

Correlation of plant, fruit and seed traits of squash accessions in Tlaxcala

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Abstract

The squash (*Cucurbita moschata* Duchesne) is grown in Tlaxcala, utilizing the plant, flower, fruit, and seed. The diversity of native accessions is due to the interaction with the environment in two regions of the state, which are appropriate to the management of producers. It is important to identify outstanding accessions in fruit and seed in the face of the scarcity of improved materials. The positive and direct correlation of traits evaluated in 50 accessions was shown. They were evaluated in two localities, and the sowing took place on May 12 and 27, 2022. The experimental plot consisted of 12 clumps 1.5 m apart and a distance of 0.8 m between rows. The analysis of variance (Anova) indicated significant differences ($p < 0.01$) between localities, accessions, and the interaction, which shows genetic variability and response to the environment. Accessions 5, 25, 34, 35, 37, 38, and 39 were productive, with fruit yields between 31.8 and 46.6 t ha⁻¹ and seed yields between 941 and 1 190 kg ha⁻¹. There was a significant positive correlation ($r = 0.9^{**}$) between fruit and seed yield, both associated with fruit weight, number of seeds per fruit, fruit diameter, pulp thickness and peduncle diameter. The results confirm genetic variability in native accessions. The high correlation between fruit and seed yield, as well as their association with key morphological traits, indicates their usefulness in genetic improvement programs to increase productivity and quality. Outstanding accessions may represent an important genetic basis for conservation and use in production systems.

Keywords:

Cucurbita moschata, genetic diversity, phenotypic correlation, yield.



Introduction

The squash that is planted in the High Valleys of Tlaxcala belongs to the genus *Cucurbita* and to the species *moschata*, Duchesne; it is an annual, herbaceous, creeping-climbing dicotyledonous plant susceptible to frost, with fibrous roots, elongated and cylindrical or angular stems with pubescence and tendrils (Lira *et al.*, 1995; Fornaris, 2012; Dorantes *et al.*, 2016) .

In Mexico, the largest area planted with squash is in Zacatecas and Campeche, with 19 318 and 16 821 ha, respectively. In terms of cultivated area, Tlaxcala ranks ninth with 1 525 ha and an average yield of 1.07 t ha⁻¹, which is obtained from two regions: the east, in the municipalities of El Carmen Tequexquitla, Cuapiaxtla, Alzayanca, Huamantla, and Zitlaltepec de Trinidad Sánchez Santos; and the west, in Nativitas, Tepetitla de Lardizábal, Ixtacuixtla de Mariano Matamoros, Españita, Nanacamilpa de Mariano Arista, Calpulalpan, Atlangatepec, and Apizaco [Agrifood and Fisheries Information Service (SIAP), 2016] .

The squash crop has been developed in the milpa production system, which is the association of corn, beans and squash (Ramírez *et al.*, 2023), where vines, flowers, fruits, and seeds are used (Ayvar *et al.*, 2007).

The genetic resources available in germplasm banks and the native materials used by producers in their production units lack agronomic characterization and evaluation (Peeters and Galway, 1988). To be used as potential products in the obtaining of improved cultivars, in addition to meeting the expectations of the market, Food and Agriculture Organization of the United Nations (FAO, 1993; Rodríguez *et al.*, 2009), as well as to face and mitigate adverse temperature conditions, delays in the rainy season, and erratic rains [Secretaría del Medio Ambiente y Recursos Naturales-Comisión Nacional Forestal (SEMARNAT-CONAFOR), 2014).

Therefore, there is a need to evaluate native accessions of producers in the environments of origin of the collection to know their agronomic behavior and confirm the adaptive potential, their capacity to replicate in environments, and the utilization of the diversity of the crop in genetic improvement programs (Martínez *et al.*, 2018).

There is no information on the characterization and agronomic evaluation *in situ* of the native accessions of producers that determines their adaptation and capacity to replicate the yield of fruit and seed and that contributes to the productivity, profitability, and competitiveness of the crop (Ayvar *et al.*, 2007; Rojas and Fernández, 2024). This publication aims to know the correlation of plant, fruit, and seed traits of squash accessions collected in two regions of the state of Tlaxcala.

