48.7134	38.5005	18.1472	30.996
D	II	20.8075	28.0349	22.2839	34.1508	47.4888	38.2912	19.1382	31.2369
D	II	26.594	30.8712	32.5704	49.4901	57.7267	47.7073	28.5325	28.1382
D	II	21.5767	29.079	27.3949	47.0698	57.888	46.6386	23.2538	20.9948
D	II	19.491	29.0503	24.257	38.6627	56.3535	44.2312	17.9179	33.003
D	II	23.6616	30.2635	29.1446	42.6054	58.499	46.9858	24.7886	38.3553
E	II	36.5685	42.4996	40.6627	60.6402	89.1633	78.8634	51.3492	74.1057
E	II	57.2945	83.2375	42.8158	60.1211	91.8493	81.7979	47.4172	75.73
E	II	82.2555	88.7895	54.9033	67.4831	99.3343	85.1414	54.6601	67.2003
E	II	59.8709	74.2757	43.416	57.86	98.4266	85.0613	44.5597	62.5444
E	II	57.8137	85.38	37.8787	45.775	69.3592	60.9191	33.4168	39.3994
E	II	64.30865	82.92068	44.75345	57.8098	89.74235	78.22993	45.01345	61.21853
F	III	55.6323	87.036	55.2031	76.0962	88.9798	74.9731	36.1626	18.6297
F	III	50.895	84.4705	55.1065	78.0348	91.5638	78.0314	37.3964	17.4145
F	III	55.0258	84.4493	54.7449	70.4905	83.5943	70.5231	35.685	19.7912
F	III	53.3057	86.3024	55.5858	74.8554	88.8982	75.0115	35.4339	16.9245
F	III	71.6856	98.8654	70.0625	87.264	93.096	78.6506	45.4361	25.9005
F	III	68.2787	90.70847	60.0241	77.59397	94.6647	80.6078	45.83087	36.83843

Variedad	Zona	1.2	1.24	1.28	1.32	1.36	1.4	1.44	1.48
A	I	20.26437	16.72936	117.8464	121.9396	76.05093	17.95651	6.443629	31.00109
A	I	19.859	15.1608	125.751	135.515	83.1125	20.3378	6.80812	26.6
A	I	17.915	15.6348	122.451	126.936	71.606	15.5302	5.28523	28.407
A	I	17.058	13.5956	112.888	115.639	66.7807	14.422	4.35121	27.5406
A	I	22.2903	18.8886	115.94	121.137	80.891	20.445	8.16069	32.6557
A	I	20.3113	17.2471	129.122	132.834	87.3782	18.4678	5.55183	29.7894
B	I	20.0774	13.458	99.8882	105.789	70.5228	11.1378	0.782783	12.1441
B	I	17.6484	15.5501	116.181	119.676	72.8393	9.84521	0.896901	13.412
B	I	27.8738	20.9598	108.24	109.028	100.152	11.7033	3.37574	14.0177

B	I	42.898	40.0542	168.79	163.377	125.724	22.1281	10.7287	23.1112
B	I	57.8991	35.3247	113.286	132.623	103.76	15.1991	5.87686	21.162
B	I	74.6621	42.8058	172.073	171.091	161.817	20.998	6.18707	21.3308
C	I	9.17965	8.23894	118.232	116.919	70.813	20.1384	4.89309	22.0271
C	I	12.426	13.9981	130.966	129.985	74.6089	22.4327	7.96399	22.5803
C	I	9.75061	10.0951	124.696	120.886	71.3969	20.1322	5.25871	21.8497
C	I	7.67284	7.44799	127.038	132.183	78.0787	22.206	5.01698	18.6265
C	I	10.8586	10.9766	131.323	135.998	81.7498	27.1612	8.536	20.9568
C	I	9.421771	9.0656	128.0416	130.934	78.41811	23.6319	6.271664	20.94754
D	II	9.31937	8.77825	118.436	127.755	77.7624	18.1849	5.059	18.592
D	II	10.0534	9.80586	112.54	122.56	75.5326	19.1992	6.55549	19.1135
D	II	19.4836	24.7879	105.764	110.379	69.6573	26.4382	17.2677	32.1826
D	II	10.4494	13.0646	107.756	118.551	73.5854	22.1409	9.15335	23.207
D	II	9.73687	7.47151	111.318	120.089	76.5629	18.4397	4.3424	19.2834
D	II	17.2715	19.766	116.517	122.146	79.2159	25.5934	14.1335	29.3628
E	II	22.2733	23.0096	171.67	161.899	93.9791	25.6782	10.3089	25.12
E	II	24.6064	25.5524	173.51	186.976	139.81	41.275	12.2984	23.803
E	II	35.9832	59.0343	243.798	227.993	145.005	44.0664	23.5499	41.6984
E	II	21.0229	29.3737	206.762	203.204	136.397	39.4589	14.7288	31.795
E	II	21.0544	24.8209	133.664	151.882	132.333	44.2254	17.0411	25.4773
E	II	25.66673	34.69533	189.4335	192.5138	138.3863	42.25643	16.90455	30.69343
F	III	17.5548	22.7089	91.8286	107.773	106.284	48.5697	18.4592	26.5217
F	III	15.577	20.3129	96.5372	113.567	106.075	49.0738	17.6292	25.804
F	III	18.5166	23.078	88.1962	102.489	103.589	48.6427	20.9271	27.6255
F	III	16.0981	21.184	107.573	123.791	103.402	45.8815	16.3501	24.867
F	III	28.2075	36.934	108.065	118.22	112.07	55.1454	28.8937	36.7308
F	III	26.58923	38.7604	149.4667	153.26	121.05	49.42853	23.3576	34.7444

Variedad	Zona	1.52	1.56	1.6	1.64	1.68	1.72	1.76	1.8
A	I	47.84432	30.01415	24.13563	10.1893	1.691224	1.379082	4.226826	18.68338
A	I	46.5415	32.8308	27.1682	11.0736	1.18915	0.696255	3.04413	17.6628
A	I	43.8508	26.7228	24.9756	10.2313	1.85569	1.64827	4.48097	18.8466
A	I	42.233	25.1712	22.0291	8.85645	1.00162	1.03299	3.7548	17.6693
A	I	50.6686	33.1087	24.8362	10.9286	2.28231	1.64484	4.45263	18.6091
A	I	47.7929	30.7808	26.2544	9.73175	0.711815	0.321351	3.43226	17.7412
B	I	26.6006	20.2949	18.828	5.50279	-1.71576	-3.44015	-1.19885	14.6843

B	I	26.216	19.4372	22.2282	6.37019	-0.71794	-2.15435	0.757517	16.4477
B	I	27.747	21.2647	21.4086	7.83207	1.39634	-0.8717	1.25529	16.3754
B	I	35.3553	26.9527	34.7439	13.7579	4.80366	2.28555	4.60187	17.6205
B	I	31.2412	21.5424	22.3701	8.63394	2.61544	0.18216	2.59722	16.4974
B	I	34.2152	23.5539	33.5888	10.359	1.39987	-1.46909	0.395273	15.3957
C	I	42.488	37.4078	25.3931	9.85652	2.38145	0.75871	3.2289	22.356
C	I	40.9019	35.3396	30.6568	12.6267	5.50186	4.11823	7.50177	26.8599
C	I	42.1563	37.6263	27.3865	11.1173	3.68518	2.32767	4.77913	24.0049
C	I	38.0977	34.1698	28.7652	9.72504	1.84507	-0.08908	2.7172	22.2524
C	I	38.6418	34.3929	30.6819	13.8342	4.97806	3.00137	4.25113	21.5159
C	I	40.53735	36.02997	28.84567	11.36136	3.129557	1.248141	3.467058	22.48226
D	II	32.8689	27.6421	26.1959	8.37157	0.506537	0.820678	4.18771	22.5086
D	II	32.7043	27.3336	25.9821	9.11051	1.55514	1.52634	4.60044	22.549
D	II	43.3039	37.448	33.987	20.3168	15.512	17.082	21.315	36.2198
D	II	36.0316	29.9474	27.8892	12.1701	5.17885	5.50963	8.88171	25.1963
D	II	33.4364	27.2125	23.9334	7.77985	0.45955	1.68047	5.40626	23.0368
D	II	39.9217	34.033	32.1579	16.3153	10.3038	11.7244	15.8484	30.7331
E	II	37.318	33.2013	42.3905	20.0684	12.0914	9.56105	11.5989	28.5761
E	II	37.246	35.8528	39.1251	22.4417	12.3359	8.26393	14.8292	27.4432
E	II	51.0524	47.869	57.9663	33.1736	23.0015	20.2479	27.921	35.9445
E	II	44.5345	42.5885	47.4573	23.3623	13.9552	9.82477	16.4055	26.7257
E	II	33.1912	29.8627	31.8248	21.926	14.1124	10.1595	18.6622	25.699
E	II	41.50603	39.04325	44.09338	25.2259	15.85125	12.12403	19.45448	28.9531
F	III	40.9782	44.3885	25.9642	24.5473	20.6882	19.8671	28.9986	43.0747
F	III	40.6941	45.4327	26.6545	24.2298	19.4446	18.5126	26.7917	42.2438
F	III	41.7831	41.1315	25.8758	25.0019	21.2766	20.2761	29.4898	41.5046
F	III	38.8815	44.3862	28.6917	24.2313	18.8666	17.1323	24.6287	39.482
F	III	50.5009	50.2783	35.4383	34.8595	30.826	30.4699	40.1777	52.4973
F	III	47.4158	47.86	40.0197	30.7543	24.42403	23.0768	31.63013	43.56187

Variedad	Zona	1.84	1.88	1.92	1.96	2	2.04	2.08	2.12
A	I	5.118183	9.942266	28.6287	88.43276	35.72143	41.22106	59.17623	28.30296
A	I	4.26459	8.3389	26.2885	86.129	34.4487	42.7213	62.8998	27.6805
A	I	5.5868	10.366	28.8353	84.0211	32.9566	39.921	55.1673	26.2263
A	I	4.32365	8.57847	27.2586	78.9191	31.2051	36.4255	50.8005	24.2253
A	I	5.61457	10.7269	28.3311	92.795	38.1569	43.6154	64.1048	30.7319

A	I	4.23538	8.90758	27.621	90.3429	40.2136	45.1236	64.7091	29.0669
B	I	2.20076	6.11334	17.3805	57.4293	27.0706	30.9781	47.5201	16.6182
B	I	3.37453	7.63155	19.7985	63.5316	27.1573	35.1959	50.5455	17.3512
B	I	4.48824	9.13293	17.7078	31.5361	74.4499	33.3762	51.7864	19.0596
B	I	7.9238	12.9143	23.5564	37.9081	91.4233	50.0002	64.66	26.5571
B	I	5.21933	9.69568	21.8888	97.4453	34.1292	36.073	44.8517	22.0655
B	I	2.44535	6.84518	19.365	44.0392	105.349	45.2477	55.104	21.4028
C	I	6.19118	13.7526	20.7279	36.1573	58.9154	41.3263	80.3402	27.3292
C	I	10.4734	18.7838	25.6596	43.2472	66.0607	48.5681	88.5811	32.0699
C	I	7.75356	15.5177	22.3575	38.2638	60.1784	42.7312	79.7078	27.1595
C	I	5.91329	13.9608	20.8511	39.3401	64.7311	45.8095	89.1743	30.3961
C	I	8.31507	14.8503	23.8529	41.9299	48.3103	42.3189	71.0168	27.6159
C	I	6.942644	14.47166	22.24685	39.92528	58.46531	44.0146	81.78064	29.01601
D	II	4.77674	11.8766	23.7642	40.0396	57.2589	44.6776	69.3706	27.252
D	II	5.72193	12.6709	23.758	40.4871	56.2808	44.1707	69.9615	28.2239
D	II	20.2034	25.9612	43.2358	56.6014	67.7833	51.2682	70.8994	36.51
D	II	8.41264	13.7587	30.9768	44.7972	59.4089	42.2968	65.9445	26.7575
D	II	4.07816	10.5329	27.3296	40.9911	62.6291	41.7404	72.4487	26.8002
D	II	14.2177	20.9796	37.1508	50.0098	70.3853	52.2897	78.587	36.8076
E	II	13.7744	20.3478	23.1812	40.5526	64.6367	61.9002	81.2057	37.111
E	II	12.1294	18.2937	21.5914	38.393	62.5156	57.8324	78.8985	36.681
E	II	23.9179	30.5186	34.8963	49.1386	77.3459	79.1639	88.0519	49.1148
E	II	12.5327	19.5952	22.911	37.6096	69.0022	67.4414	80.1327	41.7041
E	II	14.4239	19.8453	21.6992	31.7797	54.3283	47.3453	72.4191	35.7371
E	II	15.75098	22.0632	25.27448	39.23023	65.798	62.94575	79.87555	40.80925
F	III	24.8687	31.8859	32.0345	48.8412	52.847	63.3166	86.2189	43.8456
F	III	23.9679	31.9642	31.2555	49.0329	54.535	67.357	91.9664	45.2627
F	III	25.6381	33.3467	33.3222	48.2211	53.8012	68.1429	92.4437	48.7387
F	III	21.7613	29.3663	28.2812	44.8955	52.3137	70.3083	97.1576	43.2234
F	III	37.2062	47.0794	45.1725	62.1707	68.9744	85.8775	117.017	61.087
F	III	28.364	36.52073	37.1081	53.4474	66.95177	77.46613	99.01177	51.8215

Variedad	Zona	2.16	2.2	2.24	2.28	2.32	2.36	2.4	2.44
A	I	19.37677	18.52872	24.44478	27.83987	28.84474	41.504	40.83492	18.18666
A	I	19.4989	18.053	28.6159	26.4943	28.4403	39.3625	43.0379	17.5167
A	I	17.4801	16.7818	25.1903	24.4125	27.2677	40.0929	40.0254	17.5784