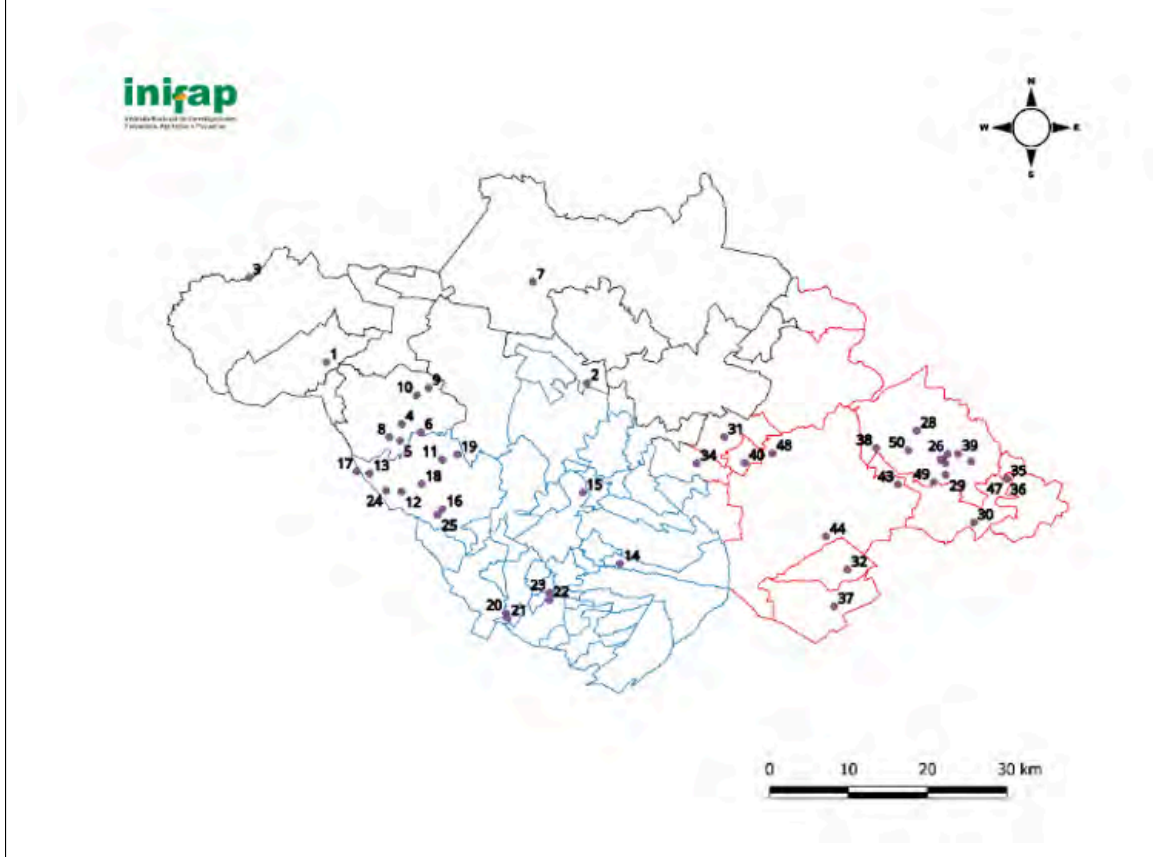
Materials and methods

Accession collection sites

Fifty accessions were collected in 2022 in 38 localities in 16 municipalities in the state of Tlaxcala, Mexico, with the participation of 50 producers. Of these, 10 accessions came from DDR 163-Calpulalpan, 15 from DDR 164-Tlaxcala, and 25 from DDR 165-Huamantla, as illustrated in Figure 1. The altitude ranged from 2 188 to 2 720, with an average of 2 457 masl.



Figure 1. Location of collection sites of cultivated squash accessions in the state of Tlaxcala, Mexico, 2022.



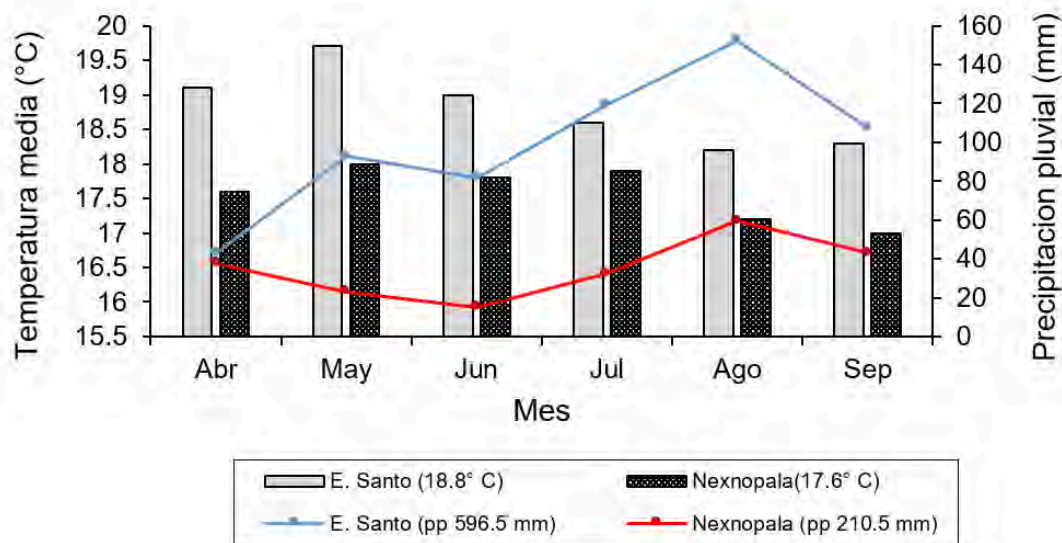
Evaluation sites

The trial was established on May 12 and 27, 2022, in Nexnopala, municipality of Alzayanca and Espíritu Santo, municipality of Ixtacuixtla, both located in the state of Tlaxcala, Mexico, with geographic location 19° 23' 7.51" north latitude and 97° 46' 32.70" west longitude and 19° 20' 27.5" north latitude and 98° 26' 48 8" west longitude, at 2 483 and 2 360 masl, respectively. The climate is sub-humid temperate, with an average annual rainfall of 500 to 600 mm and a frost-free period ranging from 170 to 200 days with rainfall from May to October.