A	I	15.8106	14.7124	21.3056	22.117	25.0312	37.8642	36.6276	15.5006
A	I	21.8142	21.2657	26.16	31.941	30.978	42.7261	42.6635	19.8133
A	I	19.6122	18.7892	25.8359	31.4653	29.3688	41.9132	42.9602	17.0317
B	I	14.3978	13.7751	17.426	20.8533	16.319	26.0054	39.4074	8.46265
B	I	15.2912	14.999	21.6975	22.9778	18.5715	28.5281	41.1733	9.37276
B	I	16.4849	16.6784	18.0457	30.8948	18.7039	27.4677	34.481	10.3483
B	I	22.4587	22.1597	25.1644	41.1086	26.7066	37.0757	40.716	16.5473
B	I	16.3219	16.8219	23.3279	26.0076	21.3696	28.812	29.8292	11.1977
B	I	15.0593	14.749	20.8905	35.8604	19.23	31.9998	33.1813	9.55842
C	I	26.9887	26.2142	23.2779	42.757	30.3176	37.8732	50.8194	16.0157
C	I	30.6343	31.234	28.3449	50.1558	35.22	43.2844	59.2564	20.3476
C	I	27.4944	26.5418	23.6972	44.3675	31.2367	38.7438	53.2394	17.4552
C	I	27.9565	27.647	24.3347	48.2085	32.7719	39.941	57.1915	18.0651
C	I	26.6056	24.7444	25.2444	38.8961	30.7169	39.5591	48.87	18.0626
C	I	27.72727	26.7259	24.77138	44.15294	31.89418	39.90692	53.33951	17.72876
D	II	23.6883	23.651	16.9672	41.184	27.9295	38.4362	54.3316	16.0981
D	II	24.6809	24.5192	17.8238	40.9711	28.2078	37.9236	54.5931	17.0615
D	II	36.034	35.266	33.3873	49.4475	40.4113	49.7328	60.4516	29.4274
D	II	25.5706	24.2073	21.9545	39.2197	29.7628	40.2569	48.5867	17.0924
D	II	25.0932	24.3333	20.2569	40.0391	29.1965	41.5922	51.7466	15.4982
D	II	35.3899	34.327	29.8613	51.4363	40.2604	51.2904	59.4424	27.4895
E	II	34.9144	29.5551	22.4783	52.9759	44.9863	44.6011	57.0266	27.0706
E	II	33.9439	27.6184	21.3296	47.0544	43.519	45.2392	61.1004	25.6335
E	II	44.584	39.2239	36.1607	68.6471	57.9277	63.2696	73.6223	39.0162
E	II	36.5511	30.2603	23.8327	57.2717	49.0262	48.8208	68.5917	29.3695
E	II	33.6778	29.5806	25.4937	45.0865	40.2551	46.2749	50.6362	28.6758
E	II	37.1892	31.6708	26.70418	54.51493	47.682	50.90113	63.48765	30.67375
F	III	46.0421	41.6967	32.8617	44.7484	49.5895	52.1237	52.7647	46.5119
F	III	48.2625	43.6598	33.7786	46.8466	52.5846	54.9888	55.5127	48.7095
F	III	50.0843	45.5778	36.6812	48.5749	51.4107	56.9604	56.1191	49.0114
F	III	45.5933	40.9105	31.3131	43.4558	51.3674	53.4749	53.593	46.5484
F	III	64.7834	60.6692	51.0701	64.3256	65.5481	70.088	65.8942	59.206
F	III	52.5433	47.85097	40.33647	59.93977	58.6868	62.78213	65.00973	48.97723

Variedad	Zona	2.48	2.52	2.56	2.6	2.64	2.68	2.72	2.76
A	I	23.92566	96.92341	31.21492	24.43155	18.51363	9.217676	9.510526	89.4966

A	I	24.8373	94.1273	33.2827	24.9423	16.372	9.4617	13.6316	90.292
A	I	24.5836	91.3461	27.8084	22.9855	19.6624	10.2766	11.1807	91.5969
A	I	21.5249	82.3168	26.1579	20.5613	17.0556	7.8412	9.63423	82.7772
A	I	24.9327	105.884	34.4536	26.8786	18.8932	10.0572	8.83281	91.0026
A	I	21.349	101.479	33.6507	24.7161	16.9854	8.12594	8.1983	85.065
B	I	10.8619	59.4457	30.1842	13.9268	9.95558	3.82079	8.47194	50.8923
B	I	13.8133	73.9266	24.9382	16.7935	12.4898	5.60057	9.14729	64.3416
B	I	12.0372	37.9664	61.2892	11.4892	8.46366	4.99038	11.1208	43.7153
B	I	18.0614	31.7228	76.396	18.6776	14.0628	9.55286	9.32838	51.6965
B	I	12.1348	86.1634	26.6002	11.8076	9.25533	4.34418	10.5966	34.0302
B	I	10.7492	76.7816	36.9428	10.9759	7.86208	3.32146	5.85014	38.7874
C	I	18.8218	58.7381	52.3995	25.4186	22.6346	13.3345	7.8544	87.2311
C	I	24.1182	56.9444	63.6334	25.7477	32.2265	18.502	12.5887	93.924
C	I	20.5125	49.1914	65.8691	27.2104	26.9609	17.2063	10.3215	92.8252
C	I	20.8573	46.117	68.4826	22.9417	27.4633	15.7027	8.75439	85.484
C	I	17.689	55.5837	46.9243	27.2041	22.0011	13.5089	10.314	84.6638
C	I	19.50515	54.54919	57.05418	25.6919	24.51366	14.46567	9.153749	87.50883
D	II	20.6208	28.772	97.4669	27.6804	21.9482	14.8897	9.62785	77.872
D	II	20.7315	27.852	95.7765	26.8039	21.3656	15.018	9.62816	72.2111
D	II	33.183	57.4468	90.0562	36.2291	32.0602	27.3195	28.6132	92.7437
D	II	19.9695	46.8886	84.8922	22.9168	17.8833	12.2467	13.8942	85.0067
D	II	19.6212	38.3285	80.6219	23.3728	17.5097	11.4705	8.50437	84.3342
D	II	32.4572	45.7463	91.3169	36.0169	30.9569	26.1205	24.4584	85.5818
E	II	29.9821	23.7364	63.9209	57.4281	25.9881	21.7656	17.1365	55.2355
E	II	29.5364	22.5813	66.36	63.2284	26.4911	20.5466	16.7167	52.4914
E	II	46.8836	42.1633	79.3165	72.4031	43.0819	38.7385	39.3011	79.3699
E	II	36.6623	28.8409	69.6488	64.2428	37.1854	25.856	24.2954	59.6983
E	II	28.8173	25.1916	67.1877	55.7342	30.2306	23.8146	20.389	50.3632
E	II	35.4749	29.69428	70.62825	63.90213	34.24725	27.23893	25.17555	60.4807
F	III	33.0182	31.1995	49.9032	127.913	82.6002	25.7333	33.119	47.924
F	III	34.8498	33.1456	43.7516	143.298	94.125	26.2891	35.8652	51.9874
F	III	38.1376	35.2758	56.3485	126.854	82.3835	31.4053	37.5814	52.2936
F	III	32.4505	28.718	25.1665	125.506	93.0816	21.7289	30.4817	36.6696
F	III	47.4332	44.3051	70.607	144.313	92.6118	40.0458	47.697	67.407
F	III	43.05553	39.87133	64.55837	120.0047	76.60623	35.02447	40.95443	66.25477

Variedad	Zona	2.8	2.84	2.88	2.92	2.96	3	3.04	3.08
A	I	52.43668	25.7123	8.181568	-0.97474	20.16709	28.61366	1.345118	0.886268
A	I	49.7747	29.1363	10.8843	1.14767	20.5693	30.5646	5.22785	4.23556
A	I	49.9338	26.1435	9.99906	1.56378	20.9285	30.7196	4.43253	5.41901
A	I	48.0493	23.828	7.59155	-1.05676	20.2305	28.7799	1.48546	1.78445
A	I	53.7695	26.0988	8.29499	-0.83593	18.9289	26.7806	1.12642	-0.06354
A	I	58.2418	26.4711	6.75487	-2.70357	19.0048	26.6207	0.222884	-2.18132
B	I	40.5044	23.9718	12.352	-1.52331	11.7713	25.386	2.90964	0.86637
B	I	50.4311	25.5705	13.1198	0.132057	18.8201	28.266	3.79044	2.19721
B	I	31.5973	19.7065	6.75003	-0.667	8.47713	17.4076	1.69429	2.90721
B	I	42.3434	22.4703	10.3233	3.31202	12.5924	20.2305	5.0378	7.00791
B	I	23.4292	18.2698	3.5659	-1.42852	7.48507	16.5119	-0.10697	0.917482
B	I	31.6767	19.395	4.25305	-2.24932	7.88135	19.8498	1.72956	1.78292
C	I	64.9347	35.5592	27.1144	4.10524	22.7578	38.9092	9.8211	4.12441
C	I	79.6229	41.545	34.4749	9.46479	31.6627	47.1149	15.4659	9.25272
C	I	71.5716	38.1063	31.2707	7.07703	26.9468	43.8011	14.0832	8.3916
C	I	80.1138	40.0069	32.927	7.35801	29.326	45.5898	14.2914	7.31129
C	I	71.7509	38.681	33.8618	8.89297	29.1213	48.8479	15.5686	10.6169
C	I	73.7118	38.84401	31.92709	6.921115	27.60973	45.33795	13.49157	7.497884
D	II	99.6507	42.6082	33.5145	8.37275	39.5274	50.6936	16.1172	9.43383
D	II	93.7505	40.6627	33.7574	8.32367	34.1569	48.2675	15.3076	8.32173
D	II	93.7025	53.0729	51.7606	27.791	56.0494	71.4263	37.0834	32.5424
D	II	85.8779	37.3365	35.611	11.0054	40.092	56.1502	18.5797	13.827
D	II	83.1824	41.8372	31.7511	6.78352	41.8031	53.6682	14.5733	7.97895
D	II	103.628	55.6338	46.5939	25.6051	59.5251	68.888	33.6819	29.101
E	II	94.2072	42.2054	36.527	13.4071	35.6165	45.7988	20.6983	19.1751
E	II	101.207	47.5734	37.2616	12.8701	36.1182	48.5501	20.6141	16.4468
E	II	116.533	66.4069	51.8339	36.3042	62.3619	66.57	43.1902	44.0783
E	II	110.039	58.5994	39.5371	20.2882	44.3913	53.3236	25.2176	20.7207
E	II	89.2373	43.1082	30.6668	16.6366	34.691	39.0307	20.9053	20.2063
E	II	104.2541	53.92198	39.82485	21.52478	44.3906	51.8686	27.4818	25.36303
F	III	145.341	101.415	57.232	29.8811	50.9355	60.9373	30.6172	21.298
F	III	157.252	112.07	61.0169	33.0041	57.8333	66.3112	34.1113	25.1883
F	III	148.179	92.5094	57.9073	33.6278	52.1161	58.3151	32.997	27.5372
F	III	136.104	103.203	50.4805	25.9752	44.0204	53.3785	24.9423	16.1697
F	III	158.998	108.756	69.7758	43.9075	59.9797	70.1517	42.1884	36.0433

F	III	144.261	95.7443	60.87553	37.7386	60.0583	67.67763	39.82997	35.1033

Variedad	Zona	3.12	3.16	3.2	3.24	3.28	3.32	3.36	3.4	3.44
A	I	15.10583	17.98416	49.08135	154.5752	0	0	160.1187	351.0642	751.42
A	I	18.8654	23.9959	55.014	163.756	0	0	183.164	307.277	782.712
A	I	21.7602	24.3055	54.8601	148.865	0	0	152.797	363.699	654.271
A	I	16.6053	18.5999	46.9037	139.243	0	0	145.884	334.05	653.545
A	I	12.7264	16.3208	48.3999	160.903	0	0	165.026	347.628	805.523
A	I	10.5566	13.7515	43.1488	153.87	0	0	163.076	325.064	798.96
B	I	17.8068	36.7977	94.3306	154.738	0	0	292.13	298.62	753.085
B	I	19.1707	33.1158	91.3465	157.055	0	0	251.323	299.367	728.073
B	I	16.8289	36.5792	83.7661	138.581	0	0	256.117	295.971	672.059
B	I	23.1899	44.5017	100.599	151.323	0	0	286.851	458.298	674.136
B	I	13.8633	28.2784	62.1861	112.256	0	0	237.991	269.141	507.127
B	I	14.6831	31.5688	68.467	130.993	0	0	250.278	260.761	591.578
C	I	20.3956	28.0229	96.1522	264.103	0	0	227.878	330.797	856.228
C	I	27.2747	34.6984	94.4311	257.753	0	0	223.668	294.884	693.325
C	I	26.2355	34.9827	99.7575	251.182	0	0	235.3475	317.458	811.112
C	I	25.9121	34.5717	100.989	278.254	0	0	247.027	315.128	736.785
C	I	29.9078	45.2517	99.3285	217.653	0	0	281.241	362.184	638.431
C	I	25.91327	36.66774	100.7997	258.4034	0	0	257.0896	342.7571	758.691
D	II	27.2163	33.7232	93.05	276.073	0	0	222.503	416.752	1006.19
D	II	25.5779	32.4018	91.5857	262.461	0	0	251.604	401.771	975.327
D	II	52.606	61.9352	124.314	252.516	0	0	280.705	396.441	847.389
D	II	32.64	45.3378	102.8	244.502	0	0	266.912	406.232	862.766
D	II	25.76	31.4099	89.3521	274.552	0	0	253.3655	378.325	938.322
D	II	46.5549	54.3827	116.9	285.872	0	0	239.819	442.514	940.691
E	II	30.2835	48.2575	114.281	298.655	0	0	213.665	415.897	699.744
E	II	26.3285	40.0173	105.046	310.114	0	0	219.135	349.96	811.186
E	II	54.8304	73.9177	165.362	358.934	0	0	252.621	509.134	835.271
E	II	28.6758	38.7472	115.849	372.928	0	0	225.575	433.438	956.84
E	II	28.4014	39.329	116.936	243.4	0	0	176.305	559.369	458.401
E	II	34.55903	48.0028	125.7983	321.344	0	0	218.409	462.9753	765.4245
F	III	30.2041	35.8542	68.1884	247.576	0	0	179.122	191.502	450.141
F	III	35.3154	43.1143	83.3881	272.21	0	0	196.548	217.397	476.293

F	III	35.9658	45.7785	75.9087	257.238	0	0	191.056	222.415	439.694
F	III	23.6021	29.4285	62.7256	259.564	0	0	160.197	183.479	464.654
F	III	45.2775	54.2278	98.638	276.309	0	0	210.593	259.999	488.872
F	III	45.1411	57.0866	115.796	302.4843	0	0	219.9207	328.8433	600.1453

Variedad	Zona	3.48	3.52	3.56	3.6	3.64	3.68	3.72	3.76
A	I	771.4036	459.7194	140.714	123.633	1037.93	1221.014	556.3375	1844.957
A	I	693.622	520.631	161.099	133.338	980.892	1234.31	544.85	1777.68
A	I	755.506	374.629	124.149	123.611	977.657	1108.8	540.415	1683.2
A	I	719.352	379.666	117.38	110.689	945.469	1084.52	515.648	1640.53
A	I	778.519	512.993	155.851	129.375	1069.93	1286.38	564.619	1941.91
A	I	716.743	534.477	140.143	117.984	1038.4	1266.79	546.29	1837.06
B	I	636.378	549.624	197.671	136.727	967.137	1277.86	721.365	1668.4
B	I	618.65	528.453	174.132	129.525	983.388	1220.06	668.463	1628.4
B	I	620.535	481.363	208.827	155.176	986.211	1204.15	703.697	1624.64
B	I	789.559	491.904	244.227	239.732	1162.39	1289.33	858.494	1875.76
B	I	524.713	425.7	247.834	206.821	861.719	1046.48	669.318	1332.43
B	I	547.204	485.909	286.687	209.079	927.794	1121.72	722.448	1427.21
C	I	665.862	717.2	187.442	161.171	1124.61	1482.86	652.198	1992.81
C	I	571.837	643.316	199.661	173.228	945.468	1245.25	652.271	1577.06
C	I	646.057	672.53	189.072	165.619	1067.83	1430.37	659.96	1894.17
C	I	604.026	690.353	218.368	185.624	996.669	1325.35	697.241	1675.39
C	I	665.481	523.008	190.137	163.58	883.959	1218.59	695.293	1587.8
C	I	658.0255	656.3907	202.622	173.5275	1021.781	1369.112	695.2089	1787.04
D	II	806.265	827.753	223.996	197.942	1354.45	1598.81	701.603	2323.58
D	II	802.618	790.659	228.56	197.077	1292.07	1566.05	700.013	2254.71
D	II	732.419	645.746	229.663	209.973	1107.2	1316.39	679.066	1892.21
D	II	821.967	600.613	211.669	187.64	1151.76	1370.79	712.758	2045.36
D	II	785.585	705.962	189.99	165.166	1238.25	1490.35	639.512	2163.38
D	II	786.287	762.086	244.911	243.966	1304.6	1476.87	718.087	2196.8
E	II	753.919	496.247	201.061	202.35	1209.5	1266.89	732.036	1898.1
E	II	717.41	592.877	220.284	198.561	1147.87	1420.95	692.428	1999.83
E	II	854.4	583.59	264.182	333.014	1433.36	1423.82	867.597	2283.75
E	II	715.726	828.413	248.855	255.227	1419.97	1635.98	760.127	2315.96
E	II	810.994	332.138	170.629	203.233	1095.93	1097.25	668.508	1686.47
E	II	774.6325	584.2545	225.9875	247.5088	1274.283	1394.5	747.165	2071.503

F	III	323.86	523.826	202.124	184.157	587.327	902.05	502.487	1016.86
F	III	348.829	567.146	218.737	213.338	657.882	968.363	545.001	1099.82
F	III	381.587	508.285	224.393	215.289	646.861	904.139	574.802	1044.53
F	III	305.884	570.345	199.891	184.811	609.331	941.004	497.686	1045.08
F	III	421.532	539.795	237.271	242.076	722.559	976.95	596.651	1189.02
F	III	541.587	563.5103	240.0633	262.8093	937.9337	1123.044	669.7497	1524.197

Variedad	Zona	3.8	3.84	3.88	3.92	3.96	4	4.04	4.08
A	I	2700.15	2595.765	374.764	274.2586	148.6208	147.4188	1079.588	251.3009
A	I	2550.74	2670.65	389.641	274.009	149.219	140.812	1037.03	250.937
A	I	2520.07	2227.74	285.671	225.815	118.133	123.898	986.374	219.356
A	I	2447.24	2225.69	290.787	227.207	118.962	120.496	969.637	219.99
A	I	2795.77	2814.63	436.91	305.334	169.622	165.754	1126.65	267.973
A	I	2729.96	2798.69	391.521	266.003	146.582	157.442	1091.65	263.165
B	I	2452.76	2579.17	420.349	354.321	157.598	179.592	1020.59	345.803
B	I	2451.73	2501.33	326.526	314.463	137.46	173.27	1010.39	308.776
B	I	2362.94	2333	341.215	311.233	132.996	175.25	967.595	331.137
B	I	2796.52	2402.84	510.896	418.574	219.766	273.642	1070.94	396.182
B	I	1979.07	1874.87	385.261	325.577	146.241	181.387	800.385	356.627
B	I	2057.64	2124.2	376.326	342.658	146.484	182.075	854.92	360.765
C	I	2879.02	2994.25	400.766	377.493	194.265	208.111	1216.84	358.013
C	I	2378.93	2443.79	372.472	385.116	189.655	210.7	1023.13	346.298
C	I	2692.32	2800.07	365.746	374.123	186.12	205.423	1150.92	353.451
C	I	2532.97	2589.6	411.779	400.111	194.926	219.635	1069.52	363.971
C	I	2364.9	2211.43	485.329	406.185	203.447	200.943	959.523	340.51
C	I	2644.143	2650.395	441.2772	402.4883	201.4969	213.7543	1103.6	361.248
D	II	3473.78	3455.08	494.49	457.51	240.627	241.016	1413.6	363.957
D	II	3350.35	3387.83	550.726	497.651	278.909	269.044	1391.57	390.903
D	II	2768.37	2821	538.962	486.476	303.864	292.323	1185.56	382.425
D	II	2916.55	2913.39	542.305	480.935	285.983	279.685	1236.71	361.973
D	II	3170.7	3206.4	409.805	391.39	197.339	206.202	1303.32	315.119
D	II	3236.84	3150.06	523.109	492.94	298.533	312.671	1320.67	372.433
E	II	2758.41	2455.3	462.82	407.084	240.675	247.436	1099.46	337.548
E	II	2772.2	2829.69	526.368	435.174	258.635	240.586	1146.14	366.107
E	II	3137.31	2735.96	538.204	453.786	314.702	360.103	1198.34	370.518
E	II	3463.36	3359.08	672.148	547.996	375.898	364.836	1400.55	458.669

E	II	2588.12	1997.06	439.037	369.704	232.277	246.719	982.505	292.336
E	II	2990.248	2730.448	543.9393	451.665	295.378	303.061	1181.884	371.9075
F	III	1481.11	1565.68	363.01	391.217	211.568	199.95	711.977	345.557
F	III	1592.09	1598.69	344.495	399.855	199.812	215.437	745.693	343.796
F	III	1528.79	1463.03	361.538	395.675	209.111	210.017	709.733	334.379
F	III	1565.98	1629.75	349.777	406.822	201.005	212.702	757.046	358.173
F	III	1667.4	1644.95	413.111	429.396	242.872	249.874	774.434	365.588
F	III	2132.267	1993.2	431.9367	427.679	252.462	275.138	906.1557	359.9673

Variedad	Zona	4.12	4.16	4.2	4.24	4.28	4.32	4.36	4.4
A	I	106.1658	981.1734	88.35031	68.18883	73.29784	51.48192	34.69102	29.47649
A	I	98.2497	947.38	85.1372	60.145	64.1172	43.0941	26.4298	22.167
A	I	76.3745	874.571	56.8628	49.3954	60.744	38.4622	24.8141	20.9528
A	I	75.7882	869.251	62.523	51.8605	59.7868	39.9035	26.3615	22.5881
A	I	130.359	1035.94	109.031	80.545	82.5391	60.0614	40.9997	34.6478
A	I	123.456	1001.62	103.628	68.0945	72.3358	58.7109	36.8962	31.7477
B	I	127.323	845.386	81.0619	60.0003	58.1665	41.7091	24.3771	19.379
B	I	111.677	842.743	59.9237	51.5429	58.073	42.5045	22.8918	18.4408
B	I	134.413	789.49	62.0624	58.0712	58.4837	39.5935	27.1185	23.0758
B	I	226.094	863.897	113.772	96.8219	83.8043	64.2291	46.7394	37.9614
B	I	126.975	612.042	82.8627	65.7533	58.1897	39.4859	31.5769	26.5738
B	I	144.271	671.716	73.2969	56.0547	51.7886	35.3381	22.9716	19.5733
C	I	131.529	1028.9	72.9454	71.9926	70.8402	75.6498	38.3727	30.7403
C	I	116.897	814.19	73.508	69.5253	70.7967	80.029	39.6616	30.8185
C	I	124.084	951.664	58.0959	64.6849	64.5942	73.5926	33.6958	27.0795
C	I	123.531	847.699	76.2884	65.9797	61.963	77.5212	35.1341	26.4684
C	I	126.513	764.693	86.9533	73.9928	71.1468	53.4932	31.1923	23.231
C	I	129.7348	898.0393	80.30361	72.06813	69.343	70.26583	35.59769	27.3495
D	II	152.988	1236.61	102.766	87.045	71.6921	98.1166	39.1142	29.506
D	II	177.735	1212.44	133.005	110.845	90.9138	113.738	53.833	41.8995
D	II	200.81	1017.3	160.294	141.641	129.373	130.812	82.5498	69.4041
D	II	186.575	1049.83	133.943	115.7	113.157	100.053	58.17	45.9164
D	II	126.875	1144.43	79.4862	70.4157	65.0403	75.9811	31.4589	24.071
D	II	216.191	1151.88	138.694	123.509	106.843	117.104	65.0649	52.9665
E	II	204.561	908.107	104.182	90.7812	67.5017	102.192	49.3286	40.5757
E	II	204.96	968.723	127.582	95.1711	64.1539	105.156	45.7763	37.263

E	II	306.456	1018.31	147.624	117.566	89.2776	125.274	62.0547	49.5658
E	II	303.858	1235.62	215.39	169.844	136.215	180.128	108.643	92.3781
E	II	214.282	808.807	128.529	101.67	75.1856	111.228	56.6405	42.3886
E	II	257.389	1007.865	154.7813	121.0628	91.20803	130.4465	68.27863	55.39888
F	III	101.644	499.98	103.591	95.6898	63.1649	168.69	74.8051	50.3893
F	III	91.1739	504.456	81.7087	85.1617	54.3491	170.314	67.0984	41.0258
F	III	107.355	482.695	96.9665	91.8416	59.7102	158.793	68.96	46.0772
F	III	98.0507	532.744	98.7345	102.949	67.5994	147.772	106.211	55.4489
F	III	137.473	545.583	118.601	115.44	79.1394	184.728	87.8733	61.1626
F	III	178.3676	689.4497	115.9779	106.0559	74.25537	160.1053	72.34213	50.58473

Variedad	Zona	4.44	4.48	4.52	4.56	4.6	4.64	4.68	4.72
A	I	22.67215	40.43543	16.36443	41.11343	20.5967	14.59829	9.302754	3.106985
A	I	15.6996	33.5979	11.6106	37.4613	18.1162	11.5431	8.58713	1.94366
A	I	15.6714	32.9963	10.9029	39.129	14.549	10.9236	6.53803	1.87407
A	I	17.2567	34.2982	12.0125	37.5501	15.5797	11.4722	7.1297	2.23821
A	I	26.7669	44.2172	19.7631	42.2818	24.4139	16.874	10.9339	3.79477
A	I	24.4709	42.0907	18.5647	38.8719	22.4792	15.5981	9.66712	3.52744
B	I	16.4755	28.8127	13.1848	79.5969	23.2878	12.2395	8.8347	2.65594
B	I	15.8971	27.7918	12.811	71.3964	21.6625	10.7465	7.09131	2.24982
B	I	20.1052	31.4165	14.1455	75.1985	21.4326	12.5443	7.28401	1.98574
B	I	33.0217	43.6916	26.2046	88.6205	28.6874	18.5546	11.4482	4.19204
B	I	24.2343	34.2056	17.5469	60.7	19.294	12.7324	6.53777	2.21608
B	I	17.9765	31.5833	13.4972	56.4297	17.8111	11.1607	5.51434	1.13069
C	I	23.61	38.831	17.8855	74.4819	33.5099	18.248	8.11902	3.03806
C	I	23.4834	38.9386	19.749	72.2966	30.8591	19.4889	8.95389	3.93812
C	I	20.7311	35.841	15.7928	72.5915	28.4399	16.2519	6.75313	2.45842
C	I	19.4887	36.1886	17.1351	73.444	31.257	17.4752	7.1323	2.45627
C	I	17.2494	30.2307	13.7165	81.4112	22.1121	13.3098	10.8903	3.11229
C	I	20.51835	35.7851	16.57061	77.97461	29.53886	16.67122	8.888151	2.926251
D	II	23.6436	44.9092	18.2169	63.5838	29.2183	17.4928	10.0084	3.1048
D	II	33.7047	52.4368	25.4476	70.1334	33.996	21.4488	11.5367	4.21804
D	II	58.7	70.5348	46.1289	96.2347	44.073	30.7243	35.7215	11.9517
D	II	36.6612	50.687	27.5601	82.2398	30.2933	19.4532	28.6373	6.65067
D	II	19.0521	41.208	14.4313	57.2593	27.6962	14.3093	10.1606	2.45534
D	II	44.4545	59.9349	33.5907	71.2741	39.8557	23.5292	16.303	3.06508

E	II	35.856	55.6318	24.7887	71.7424	34.1422	23.0692	13.2326	4.50903
E	II	31.5534	53.6842	22.4218	61.8006	34.9349	21.1308	10.6954	3.4681
E	II	43.6816	58.4942	27.097	60.4526	30.1904	8.55949	-8.08774	-21.7471
E	II	82.7074	101.628	63.6273	97.9208	73.6759	44.8755	23.8672	8.90517
E	II	36.5199	51.0099	22.8075	59.0053	22.9827	12.5773	-1.77012	-11.2118
E	II	48.61558	66.20408	33.9884	69.79483	40.44598	21.78577	6.176185	-5.14641
F	III	33.6889	55.1956	32.732	62.6676	26.1351	37.9035	15.7096	7.73068
F	III	26.3598	50.7282	27.891	62.8839	20.8183	34.0823	10.6988	4.00163
F	III	31.4115	53.8971	32.0459	61.9099	24.7462	37.5783	13.6581	6.34103
F	III	36.6538	62.1385	36.2284	67.0031	28.3525	41.6808	17.2892	8.46596
F	III	43.7848	66.1066	42.8366	76.0584	33.4245	44.8325	19.2971	10.3728
F	III	37.94207	58.443	32.6082	66.46497	28.1444	29.1581	7.30272	-2.45756

Variedad	Zona	4.76	4.8	4.84	4.88	4.92	4.96	5	5.04
A	I	-0.20834	-0.99867	-0.42809	2.244509	8.148562	5.21542	4.092139	4.167488
A	I	-0.74441	-0.94069	-0.2833	2.16527	8.52897	5.38053	4.26296	4.41525
A	I	-0.42136	-0.72145	-0.10358	2.1064	7.0264	4.17516	3.13645	3.28691
A	I	-0.2276	-0.62961	-0.16604	2.09034	7.08372	4.05439	2.93397	2.89709
A	I	-0.17695	-1.30955	-0.6652	2.26793	8.73873	6.07264	5.01193	5.19512
A	I	-0.05341	-0.85512	-0.19196	2.29486	8.14135	5.26302	3.41189	3.26294
B	I	-0.25542	-0.7285	-0.36116	2.18288	11.0613	4.37713	4.11844	3.10037
B	I	-0.35567	-0.84034	-0.31577	2.02741	10.2663	3.41379	2.91564	1.93678
B	I	-0.57516	-0.87801	-0.32593	2.74102	10.3304	3.61906	4.40891	2.1196
B	I	0.039141	-1.20308	-0.13924	4.47874	12.264	6.36808	7.68283	6.03593
B	I	0.004354	-0.35466	0.238504	5.03436	14.9856	5.88109	7.8295	4.4274
B	I	-0.70334	-0.9074	-0.0749	5.71629	19.5361	5.97109	7.94795	3.86812
C	I	-0.70761	-1.75406	-1.0229	1.38867	8.72394	5.80059	3.35181	4.27129
C	I	0.044083	-0.76815	0.053126	2.63015	9.40865	6.76471	5.07098	6.27108
C	I	-0.53718	-1.12678	-0.45383	1.68238	8.58169	5.2965	3.3149	4.2614
C	I	-0.87059	-1.20828	-0.38144	2.30297	9.25452	6.58255	4.87622	6.04044
C	I	-0.68007	-1.03709	-0.75136	1.81027	7.9362	6.17051	5.27349	5.51011
C	I	-0.76781	-1.35981	-0.73294	1.870649	8.810984	6.308241	4.590517	5.379426
D	II	-0.98061	-1.50443	-0.77848	1.86153	9.64503	7.00598	6.58088	8.35921
D	II	-0.93109	-1.79777	-0.71711	2.19178	9.90979	7.74822	7.46686	9.40314
D	II	-0.00797	-2.16604	-0.21915	4.88334	13.0933	13.1478	13.2215	14.7467
D	II	-1.05584	-1.83549	-0.26073	2.54543	8.30336	7.06731	6.45144	7.9644

D	II	-1.15935	-1.51182	-0.93038	1.98682	10.6411	6.60867	4.74014	5.68991
D	II	-5.1896	-6.77414	-4.33669	2.13301	12.5376	9.95959	9.57421	11.2156
E	II	-0.70605	-1.55405	-0.48062	2.70603	8.19418	8.67927	8.17562	9.32554
E	II	-1.00547	-1.73082	-0.71705	2.11073	7.83674	9.16059	8.26987	10.5153
E	II	-31.1828	-31.8365	-26.7759	-17.8478	-7.91071	-2.88588	-1.12125	3.12344
E	II	-1.20895	-3.10687	-0.78479	5.90981	15.2058	20.0292	19.8655	23.5845
E	II	-18.868	-19.9468	-16.4142	-10.2562	-3.70006	-1.58059	-0.66772	1.78777
E	II	-13.0663	-14.1552	-11.173	-5.02087	2.857943	6.18083	6.5866	9.752753
F	III	0.783749	-0.79942	1.08681	5.2638	9.99045	13.6753	10.1446	12.2007
F	III	-1.74191	-2.32342	0.134742	3.74011	7.62962	11.1713	7.75643	10.2982
F	III	-0.28882	-0.98134	1.31231	5.58923	11.247	16.2054	13.8046	15.3382
F	III	1.30236	-0.60784	1.34954	4.78236	8.15441	12.3348	9.00729	11.4957
F	III	1.22955	-0.73817	1.4928	6.33532	12.8522	19.54	16.6671	19.2536
F	III	-10.5651	-11.6327	-8.38279	-2.59079	4.19037	9.27514	7.767427	10.89175

Variedad	Zona	5.08	5.12	5.16	5.2	5.24	5.28	5.32	5.36
A	I	3.04125	5.828662	18.81331	2.444339	3.559258	1.979269	3.951173	21.12437
A	I	3.41193	6.48517	21.7178	4.49454	6.33802	5.26128	9.60572	32.9259
A	I	2.43227	5.683	20.135	2.30473	4.91723	3.38162	6.48642	26.4707
A	I	2.02323	4.96165	18.0583	1.66897	3.37759	2.43607	4.49334	21.6087
A	I	3.88211	6.35614	18.4724	3.07732	3.53359	1.40717	3.17884	19.4095
A	I	1.92399	4.39671	16.5167	2.07151	2.27481	1.16418	3.9551	25.8395
B	I	2.43361	7.57124	60.6079	7.69709	10.2296	3.5211	4.83761	22.6677
B	I	1.35293	6.4354	54.1474	5.37784	7.7354	2.55529	4.40356	25.5355
B	I	1.77848	7.61143	59.1443	5.07526	8.34199	2.6051	3.71667	20.1971
B	I	6.77808	14.3703	67.3247	12.0099	16.3147	10.0026	12.8792	44.9964
B	I	3.45597	8.32937	44.5839	6.98802	7.8527	3.15285	4.38838	18.9795
B	I	3.12104	8.80977	48.1835	6.36565	7.73286	4.94552	9.81007	38.4583
C	I	6.36915	9.5558	41.9407	7.00909	13.1307	3.75785	6.21747	28.4059
C	I	6.56415	11.8355	41.5251	9.27518	17.1424	4.40454	6.12919	31.1713
C	I	6.14977	10.0164	43.8374	7.23384	13.5534	3.83499	6.59188	29.9769
C	I	6.57766	12.2741	43.5973	9.6188	17.965	6.2422	10.1625	39.7161
C	I	7.98608	11.4302	48.0849	11.2635	23.4148	7.42195	9.07433	32.6873
C	I	7.117183	11.30843	45.43179	9.483073	18.53357	5.92348	8.654462	34.27516
D	II	8.95656	13.51	40.1568	9.65698	12.7369	9.20664	13.4284	42.3469
D	II	10.1758	14.9743	41.3476	11.9614	14.6344	10.162	13.1432	38.2014

D	II	16.5851	19.6525	55.5608	21.0733	24.9236	17.177	18.1238	35.7011
D	II	10.3932	13.8799	50.5103	13.6856	19.8282	12.6798	15.7293	39.9129
D	II	6.98159	9.20877	34.6178	6.17622	10.6076	6.877	11.2708	38.6863
D	II	13.2351	16.427	42.0279	15.6324	19.1651	16.9881	22.2115	52.9598
E	II	9.12849	13.0919	38.9688	7.38353	5.92944	8.84684	13.6016	44.8939
E	II	9.59659	12.9621	36.2959	7.91783	4.95608	6.99289	11.9813	40.7236
E	II	6.03507	11.3038	30.4134	9.00986	9.59234	16.1056	28.6161	84.3422
E	II	24.6318	28.5916	47.538	27.048	22.3977	25.6823	32.9744	70.6494
E	II	3.34754	6.85863	24.6972	4.37153	4.88525	8.4079	13.3596	35.0281
E	II	10.90275	14.92903	34.73613	12.08681	10.45784	14.29717	21.73285	57.68583
F	III	8.39304	14.6536	30.9463	8.27754	5.75089	4.82176	5.78665	16.3799
F	III	6.96495	14.8391	35.1861	6.54778	5.63896	6.05003	9.43329	25.9946
F	III	11.734	18.2696	34.9407	8.9977	7.42949	7.14261	8.58577	20.9855
F	III	8.27922	15.3048	32.3389	7.84841	6.01964	5.22481	7.11371	23.2275
F	III	15.127	22.796	42.019	13.2022	10.3236	8.58319	9.31688	21.876
F	III	9.375673	16.31297	35.87283	9.586613	8.5183	10.24627	15.78876	44.07093

Variedad	Zona	5.4	5.44	5.48	5.52	5.56	5.6	5.64	5.68
A	I	631.8628	329.7566	31.13118	17.1443	6.351634	2.824904	4.29699	0.463862
A	I	567.297	365.775	28.9887	14.6678	4.12052	1.30078	2.95513	-0.039
A	I	636.74	231.243	18.4637	10.6798	2.94569	0.934567	3.31176	-0.05111
A	I	624.88	228.784	19.4286	11.0036	3.20141	1.05116	3.22564	0.047529
A	I	602.038	411.52	41.0203	22.2863	9.13186	4.43409	5.11803	0.853174
A	I	577.143	423.068	30.6269	14.7306	5.32581	2.39547	4.02005	0.315625
B	I	526.277	287.641	23.021	12.2168	3.28397	0.838197	2.82784	-0.04774
B	I	526.892	290.167	13.2001	9.8861	2.63942	0.784705	2.79185	-0.01381
B	I	509.19	246.003	14.346	10.0505	2.96655	0.909404	3.5851	-0.01833
B	I	601.357	249.645	42.3619	28.6615	16.0938	10.7451	10.5284	5.26924
B	I	397.669	186.275	22.5862	13.8161	5.28853	2.59942	4.34857	0.589194
B	I	433.883	210.563	14.9133	9.10615	1.91754	0.31123	3.19191	-0.1423
C	I	570.13	398.305	15.8713	12.0192	4.17445	0.997932	3.25329	0.012604
C	I	461.128	304.483	17.8727	12.2711	5.44697	1.84883	3.82431	0.254317
C	I	514.585	378	12.0333	10.4522	3.82455	0.767961	3.28507	-0.00959
C	I	516.428	294.914	15.1851	8.79374	2.84308	0.091446	2.92124	-0.18786
C	I	491.401	237.673	31.0425	17.5754	5.37336	1.54029	2.18657	-0.0995

C	I	536.5061	316.5033	21.11363	13.05204	4.212903	0.894087	2.842774	-0.09342
D	II	772.63	415.092	32.427	22.0437	10.2492	3.97357	5.27868	0.605067
D	II	719.802	429.879	44.8525	31.0837	17.7853	9.85588	9.73526	3.86977
D	II	548.348	402.14	63.5899	47.5661	33.8545	25.3077	22.209	16.4191
D	II	656.672	346.365	49.0089	35.8555	22.108	15.0844	12.9838	7.93068
D	II	718.907	382.208	20.6738	13.8844	4.68252	0.64415	2.64163	-0.2504
D	II	688.667	410.656	45.7402	37.2424	24.9482	17.076	15.7328	10.6422
E	II	621.737	229.153	30.5752	22.5259	12.3632	6.90087	8.78106	2.75357
E	II	538.356	362.741	34.2143	22.449	11.2504	4.86351	6.74114	0.944614
E	II	659.719	326.212	47.6062	37.6282	26.0851	19.9103	19.4018	13.2945
E	II	695.741	438.902	63.6969	51.9983	39.3321	31.7542	30.9433	24.124
E	II	612.665	158.023	33.7185	26.7823	17.1361	12.0238	12.5491	6.94254
E	II	626.6203	321.4695	44.80898	34.71445	23.45093	17.13795	17.40884	11.32641
F	III	215.01	211.644	17.1317	12.1565	9.34685	1.8216	3.1402	0.07193
F	III	256.214	184.257	6.88538	7.54648	6.34992	-0.10537	2.37003	-0.29609
F	III	295.988	120.737	16.8234	11.7354	7.93003	1.61837	3.04927	0.123956
F	III	230.406	219.277	14.2503	12.5885	10.0689	2.45931	4.39375	0.63575
F	III	261.303	206.958	25.7527	18.2774	13.3116	4.42722	5.0422	0.965743
F	III	392.412	239.1423	26.74809	21.15069	15.24887	8.077383	8.93801	4.654716

Variedad	Zona	5.72	5.76	5.8	5.84	5.88	5.92	5.96	6
A	I	0.683743	0.096169	0.196599	0.088066	-0.04576	0.454157	-0.03	0.685517
A	I	0.457662	0.038157	0.122398	0.164849	-0.06717	0.598451	0.033118	0.749102
A	I	0.482017	0.04774	0.384984	0.107549	0.075662	0.509505	0.031235	0.810555
A	I	0.485945	0.063479	0.262898	0.093488	0.02338	0.447956	0.030688	0.717959
A	I	0.841711	0.123257	0.118847	0.077514	-0.11224	0.433902	-0.08893	0.613141
A	I	0.708572	0.17656	0.161143	0.209107	-0.03078	0.622777	0.003334	0.657781
B	I	0.795627	0.090112	0.159913	0.221834	0.118017	0.582481	0.017733	0.640831
B	I	0.841714	0.125642	0.174963	0.239647	0.188487	0.603416	0.057474	0.648275
B	I	1.11314	0.045626	0.160704	0.159761	0.140372	0.479309	-0.01323	0.553652
B	I	4.79593	2.57667	1.83136	0.790664	0.538938	0.556966	0.024981	0.573359
B	I	1.5838	0.113236	0.213232	0.18682	0.309357	0.410372	-0.01796	0.410659
B	I	1.41424	-0.05162	0.10345	0.158347	0.19088	0.458103	0.05	0.589529
C	I	1.10851	0.398311	0.214583	0.31783	-0.06167	0.93564	0.121438	0.954076
C	I	1.24418	0.517465	0.172266	0.258308	-0.03869	0.823584	0.113075	0.8921
C	I	1.087	0.383749	0.196583	0.305021	-0.09638	0.865071	0.108812	0.988491

C	I	1.13697	0.441739	0.194763	0.262756	-0.00877	0.832692	0.128625	1.1194
C	I	0.651809	0.178553	0.410547	0.046901	-0.00494	0.529236	0.084721	1.28793
C	I	0.985078	0.346325	0.278764	0.213345	-0.02563	0.781173	0.113827	1.142878
D	II	1.0662	0.277754	-0.00331	0.083008	-0.07934	0.585826	0.213153	0.680854
D	II	3.22829	1.60483	0.578567	0.269274	-0.04349	0.544856	0.143958	0.583929
D	II	13.633	10.2046	7.25114	4.61841	2.92801	2.85947	1.90494	1.7299
D	II	6.35581	4.12302	2.57355	1.34416	0.585405	0.709246	0.285511	0.755205
D	II	0.896273	0.241804	0.064971	0.127756	-0.02489	0.700608	0.338521	0.814109
D	II	9.60689	7.36407	5.75369	4.61604	3.4437	3.19932	2.06491	1.74952
E	II	2.84232	1.42065	0.943435	0.280435	0.152412	0.635751	-0.04895	0.962635
E	II	1.23992	0.39494	0.267306	0.099988	-0.02609	0.737631	0.020103	0.971539
E	II	12.1005	9.68537	8.12611	6.48805	5.20079	4.64427	2.93657	2.78045
E	II	22.4846	19.5835	17.4557	15.4344	13.2617	12.7812	10.148	9.48696
E	II	6.49159	4.51937	3.68512	2.21033	1.7295	1.67259	0.723805	1.18342
E	II	10.57915	8.545795	7.383559	6.058192	5.041475	4.958923	3.45712	3.605592
F	III	1.7738	1.31972	1.69067	2.33945	1.3731	4.74314	0.121546	2.03244
F	III	2.06749	1.2503	2.1992	2.46703	1.59489	5.04141	0.134876	2.5088
F	III	2.25355	1.03747	2.12552	2.51917	1.26297	4.7853	0.099697	2.73145
F	III	2.38778	1.57809	2.26038	2.82012	1.59282	5.78418	0.23602	2.39534
F	III	2.87473	1.7022	1.88417	2.05994	1.34946	4.44663	0.124288	2.43415
F	III	5.680907	4.212623	4.069827	3.671673	2.715047	4.71077	1.065245	2.574467

Variedad	Zona	6.04	6.08	6.12	6.16	6.2	6.24	6.28	6.32
A	I	0.015864	-0.13235	0.437175	0.439483	0.043571	-0.06034	0.375257	2.572286
A	I	0.089394	-0.08827	0.433352	0.511665	0.074594	-0.05855	0.374352	2.586
A	I	0.087801	-0.03692	0.44372	0.426461	0.040452	-0.093	0.403464	2.53685
A	I	0.02566	-0.08194	0.414209	0.446535	0.043859	-0.04918	0.375048	2.21241
A	I	0.005143	-0.17505	0.434675	0.406831	0.040745	-0.06799	0.353606	2.78232
A	I	0.124149	-0.08581	0.402018	0.421143	0.046268	-0.05679	0.464363	2.91657
B	I	0.130021	-0.03707	0.321325	0.110787	0.071657	-0.02228	0.39491	2.1236
B	I	0.156756	-0.04073	0.312921	0.05534	0.019099	-0.04064	0.410572	2.12267
B	I	-0.0125	-0.16454	0.071793	0.03683	-0.00186	-0.05483	0.376344	2.42566
B	I	0.022004	-0.11026	0.269687	0.23751	0.08173	-0.03416	0.434223	2.77487
B	I	0.096871	-0.0458	0.205272	0.155037	-0.00364	-0.04452	0.458767	1.98031
B	I	0.210094	-0.03866	0.229925	0.240775	0.062849	-0.0609	0.34403	1.8877
C	I	0.209604	-0.07956	0.641866	0.153197	0.036268	-0.03122	0.524218	3.62075

C	I	0.208027	-0.06544	0.48352	0.061776	-0.00813	-0.01118	0.381654	3.60948
C	I	0.256239	-0.06158	0.562319	0.088574	-0.07836	-0.11447	0.223652	3.13558
C	I	0.273306	-0.14359	0.455052	0.067039	0.011219	-0.01192	0.515419	3.88529
C	I	0.121453	-0.06737	0.324206	0.068453	-0.02617	-0.06691	0.318424	2.94729
C	I	0.205483	-0.09878	0.483182	0.098154	0.007247	-0.03742	0.461741	3.554132
D	II	0.093724	-0.07688	0.646162	0.094504	0.004654	-0.00972	0.610165	3.69599
D	II	0.041005	-0.09621	0.614503	0.056435	-0.01351	-0.05897	0.508496	3.32019
D	II	0.659833	0.17231	0.593346	0.04248	-0.0991	-0.15359	0.204059	2.59151
D	II	-0.03499	-0.07424	0.490293	0.009941	-0.0405	-0.08127	0.329305	2.88804
D	II	0.068372	-0.02395	0.787936	0.078895	0.07576	0.095185	0.886676	3.92504
D	II	0.482144	0.097092	0.740279	0.087989	-0.04944	-0.03914	0.58196	3.2611
E	II	0.021414	-0.11847	0.424845	0.200934	-0.06796	0.002543	0.718829	3.14721
E	II	0.15645	-0.07292	0.494168	0.269013	-0.0148	-0.01786	0.772857	2.95351
E	II	0.879643	0.310223	0.83846	0.314899	-0.04067	-0.02736	0.776717	2.55913
E	II	7.05479	5.18377	4.56225	2.65582	0.980186	0.387043	1.06795	2.66585
E	II	-0.03742	-0.29651	0.208197	-0.29265	-0.64885	-0.53567	0.377301	2.6101
E	II	2.013367	1.281142	1.525769	0.73677	0.068967	-0.04846	0.748706	2.697148
F	III	1.42724	-0.17912	-0.11702	0.354625	-0.30544	0.038159	1.32247	4.19901
F	III	1.41519	-0.13107	0.213685	0.68304	0.019491	0.426807	1.86283	4.77532
F	III	0.554991	-0.21348	0.01194	0.363753	-0.25794	0.150945	1.67637	4.89092
F	III	1.91855	-0.03351	0.186438	1.10928	0.400065	0.948235	2.48642	5.15939
F	III	1.15071	-0.16672	0.090657	0.558078	-0.33774	0.152054	2.01836	5.63468
F	III	1.148514	0.004146	0.380934	0.518672	-0.11964	0.183835	1.552636	4.323043

Variedad	Zona	6.36	6.4	6.44	6.48	6.52	6.56	6.6	6.64
A	I	0.751136	2.475178	-0.06394	0.41882	0.334463	0.060865	0.808456	-0.12785
A	I	0.966472	2.30579	-0.05726	0.365514	0.288391	0.069984	1.03265	-0.24608
A	I	0.60839	2.3867	-0.03946	0.451554	0.269678	0.058334	0.735024	-0.10032
A	I	0.419257	2.10574	-0.08836	0.435882	0.336062	0.126066	0.727964	-0.07544
A	I	1.03926	2.70043	-0.0358	0.37736	0.31338	-0.00788	0.841853	-0.17282
A	I	1.02747	2.60583	0.098641	0.46448	0.365399	0.056588	0.876883	-0.07967
B	I	1.03662	2.35134	0.152439	0.243619	0.115272	0.025375	0.730918	0.125425
B	I	0.85059	2.0715	0.095684	0.193281	0.08652	-0.02106	0.933945	0.021922
B	I	1.12486	2.60045	0.041004	0.133907	-0.02442	-0.10196	0.003556	0.586538
B	I	1.36375	2.7183	0.261155	0.436446	0.073114	-0.01964	-0.02809	0.516524
B	I	1.03988	2.47345	0.180988	0.380932	0.072025	-0.02782	0.249458	-0.09615

B	I	0.623858	2.11501	-0.25263	0.017132	-0.13801	-0.16024	0.051628	0.100888
C	I	1.47778	3.13124	0.065903	0.357915	0.077266	-0.05288	-0.30873	-0.68874
C	I	1.41954	3.15709	0.07429	0.425366	0.164178	-0.01242	0.051331	0.099189
C	I	1.09921	2.59418	-0.43671	-0.11399	-0.28573	-0.23965	-0.16004	-0.21688
C	I	1.59975	3.32672	-0.14445	0.041551	-0.66481	-1.11457	-2.24736	-3.01043
C	I	0.78018	1.99498	-0.14644	0.449671	-0.02985	0.244916	0.051097	0.26824
C	I	1.311621	2.874	-0.07649	0.288707	-0.20992	-0.31366	-0.8517	-1.16652
D	II	1.52993	3.65916	0.287541	0.221786	0.175238	-0.23613	-0.16225	0.215148
D	II	1.18412	3.47833	0.238462	0.273956	0.199836	-0.11319	-0.1287	0.2085
D	II	1.06707	2.09473	0.118519	0.10472	0.024464	-0.12222	-0.01446	0.892595
D	II	0.826993	2.16612	0.037037	0.23552	0.028887	-0.06544	-0.0408	0.781082
D	II	1.50907	3.28616	0.166971	0.243558	0.081801	-0.21742	-0.10674	0.381798
D	II	1.25941	2.81461	0.135429	0.127333	0.049368	-0.16732	-0.10777	0.232732
E	II	1.57505	4.36909	-0.08004	-0.04924	-0.2082	-0.27847	-0.17095	-0.45992
E	II	1.74178	4.3265	0.033452	-0.14273	-0.13682	-0.3246	-0.23261	-0.58593
E	II	1.50791	3.60818	-0.0651	-0.01799	0.036482	-0.09786	-0.15446	-0.46703
E	II	2.05302	4.02598	0.194487	-0.26905	-0.09015	-0.21914	-0.12124	-0.51243
E	II	1.00328	3.48132	-0.65207	-0.2924	-0.71386	-0.43433	-0.32181	-0.63491
E	II	1.576498	3.860495	-0.12231	-0.18054	-0.22609	-0.26898	-0.20753	-0.55008
F	III	4.0101	6.36438	1.30442	-0.22588	0.898433	-0.2258	0.026295	-0.30312
F	III	3.58171	6.22428	-0.25248	-1.49663	-0.39655	-1.83167	-2.01317	-2.77307
F	III	3.58805	6.73173	0.555462	-0.44794	0.439527	-0.61614	-0.30486	-0.84732
F	III	5.41221	7.56278	1.8105	-0.21055	1.03055	-0.64811	-0.41839	-0.80788
F	III	4.90054	8.51402	1.5848	-0.04399	0.837211	-0.32288	0.196844	0.120982
F	III	3.330053	6.115493	0.422407	-0.51954	0.159048	-0.7508	-0.65693	-1.03971

Variedad	Zona	6.68	6.72	6.76	6.8	6.84	6.88	6.92	6.96
A	I	0.020971	-0.24961	0.249027	0.573652	3.761622	6.37724	11.37527	41.62472
A	I	-0.10814	-0.4855	-0.1798	-0.06076	3.28006	5.16761	9.55204	39.9674
A	I	0.149185	-0.17189	0.298307	0.725191	3.4094	6.46344	11.2566	34.4717
A	I	0.111594	-0.21036	0.258116	0.664595	3.46475	5.89207	10.518	34.5401
A	I	-0.07087	-0.27432	0.225432	0.449292	3.83937	6.49092	11.5699	46.2846
A	I	0.056164	-0.07423	0.392171	0.618846	4.16615	6.64384	11.3682	41.8233
B	I	-0.00369	-0.14224	0.187113	0.077544	1.52715	5.4071	9.53177	44.0559
B	I	-0.003	-0.13796	0.264482	0.324869	1.90836	5.98277	9.97189	46.5894
B	I	-0.04443	-0.17416	0.556685	0.875832	1.92693	6.99367	14.3364	41.9702

B	I	-0.07537	-0.2603	0.452417	0.808069	2.27079	7.55921	16.6303	44.8277
B	I	-0.05372	-0.15846	0.694164	1.13456	2.06873	6.63094	14.3118	26.9097
B	I	-0.22925	-0.3806	0.564377	0.756601	2.01903	6.97548	15.6027	31.7117
C	I	-1.15736	-1.33811	-0.91387	-0.90643	4.21856	4.47714	7.75795	67.1226
C	I	-0.11992	-0.10273	0.143159	0.047507	4.49048	6.07008	9.01172	55.6615
C	I	-0.48729	-0.56813	-0.30326	-0.21781	4.48703	5.04849	8.3741	57.4337
C	I	-3.93348	-4.57666	-4.28457	-4.17204	0.817704	2.44532	6.90324	60.1099
C	I	0.046361	-0.24702	0.042152	0.673611	3.66596	4.76495	7.96738	43.1222
C	I	-1.71512	-2.09501	-1.75314	-1.49765	2.958756	3.973719	7.693714	57.9206
D	II	-0.40732	-0.70089	-0.14752	-0.4403	3.00897	7.00721	10.4661	65.7679
D	II	-0.74128	-1.51876	-1.39585	-1.94277	1.5806	6.22164	9.39776	63.6724
D	II	0.022109	0.031642	0.670564	0.833941	4.58053	6.83352	8.60313	41.3517
D	II	-0.0865	-0.30713	-0.06516	-0.20328	3.19281	5.37187	8.35097	52.9897
D	II	-0.32106	-0.72772	-0.53572	-1.03001	2.9206	6.22008	9.80149	67.5022
D	II	-0.77358	-1.42259	-1.17834	-1.40851	2.44561	5.59465	9.97495	65.6092
E	II	-0.31556	-0.65871	-0.02417	1.17734	5.98142	8.92114	16.6262	75.3359
E	II	-0.16174	-0.88479	-0.30928	-0.16377	5.59249	7.76786	13.3044	78.2074
E	II	-0.09871	-0.54591	0.404396	1.60389	7.93629	9.66111	21.5115	91.948
E	II	-0.01783	-0.59248	0.480719	1.16897	9.24882	8.79812	17.0851	104.645
E	II	-0.09742	-0.61408	0.140501	1.74705	4.47214	8.23822	18.465	67.8582
E	II	-0.09393	-0.65931	0.179084	1.089034	6.812435	8.616328	17.5915	85.66465
F	III	0.1098	-0.05745	1.89272	1.85729	6.07635	11.0324	14.8737	13.5109
F	III	-2.64482	-2.92209	-0.92478	-0.9482	3.08211	9.09862	11.7275	8.73492
F	III	-0.70113	-1.0575	0.689211	0.574113	3.8254	9.90674	12.065	9.17056
F	III	-0.2594	-0.43531	1.82392	1.61315	6.36082	12.347	16.0124	14.4633
F	III	0.723837	0.890751	3.20743	3.52138	7.42789	14.8575	18.8036	15.8217
F	III	-0.67323	-0.85908	0.895683	1.392357	6.148763	11.20574	17.34753	38.83487

Variedad	Zona	7	7.04	7.08	7.12	7.16	7.2	7.24	7.28
A	I	12.63898	14.92156	4.894313	4.641726	2.23906	3.40674	8.474155	5.786525
A	I	11.9355	13.7835	2.71411	3.0718	0.616475	2.13924	6.84333	4.79732
A	I	11.2525	15.5524	3.92767	3.90913	1.70466	3.0345	8.02542	5.5165
A	I	10.8017	14.4113	3.86714	3.88329	1.75276	2.9148	7.61076	5.11564
A	I	13.74	14.5626	5.63638	5.12977	2.59493	3.70023	8.84391	6.12033
A	I	13.7441	14.7609	4.99182	4.65463	2.92993	3.63294	9.06301	6.33933
B	I	15.6366	33.0222	3.6387	4.10526	1.04323	1.87196	7.28814	3.96546

B	I	14.4803	31.0024	3.57072	4.34258	1.95785	2.67142	8.09713	4.42668
B	I	17.3209	32.7919	5.01291	5.72801	2.59048	2.90873	11.1197	6.33369
B	I	20.3424	32.1835	7.83088	7.45139	4.01862	4.13798	12.0835	7.77628
B	I	18.2786	30.4096	6.74814	6.60942	3.10922	3.58996	10.6322	8.073
B	I	18.5508	33.0767	3.77964	4.05301	1.33569	2.19028	10.7883	7.58928
C	I	7.62066	20.9651	3.00221	5.78122	2.52718	3.07848	8.90498	3.13994
C	I	8.47841	22.8302	4.99492	7.21212	4.152	4.49299	9.76643	4.14507
C	I	7.70708	22.9101	3.50574	6.43225	3.39468	4.00199	9.37361	4.07347
C	I	4.64941	18.5156	-0.62306	1.68693	-1.38193	-0.77249	5.32098	-0.24307
C	I	18.3779	23.7868	4.84357	5.44781	3.52246	4.03777	6.9239	3.79274
C	I	10.42031	21.51095	2.455724	4.391426	1.587021	2.156877	7.190952	2.274466
D	II	13.3199	21.5136	2.58554	4.61197	0.948855	3.05149	8.44933	3.73116
D	II	12.1751	23.3337	3.55957	5.52523	1.5144	3.4491	8.72547	3.35044
D	II	43.9935	29.3204	10.3505	11.8612	9.28203	8.97192	9.94621	6.22223
D	II	33.941	22.2585	5.7703	7.0913	5.76004	5.60044	7.4036	5.53871
D	II	14.3134	19.5328	1.60464	4.15108	2.4248	2.91577	7.67692	3.99511
D	II	19.3222	20.3246	3.91577	5.98402	3.42633	5.08067	8.58572	5.53399
E	II	21.5616	28.1981	7.11852	9.4386	5.83069	8.55589	15.8484	9.37852
E	II	18.299	26.9055	3.82711	6.20731	1.86508	4.51845	11.5441	4.49036
E	II	19.3415	21.4788	7.49096	9.41793	7.18387	10.0457	16.3655	12.8292
E	II	19.8375	24.1131	7.32787	9.75072	7.19697	9.64488	15.6967	9.50701
E	II	15.2542	14.9218	6.17441	7.8207	5.62253	7.608	14.4452	9.02209
E	II	18.18305	21.8548	6.205088	8.299165	5.467113	7.954258	14.51288	8.962165
F	III	4.7387	9.80086	7.99267	12.3904	7.29536	11.6058	15.7456	10.5157
F	III	-0.01734	5.01141	3.35314	7.76628	2.22727	6.79357	10.6425	5.19141
F	III	1.95733	5.51865	5.29316	9.05905	4.25134	8.22142	12.0567	7.2347
F	III	4.10599	9.22491	8.07054	12.6215	7.54509	12.2433	17.2198	10.3852
F	III	7.69249	11.8145	11.8179	17.1558	11.1455	16.0801	21.6449	15.2605
F	III	9.005551	12.76824	7.554	11.44667	6.852213	10.97312	16.21763	11.0937

Variedad	Zona	7.32	7.36	7.4	7.44	7.48	7.52	7.56	7.6
A	I	29.59633	23.52026	10.12861	11.91828	9.901251	1.059964	0.191828	-0.03617
A	I	30.5433	22.5726	9.23398	10.3513	10.5953	0.596693	-0.06739	-0.00647
A	I	24.7964	19.6363	8.96783	13.1512	9.94722	0.935718	0.338112	0.075954
A	I	24.602	19.485	8.57881	11.8571	8.80193	0.514422	-0.02436	-0.18208
A	I	32.8666	26.1854	11.0884	11.2852	10.4238	1.54376	0.396839	0.111853

A	I	30.2194	24.4345	10.5979	11.3138	10.5698	1.5014	0.379484	0.274817
B	I	34.2443	21.8567	6.62985	15.4272	23.958	1.81595	0.447473	0.1941
B	I	35.3917	22.6299	6.45197	14.7939	22.2861	1.41204	0.300776	0.116194
B	I	31.7828	19.4277	7.09982	16.4169	23.4887	1.81524	0.627416	0.320647
B	I	34.5017	20.4067	8.98051	19.0741	21.7122	2.69211	0.943684	0.165089
B	I	19.6963	13.5177	7.84396	17.7843	20.2945	2.5042	0.883391	0.096009
B	I	23.7965	13.9782	7.65281	18.0554	22.6892	1.49985	0.05188	-0.28419
C	I	47.2908	34.8053	10.5588	12.7557	16.9447	0.864859	-0.18036	0.075062
C	I	38.2102	31.6594	10.6951	13.3466	17.7399	1.73054	0.366096	0.334481
C	I	40.4408	32.3212	10.3553	13.2416	18.4152	1.33357	0.142525	0.236616
C	I	42.4971	26.9208	5.49064	9.35005	12.3128	-3.96098	-4.67394	-4.1491
C	I	40.3998	24.7759	9.8408	14.4189	19.1315	1.80467	0.427096	0.272731
C	I	44.26382	29.41068	8.802682	12.41838	16.45226	-0.43909	-1.50525	-1.29244
D	II	52.5076	29.6597	9.79783	13.6117	15.6739	0.27184	-0.6189	-0.43457
D	II	47.8797	31.0237	10.4779	14.3425	17.4063	1.12497	-0.10185	-0.19006
D	II	59.7554	31.7777	15.4898	17.2529	20.8474	4.44847	2.19365	1.15382
D	II	65.7221	29.5214	12.7203	15.6395	16.4833	1.92552	0.554989	0.31821
D	II	56.8747	31.388	9.38608	13.3743	14.575	-0.63135	-1.19196	-0.76665
D	II	57.923	33.3896	11.9278	14.7986	15.5117	1.27979	0.178048	0.077663
E	II	69.4905	43.6345	17.21	18.974	20.4985	2.30012	0.683227	-0.11581
E	II	61.3983	44.2867	12.5887	11.9985	15.1998	-4.24428	-6.25258	-7.12721
E	II	83.2184	51.4661	19.3329	16.8692	15.5675	2.74276	0.969278	0.202883
E	II	91.2213	51.6512	17.8027	15.9716	14.2118	-0.66333	-2.92726	-3.76443
E	II	63.6167	35.345	12.4608	14.2359	9.45289	1.10938	0.014817	-0.49463
E	II	74.86368	45.68725	15.54628	14.7688	13.608	-0.26387	-2.04894	-2.79585
F	III	14.2739	25.2828	12.8958	14.972	9.87129	1.89116	0.181215	-0.27697
F	III	9.38946	20.2391	5.46652	8.46267	1.80319	-5.71444	-7.02284	-7.03163
F	III	10.8823	20.8437	7.37474	10.713	3.80418	-2.66741	-3.93475	-4.23553
F	III	15.3578	26.8575	12.7271	14.8643	8.49607	1.5346	-0.65696	-1.22171
F	III	19.2205	30.7082	16.7704	20.2685	13.6839	5.88827	3.77211	3.09008
F	III	37.27612	34.1378	13.85661	15.20012	10.35153	0.972197	-0.76048	-1.24622

Variedad	Zona	7.64	7.68	7.72	7.76	7.8	7.84	7.88	7.92
A	I	-0.38269	-0.40021	0.412071	0.298303	-0.44732	-0.4132	0.161781	0.810116
A	I	-0.2107	-0.08707	0.867934	0.661799	-0.06467	-0.0904	0.530924	0.871906
A	I	-0.14478	-0.06753	0.766085	0.622981	0.018989	0.111818	0.550463	1.31514

A	I	-0.29105	-0.20446	0.59714	0.531862	-0.09888	0.047744	0.497052	1.29226
A	I	-0.45203	-0.57265	0.202998	0.047367	-0.7697	-0.85007	-0.18291	0.28078
A	I	-0.2506	-0.25407	0.680531	0.776246	-0.0554	-0.13296	0.381263	0.857446
B	I	-0.00386	-0.10692	0.803998	0.54955	-0.04456	-0.07387	0.758163	0.5649
B	I	-0.03065	-0.05781	0.865495	0.748549	-0.02883	-0.02142	0.730921	0.790617
B	I	0.134263	-0.06442	0.791136	0.289085	-0.15725	-0.08219	0.318974	0.241441
B	I	0.036897	-0.17018	0.696384	0.308478	-0.1502	-0.17204	0.196081	0.050787
B	I	-0.05248	-0.07893	0.455571	0.175576	-0.25158	-0.30041	0.180425	0.962683
B	I	-0.41243	-0.47684	0.42566	0.186609	-0.18854	-0.0254	0.492207	1.32686
C	I	-0.04235	-0.1267	1.47779	1.18103	-0.08373	-0.09491	0.97275	0.519486
C	I	0.02673	-0.17595	1.41573	1.23473	0.048633	-0.05149	0.987707	0.353125
C	I	0.092336	-0.11742	1.43197	1.13469	0.011652	-0.08026	1.14425	0.425664
C	I	-3.82892	-3.48053	-1.10876	-0.87855	-1.62223	-1.19007	0.211393	-0.31088
C	I	-0.07745	-0.17785	1.37648	0.91382	-0.11464	-0.09141	1.33806	0.351339
C	I	-1.34257	-1.28693	0.593473	0.413541	-0.61901	-0.46797	0.857549	0.19038
D	II	-0.2574	-0.38469	1.21651	1.45293	-0.02293	-0.14009	1.1511	0.356309
D	II	-0.21378	-0.42124	1.16984	1.31876	0.025888	-0.15164	1.06149	0.236836
D	II	0.403686	-0.1368	2.05988	1.62645	0.243506	-0.09822	0.960367	0.115529
D	II	0.139612	-0.19278	2.24301	1.49553	0.060655	-0.0968	1.05112	0.443265
D	II	-0.50499	-0.59513	1.95988	1.60472	0.071136	-0.01903	1.12421	0.530413
D	II	0.028961	-0.256	1.79874	1.61723	-0.02698	-0.22651	0.725235	0.082079
E	II	-0.24595	-0.46405	0.50487	0.709498	-0.82752	-1.18042	-0.13377	-0.87534
E	II	-7.4725	-1.61637	0.28818	-1.18073	-6.19909	-6.30606	-5.00614	-5.59189
E	II	-0.042	5.72594	6.82795	4.84713	0.264225	0.023679	0.719324	-0.09413
E	II	-4.39982	-0.17187	2.65509	0.308407	-4.20127	-4.46578	-3.49099	-4.57574
E	II	-0.60976	9.06161	7.84309	4.19267	-0.698	-1.05813	-0.67007	-0.6536
E	II	-3.13102	3.249827	4.403578	2.041869	-2.70853	-2.95157	-2.11197	-2.72884
F	III	-0.95365	4.79244	8.39474	7.25158	1.25766	0.228518	1.23732	-0.76757
F	III	-7.11447	-0.50958	1.72455	-0.16135	-4.60753	-4.86454	-3.37729	-4.95569
F	III	-4.52933	2.89297	4.22082	2.16619	-2.33723	-2.7758	-1.9392	-3.37396
F	III	-1.92698	3.12362	5.50544	4.3786	-0.04775	-1.20745	-0.24549	-2.35788
F	III	2.15295	8.07222	10.6283	9.4719	4.0805	2.96557	3.69356	1.32628
F	III	-1.66784	4.429527	6.3936	4.719225	-0.0876	-0.6251	0.345198	-1.24118

Variedad	Zona	7.96	8	8.04	8.08	8.12	8.16	8.2	8.24
A	I	1.270114	0.873549	0.250669	1.332599	5.186946	0.102313	0.439059	1.029813

A	I	1.82483	0.933864	0.491883	1.3358	5.32943	0.190883	0.581574	1.07
A	I	1.10667	0.986172	0.32917	1.40121	4.59823	0.001788	0.378575	0.861253
A	I	1.14268	0.912354	0.32496	1.38525	4.62702	0.078227	0.448295	0.905776
A	I	1.32356	0.783858	0.161776	1.20232	5.44472	0.120439	0.404246	1.09386
A	I	1.53053	1.31273	0.412019	1.37992	5.72544	0.22733	0.406767	1.09067
B	I	1.34183	0.753371	0.237221	1.02275	3.86772	0.170181	0.319165	0.751558
B	I	1.41287	0.947647	0.40042	1.09292	3.82114	0.084044	0.25391	0.710899
B	I	2.21472	0.998645	0.234701	1.09405	3.96128	0.241504	0.53552	0.770105
B	I	2.38356	0.929374	0.291384	1.34893	4.00303	0.318175	0.534784	0.668011
B	I	2.15194	0.551073	0.090576	0.953265	3.6242	0.207578	0.532125	0.643747
B	I	3.01692	0.860139	0.40148	1.1552	4.31264	0.228586	0.625584	0.712682
C	I	2.48972	0.860975	1.28971	1.64895	4.86562	0.010203	0.205902	1.0051
C	I	1.72778	0.972098	0.97037	1.92098	4.91561	0.08715	0.162312	0.804781
C	I	2.94831	1.14481	1.49112	1.78618	4.89514	0.052233	0.229715	1.00825
C	I	1.34283	0.612027	0.557891	2.19567	4.7979	-0.19903	0.043497	0.704794
C	I	1.41217	1.90969	0.145349	1.35106	4.05794	0.034291	0.157416	0.844863
C	I	1.783205	1.150115	0.677603	1.766531	4.665296	-0.05254	0.138317	0.868617
D	II	1.91868	1.04422	0.966569	2.61057	7.81427	0.195985	0.374516	1.01037
D	II	1.73858	0.755754	0.572139	2.15048	7.22889	0.104783	0.234324	0.951131
D	II	1.38471	0.443049	1.06874	0.980376	5.88015	0.205683	-0.01606	0.714005
D	II	1.33421	1.11204	1.35446	1.30816	5.97255	0.154601	0.010285	0.740879
D	II	2.23873	0.851642	1.33795	2.86208	7.22495	0.049727	0.069029	0.862767
D	II	1.6158	0.481781	0.682072	2.49147	6.61536	0.07506	0.095691	0.80616
E	II	2.04376	0.747352	0.535374	3.02882	6.04677	0.258472	0.411258	1.4783
E	II	-2.2177	-2.99639	-2.7957	-0.29404	4.93162	-1.43466	-0.90501	0.660262
E	II	2.17528	0.862989	1.09991	3.11989	6.60609	-0.10076	-0.2138	0.143893
E	II	-1.03093	-2.41629	-1.52896	0.96847	6.36803	-1.11259	-0.66744	0.829512
E	II	0.856939	0.164505	0.455363	3.50406	4.56637	0.050478	0.570015	0.77012
E	II	-0.0541	-1.0963	-0.69235	1.824595	5.618028	-0.64938	-0.30406	0.600947
F	III	1.95143	5.38735	0.905318	5.01594	5.01915	0.650084	0.46548	2.88149
F	III	-0.74289	1.87271	-1.80784	3.10547	2.71583	-1.44056	-0.47743	1.92696
F	III	0.715229	2.68008	-0.6339	4.30285	3.31086	-0.55941	-0.21517	1.83494
F	III	0.352482	4.53748	-1.02856	4.09489	3.72169	-1.50414	-0.95652	1.34847
F	III	3.48535	7.59267	2.90863	7.25741	6.96033	2.04212	1.69926	3.5437
F	III	1.639248	3.44279	0.733567	4.494257	5.427417	0.166932	0.33601	1.871518

Variedad	Zona	8.28	8.32	8.36	8.4	8.44	8.48	8.52	8.56
A	I	-0.06137	0.278203	0.694351	0.328685	0.321385	1.011686	5.842248	0.992962
A	I	-0.01908	0.3185	0.706319	0.266779	0.25152	1.34862	4.4303	0.662928
A	I	-0.03645	0.243182	0.706795	0.336431	0.304678	0.328285	5.78469	0.714889
A	I	-0.06137	0.232688	0.649376	0.278452	0.277496	0.436808	5.39828	0.649472
A	I	-0.0578	0.307512	0.698878	0.359772	0.346552	1.52763	5.94589	1.27861
A	I	-0.0764	0.203588	0.651386	0.242577	0.26887	5.00052	2.6867	0.978931
B	I	-0.05923	0.194956	0.545555	0.14402	0.207107	3.52301	0.913818	0.729855
B	I	-0.03491	0.138621	0.611494	0.143751	0.227964	3.9392	0.949164	0.586843
B	I	-0.0669	0.309894	0.611403	0.231095	0.307318	3.90164	0.902001	0.974603
B	I	-0.0395	0.299118	0.671146	0.241597	0.372917	4.65626	1.08999	1.18119
B	I	-0.09515	0.114099	0.376861	0.240236	0.487149	3.39243	2.59819	1.7814
B	I	-0.06151	0.323323	0.544856	0.307587	0.529961	6.6089	0.847931	1.56519
C	I	-0.05012	0.494912	0.477484	0.191093	0.141196	6.81502	1.22065	1.0356
C	I	-0.09629	0.395843	0.459321	0.157179	0.126782	7.87467	1.11949	0.831871
C	I	-0.10276	0.488962	0.534307	0.183216	0.137706	6.85045	0.976839	0.942858
C	I	-0.10918	0.404637	0.577538	0.203393	0.252415	8.62063	0.879565	0.946044
C	I	-0.03705	0.191417	0.613595	0.131231	0.071661	3.26659	1.25463	0.529278
C	I	-0.06676	0.370928	0.56733	0.178744	0.158192	6.358762	1.140647	0.853713
D	II	-0.07567	0.349922	0.742728	0.328294	0.330419	6.77216	0.507359	0.993422
D	II	-0.09378	0.331275	0.657202	0.262865	0.257258	6.51638	0.682429	1.03841
D	II	-0.1019	0.198424	0.508125	0.077379	0.05838	3.88918	0.963217	0.71367
D	II	-0.14372	0.157837	0.405203	0.11514	0.036351	4.13384	0.723086	0.739444
D	II	-0.1379	0.358847	0.47451	0.285566	0.273835	5.66068	0.374885	1.00864
D	II	-0.16086	0.266302	0.540933	0.222646	0.338623	5.30866	0.700971	1.21025
E	II	-0.13063	0.288264	0.74004	0.370955	0.402895	5.71217	0.293499	0.971064
E	II	-0.37508	-0.02933	0.627961	0.209384	0.250376	6.05312	0.14551	0.809087
E	II	-0.79853	-0.82983	-0.37636	-0.53475	0.00775	6.28286	-0.11494	0.661243
E	II	-0.54088	0.625374	0.426755	0.015094	0.523634	8.69402	0.069811	0.718111
E	II	-0.14602	0.298584	0.473786	0.341966	0.294595	5.78896	0.105013	0.64111
E	II	-0.46513	0.0162	0.288035	0.007924	0.269089	6.70474	0.051348	0.707388
F	III	-0.01146	0.271964	3.32113	1.64894	7.06293	1.11789	0.594942	0.607614
F	III	-0.57018	0.13938	3.48735	1.8262	7.52515	0.167104	0.351002	0.476294
F	III	-0.48283	-0.07219	3.04857	1.44646	7.2249	0.551351	0.360441	0.380681
F	III	-1.7291	-1.47412	2.5526	0.136496	8.94329	-0.25618	0.070871	0.336662
F	III	0.535632	0.592054	3.70973	1.99276	6.92816	1.47028	0.913148	0.718981

F	III	-0.27769	-0.0328	2.273573	1.094738	4.820353	2.640081	0.383069	0.618839

Variedad	Zona	8.6	8.64	8.68	8.72	8.76	8.8	8.84	8.88
A	I	0.257053	0.347949	-0.0014	0.094347	0.295126	0.15048	-0.08244	4.87223
A	I	0.056723	0.196173	-0.05173	0.098197	0.237096	0.128487	-0.02146	4.86296
A	I	0.09358	0.301698	-0.03016	0.111451	0.272025	0.155877	-0.07268	4.50748
A	I	0.077956	0.238246	-0.02805	0.080852	0.236105	0.117721	-0.1129	4.42195
A	I	0.421177	0.437384	0.025337	0.102346	0.336955	0.174474	-0.04718	5.03869
A	I	0.188613	0.305002	-0.02648	0.084086	0.263267	0.146107	-0.02579	5.33065
B	I	0.156281	0.270318	0.021587	0.083385	0.349241	0.240814	-0.0328	3.45912
B	I	0.026582	0.247476	-0.02796	0.087723	0.299882	0.189549	-0.0355	3.46097
B	I	0.292994	0.369277	0.071473	0.131957	0.557059	0.363351	-0.00019	3.49677
B	I	0.404947	0.39716	0.038312	0.114158	0.489281	0.247245	-0.00909	3.602
B	I	0.43481	0.644948	0.166088	0.068371	0.935627	0.662411	0.02516	3.35491
B	I	0.326649	0.574547	0.093363	0.103766	0.93254	0.702557	0.082163	4.0414
C	I	0.316024	0.18366	-0.04285	0.224187	0.137555	0.147027	-0.01505	4.72127
C	I	0.166055	0.188923	-0.0581	0.150212	0.189633	0.175346	-0.07686	4.71893
C	I	0.321692	0.177943	-0.03406	0.181652	0.194652	0.177559	-0.0384	4.56759
C	I	0.225929	0.182934	-0.07109	0.153179	0.211633	0.181686	0.070747	5.23731
C	I	0.186027	0.124687	-0.03317	0.15279	0.102184	0.071068	-0.06007	4.07206
C	I	0.247513	0.167036	-0.05002	0.180253	0.153466	0.135926	-0.00148	4.770418
D	II	0.204438	0.198707	-0.06677	0.073954	0.206176	0.206382	0.018139	6.63999
D	II	0.248853	0.242303	-0.06933	0.047403	0.195915	0.13375	-0.07895	6.24699
D	II	0.29995	0.12781	-0.03595	0.079835	0.114555	0.089952	-0.211	5.26442
D	II	0.240003	0.167442	-0.05407	0.071581	0.089561	0.045987	-0.08782	5.67202
D	II	0.162199	0.163424	-0.10203	0.118236	0.222254	0.086686	0.030712	7.09437
D	II	0.414443	0.25666	-0.04332	0.043927	0.136436	0.008296	-0.11716	6.32585
E	II	0.539847	0.385699	-0.02729	0.177039	0.280651	0.289587	-0.03871	5.74743
E	II	0.479202	0.340752	-0.04412	0.179902	0.20561	0.282314	-0.04162	6.32477
E	II	0.330813	0.206522	-0.08417	0.138131	0.120461	0.119387	0.15612	6.47117
E	II	0.343531	0.283555	-0.11507	0.18319	0.213706	0.246337	0.08182	7.60188
E	II	0.260449	0.171158	-0.11978	0.087713	0.090065	0.14787	-0.03385	4.81225
E	II	0.353499	0.250497	-0.09078	0.147234	0.157461	0.198977	0.040619	6.302518
F	III	0.18063	0.75782	0.055256	-0.05276	0.224496	0.156233	-0.02088	3.44956
F	III	0.123638	0.880171	-0.0188	-0.01112	0.255221	0.191591	0.109875	3.98925
F	III	0.154067	0.677407	-0.01167	-0.05778	0.27363	0.174554	0.011374	3.74807

F	III	-0.13374	0.835342	-0.0688	-0.06697	0.260224	0.205101	0.054656	4.04449
F	III	0.219566	0.730579	0.080501	-0.03079	0.182601	0.134597	-0.05123	3.91005
F	III	0.224672	0.605757	-0.00749	0.032071	0.186094	0.148525	0.071588	4.790157

Variedad	Zona	8.92	8.96	9	9.04	9.08	9.12	9.16	9.2
A	I	5.07739	0.207222	0.255631	0.021463	-0.01616	-0.03058	-0.08393	4.606783
A	I	4.82344	0.11037	0.196815	0.023351	-0.02646	-0.0168	-0.00212	4.38483
A	I	4.56992	0.093776	0.236305	0.076401	0.0054	-0.01637	-0.08835	4.20861
A	I	4.53759	0.167526	0.24711	0.018881	-0.00366	-0.01888	-0.07669	4.18316
A	I	5.32142	0.234846	0.24926	0.022795	-0.02771	-0.04051	-0.08627	4.76205
A	I	5.47974	0.245218	0.257654	0.032624	-0.03094	-0.04033	-0.01822	4.79235
B	I	3.61426	0.131049	0.22483	0.069725	-0.02629	-5.34E-05	-0.06315	3.17221
B	I	3.49985	0.095747	0.22398	0.100452	-0.00692	-0.00985	-0.03149	3.11144
B	I	3.5561	0.095621	0.183248	0.095804	-0.00528	-0.01551	-0.08846	3.16389
B	I	3.7745	0.165759	0.194824	0.091922	-0.03288	-0.03546	-0.08797	3.2403
B	I	3.64548	0.194314	0.197677	0.112293	-0.01677	-0.01664	-0.10764	2.96057
B	I	3.93421	0.101255	0.289631	0.163368	0.004517	0.006662	0.074766	3.28288
C	I	4.66711	0.092209	0.330195	0.081326	-0.00992	-0.02023	-0.05241	4.28459
C	I	4.79678	0.153878	0.325208	0.074756	-0.01407	-0.02212	-0.05027	4.31309
C	I	4.53152	0.068252	0.271915	0.069473	-0.03334	-0.01027	-0.07353	4.18852
C	I	4.81284	0.042208	0.259813	-4.84E-05	-0.02009	-0.04158	0.199344	4.34892
C	I	4.23045	0.169028	0.213994	0.080513	0.015389	-0.01418	-0.09886	3.74813
C	I	4.661536	0.103171	0.273361	0.055009	-0.00497	-0.02584	0.016345	4.209758
D	II	6.38606	0.135631	0.296131	0.074601	0.001719	-0.02797	0.070338	5.81728
D	II	6.29113	0.210617	0.299685	0.042638	-0.03138	-0.04654	-0.0228	5.65571
D	II	5.84941	0.437924	0.218989	0.046437	-0.01989	-0.04308	-0.27543	5.23013
D	II	5.6057	0.176988	0.204621	0.044814	0.014129	-0.03625	-0.04155	5.21229
D	II	6.55328	0.065029	0.271294	0.061238	0.012757	-0.04468	0.12028	6.14338
D	II	5.98272	0.124739	0.240598	0.029811	-0.06611	-0.08254	0.106257	5.57381
E	II	6.06378	0.224322	0.315035	0.068075	-0.01979	-0.0292	-0.0779	5.31783
E	II	6.74982	0.31861	0.29173	0.061716	-0.02033	-0.02964	-0.10862	5.94459
E	II	6.47	0.453225	0.346567	0.041859	-0.08025	-0.08375	0.219279	5.60536
E	II	7.70313	0.610584	0.561594	0.146403	-0.02607	-0.05897	0.191722	6.84561
E	II	5.02218	0.254686	0.209326	0.01442	-0.04326	-0.0343	-0.01481	4.40305
E	II	6.486283	0.409276	0.352304	0.0661	-0.04248	-0.05166	0.071893	5.699653

F	III	4.14705	0.259795	0.181366	0.041019	-0.01805	-0.03262	-0.15703	3.49797
F	III	4.09213	0.094559	0.188058	0.035383	-0.05232	-0.05652	0.061861	3.45295
F	III	4.15738	0.378636	0.202407	0.055272	-0.01086	-0.08451	-0.02337	3.25954
F	III	4.89798	0.345974	0.301871	0.112506	0.001251	-0.04044	-0.18883	3.95772
F	III	4.70806	0.480555	0.193093	0.034192	0.01277	-0.08437	-0.13409	3.90522
F	III	5.090063	0.34278	0.242573	0.037145	-0.03993	-0.07488	0.049018	4.321177

Variedad	Zona	9.24	9.28	9.32	9.36	9.4	9.44	9.48	9.52
A	I	0.060131	-0.04403	0.71152	1.745701	1.919034	1.831124	0.138839	0.017677
A	I	-0.01337	-0.04105	0.866678	1.69038	1.86699	1.53113	0.047106	0.025642
A	I	-0.00553	-0.04091	0.592991	1.41102	1.55944	1.57485	0.059206	-0.01113
A	I	0.027074	-0.04281	0.58211	1.38702	1.48942	1.52266	0.069039	-0.01857
A	I	0.089685	-0.04268	0.799482	2.00269	2.23686	2.03292	0.200552	0.052894
A	I	0.034416	-0.0566	0.918127	1.84849	2.09685	1.69137	0.065932	-0.03143
B	I	0.020046	-0.03423	0.756459	1.38238	1.25261	1.70974	0.14612	-0.01291
B	I	0.001807	-0.03492	0.807589	1.24649	1.19936	1.47918	0.073301	-0.0063
B	I	0.008712	-0.05298	0.519477	1.43725	1.42804	2.29972	0.21217	0.008025
B	I	0.032041	-0.04095	0.536569	1.74308	1.80314	2.50598	0.533783	0.095134
B	I	0.039578	-0.05711	0.404568	1.20125	1.30287	2.20415	0.287611	0.024525
B	I	-0.0183	-0.03541	0.539175	1.18332	1.38426	1.92568	0.090814	-0.02165
C	I	0.000146	0.040041	2.06232	3.14831	2.48582	2.14823	0.302652	0.058102
C	I	0.029832	-0.0345	2.07928	2.98758	2.39185	2.1269	0.310241	0.071001
C	I	-0.01735	-0.04879	1.6376	2.55734	1.89432	1.86527	0.155077	0.048913
C	I	-0.00894	0.142368	2.57285	2.98493	2.62581	2.18258	0.305045	0.110919
C	I	0.037092	-0.05323	1.0567	2.13009	1.53793	1.16645	0.050758	-0.01139
C	I	0.009622	0.04392	1.935236	2.809532	2.26085	1.869068	0.223875	0.053593
D	II	-0.01072	0.054954	2.09272	2.47501	2.40705	2.15986	0.249008	0.061346
D	II	0.02011	0.011108	1.90174	2.46534	2.32796	2.27653	0.280273	0.051189
D	II	0.133201	-0.0414	0.96248	1.76528	1.46946	1.18731	0.094905	-0.0194
D	II	0.070018	-0.01714	1.29909	2.02755	1.85603	1.46222	0.228818	0.018539
D	II	-0.04019	0.035971	2.00262	2.46604	2.39441	1.85305	0.193786	0.050972
D	II	-0.00708	0.018395	1.66536	2.16908	2.01712	1.50029	0.037201	-0.01974
E	II	0.022856	0.075923	1.77059	3.03209	2.41392	3.15434	0.735117	0.26516
E	II	0.070203	0.052327	1.76753	3.03548	2.3348	3.0804	0.664952	0.225018
E	II	0.010495	0.035501	1.69002	2.64641	2.13125	2.4537	0.566223	0.206943
E	II	0.05741	0.122703	2.3262	2.79318	2.36829	2.57726	0.522943	0.187912

E	II	0.017007	0.031923	1.62917	3.23074	2.31603	2.66776	0.736042	0.243681
E	II	0.038779	0.060614	1.85323	2.926453	2.287593	2.69478	0.62254	0.215889
F	III	0.068314	0.187861	3.46939	5.88584	3.99042	2.87305	1.01637	0.354169
F	III	-0.03604	0.454179	4.92909	5.61184	3.81534	2.58092	0.680987	0.242777
F	III	0.00627	0.349135	4.93697	5.19835	4.01377	2.82958	0.940115	0.370146
F	III	0.015095	0.214328	4.21262	6.33848	4.46539	3.24402	1.19205	0.497632
F	III	0.147533	0.164143	4.28823	7.84586	5.1426	3.89513	1.81443	0.857191
F	III	0.040664	0.217941	3.63578	5.368037	3.696397	2.976583	1.020547	0.435637

Variedad	Zona	9.56	9.6	9.64	9.68	9.72	9.76	9.8	9.84
A	I	-0.02694	0.037668	0.014135	0.023364	0.052109	0.024188	0.011879	0.137146
A	I	0.009629	0.020448	0.038643	0.068124	0.081224	0.033998	0.018769	0.139547
A	I	0.01916	0.026917	0.025927	0.033711	0.027994	0.037666	-0.00136	0.095219
A	I	-0.03969	0.020447	0.013893	0.021672	0.061035	0.021729	0.017313	0.123748
A	I	-0.01263	0.052695	0.013553	0.023694	0.040147	0.025239	0.005752	0.142555
A	I	0.001269	0.044891	0.01265	0.021241	0.041572	0.008645	0.004481	0.129101
B	I	0.003232	0.028233	0.010855	0.036912	0.055003	0.011876	0.008231	0.103547
B	I	0.024959	0.052996	0.03127	0.053859	0.063639	0.011509	0.004611	0.110619
B	I	0.013484	0.036092	0.018517	0.018304	0.006056	0.00834	0.007416	0.130827
B	I	0.017865	0.032186	0.019674	0.020085	0.039494	0.024945	-0.0027	0.098376
B	I	-0.01381	0.037161	-0.01227	0.022872	0.020689	0.017273	0.009424	0.105939
B	I	-0.00176	0.031335	0.004994	0.032522	0.048501	0.030943	0.00835	0.167917
C	I	0.05614	0.076681	0.060737	0.065796	0.060486	0.037115	0.028517	0.122396
C	I	0.006109	0.005834	0.033179	0.042779	0.053514	0.030527	-0.0109	0.084767
C	I	0.029616	0.054085	0.038785	0.04242	0.042257	0.034021	0.000147	0.077713
C	I	0.053424	0.062108	0.03158	0.03532	0.056898	0.032297	0.001589	0.13821
C	I	0.030013	0.035953	-0.00983	0.05654	0.040418	0.017661	0.007687	0.068159
C	I	0.047456	0.059412	0.028046	0.053603	0.053653	0.029605	0.01285	0.11178
D	II	0.057732	0.095914	0.055665	0.054807	0.053844	0.006842	0.031319	0.125016
D	II	0.027198	0.047882	0.039231	0.046816	0.07449	0.011114	0.013543	0.096429
D	II	-0.01342	0.01764	0.0198	0.000648	0.015064	3.59E-05	-0.01351	0.068966
D	II	0.020772	0.077226	0.034107	0.046987	0.05731	0.036421	0.005494	0.115309
D	II	0.008452	0.060987	0.016289	0.078763	0.071439	0.032195	0.044026	0.114636
D	II	-0.009	0.059456	0.07703	0.072507	0.084189	0.034342	0.00199	0.082877
E	II	0.023132	0.025409	-0.02159	0.029668	0.021085	0.021055	0.004891	0.097754
E	II	0.07153	0.061013	0.073618	0.077217	0.051433	0.033833	-0.01667	0.073308

E	II	0.04003	0.055819	0.069198	0.042654	0.051544	0.022601	0.0198	0.107718
E	II	0.018777	0.067532	0.067874	0.059345	0.063404	0.023384	0.010152	0.094818
E	II	0.059203	0.061738	0.041449	0.020968	0.03346	0.025593	0.005487	0.076738
E	II	0.047385	0.061525	0.063035	0.050046	0.04996	0.026353	0.004693	0.088145
F	III	0.007094	0.009523	-0.02091	0.01158	0.008559	0.023504	-0.01333	0.051874
F	III	-0.02174	0.011267	-0.00028	0.036703	0.050858	0.047043	-0.00374	0.073858
F	III	0.00548	0.020625	0.02988	0.037858	0.035032	0.047649	-0.00182	0.065377
F	III	0.004911	0.017871	-0.01154	0.010163	0.009082	0.008906	0.023333	0.036879
F	III	0.166343	0.02565	-0.00687	0.006253	-0.01072	0.012524	0.005229	0.030955
F	III	0.061545	0.030912	0.020686	0.028537	0.03056	0.027389	0.007097	0.070844

Variedad	Zona	9.88	9.92	9.96	10
A	I	0.038672	0.038998	0.053492	0.042626
A	I	0.030875	0.062629	0.045134	0.055051
A	I	0.035284	0.014612	0.021974	0.028957
A	I	0.027228	0.04846	0.060388	0.033019
A	I	0.047863	0.027265	0.04348	0.049751
A	I	0.034142	0.054812	0.057004	0.036846
B	I	0.041442	0.053865	0.040469	0.04733
B	I	0.017811	0.059573	0.033495	0.037577
B	I	0.039228	0.039891	0.032963	0.035852
B	I	0.048858	0.024038	0.034269	0.026543
B	I	0.041851	0.028436	0.03651	0.026568
B	I	0.055301	0.078916	0.035766	0.05522
C	I	0.062871	0.054531	0.049339	0.057071
C	I	0.026719	0.026349	0.021824	0.028132
C	I	0.056473	0.063598	0.066773	0.064684
C	I	0.050383	0.01596	0.048844	0.066225
C	I	0.073441	0.060102	0.060356	0.049393
C	I	0.063476	0.044402	0.053903	0.058714
D	II	0.07997	0.05694	0.044217	0.037743
D	II	0.064145	0.084157	0.073985	0.086295
D	II	0.007077	0.019226	0.028539	0.016669
D	II	0.072865	0.06881	0.04722	0.076247
D	II	0.099347	0.10032	0.082236	0.090405
D	II	-0.0059	-0.00623	0.045976	0.083242

E	II	0.061711	0.050922	0.031612	0.035116
E	II	0.010793	0.016952	-0.01608	0.092854
E	II	0.077823	0.076442	0.073535	0.072329
E	II	0.028195	0.076463	0.087662	0.085534
E	II	0.060197	0.039277	0.059547	0.047418
E	II	0.044252	0.052283	0.051165	0.074534
F	III	0.002545	0.027498	0.000196	0.035068
F	III	0.064476	0.059939	0.077021	0.078451
F	III	0.014322	0.052371	0.048151	0.032838
F	III	0.047106	0.038085	0.024685	0.039797
F	III	0.017906	0.010212	0.008957	0.00528
F	III	0.053402	0.048864	0.053171	0.05202