Figure 2 presents the monthly precipitation and average temperature recorded at the climatological stations of the National Water Commission near the evaluation sites of the squash accessions in 2022; in both test sites, the precipitation took place until May. In Espiritu Santo, there was more precipitation, with 386 mm, than that recorded in the Nexnopala area, which was 210.5 mm; the western region where Espiritu Santo is located is warmer (>1.5 °C) and presents more precipitation than that recorded in Nexnopala.



Figure 2. Distribution of precipitation and temperature recorded at stations near the evaluation sites in Tlaxcala, Mexico, 2022 (CONAGUA, 2022).



Experimental design

For the distribution of the treatments in the field, a randomized complete block design with three replications was used. The experimental unit consisted of two 6 m long furrows 80 cm apart with four clumps per furrow 1.5 m apart, depositing three seeds per clump (9.6 m²). The useful plot consisted of the four central plants of the experimental unit (4.8 m²).

Producers' conventional agronomic management

The preparation of the land consisted of fallowing and harrowing. The sowing method was in continuous furrows (1:0) in Nexnopala and alternating furrows (1:3) in Espiritu Santo. The cultivation tasks were carried out with a yoke and weed control was manual. Fertilization was with the formula 100-46-30 (NPK), applying half of nitrogen and all the phosphorus and potassium in the first task; the rest of the nitrogen was supplied 45 days after sowing. Foliar fertilization consisted of three applications with Bayfolan Forte® [N 11.5%; P₂O₅, 8%; K₂O, 6%] and Maxi-Grow Excel® [combination of organic extracts 112.5; auxins 0.09, gibberellins 0.1, cytokinins 1.5; N 6.6%, P₂O₅ 13.3%, K₂O 13.3%, Ca 2%, Mg 4%, Cu 13.3%, Fe 17.2%, Mn 13.3% and Zn 26.5%].

Recorded agronomic traits

The agronomic traits were 19, of which four belonged to the plant, eight to the fruit, and seven to the seed, which are indicated in Table 1, according to Villanueva (2007).



Table 1. Traits recorded in plant, fruit, and seed by squash accession.

Plant	Fruit	Seed
Plant height in cm (PH)	Fruit yield t/ha (FYIE)	Seed yield kg/ha (SEYIE)
Number of vines per plant (VP)	Average weight per fruit g (WF)	Seed length mm (SLE)
Main vine length (MVL)	Fruit diameter cm (FRD)	Seed width mm (SWI)
Days to male flowering (DF)	Fruit length cm (FRL)	Number of seeds per fruit (SEF)
	Pulp thickness mm (PUT)	Average weight of seed per fruit g (WSF)
	Skin thickness mm (SKT)	Volumetric weight of seed g/L (VW)
	Peduncle diameter mm (PED)	Weight of one hundred seeds g (WHS)
	Peduncle length cm (PEL)	

Statistical analysis

A basic data matrix (BDM) was developed, Ruelas *et al.* (2015), based on the averaged data. Subsequently, a combined analysis of variance (ANOVA) was performed to evaluate significant differences for the factors of locality (LOC), accession (ACC), and interaction (LOC-ACC). The comparison of means was carried out using Tukey's test ($\alpha = 0.05$) and the correlation of plant, fruit, and seed traits was determined with the Statistical Analysis System (SAS), version 9.3 (SAS, 2014).

Results and discussion

The combined analysis of variance showed statistically significant differences ($p < 0.01$) for (LOC) and (ACC) in the 19 traits evaluated, except for days to flower, which did not present significant differences in the factor (ACC). The interaction (LOC-ACC) was significant in most traits, except for days to flowering, fruit diameter and seed width (Table 2).

Table 2. Mean squares and coefficient of variation of 19 traits of squash accessions in two localities of the state of Tlaxcala, Mexico, 2022.

Trait	Locality (LOC)	Accession (ACC)	Interaction LOC-ACC	CV (%)
PH	35 979**	116.1**	95.8**	6.4
VP	33.1**	3.9**	3.2**	11.8
MVL	125.3**	1.2**	0.6**	10.3
DF	14 993.3**	69.7 ns	64.4 ns	11.4
FYIE	3 272.6**	368.6**	128.7**	10.1
WF	204 341 643.3**	2 235 909.2**	1 291 472.6**	10.3
FRD	1 090.7**	16.2**	7.8 ns	11.6
FRL	737.1**	16.9**	7.6**	14.9
PUT	1 737.1**	27**	17.4**	11.6
SKT	4.3**	0.31**	0.24**	12.6
PED	57.5**	25**	13.6**	9.4
PEL	131.9**	13.3**	8.7**	6.6
SEYIE	322 685.6**	276 678.1**	93 907.3**	9.5
SLE	121.4**	8.2**	3.2**	2.9
SWI	50.2**	1.2**	0.64 ns	8.4
SEF	268 217.1**	478 615.4**	444 310.7**	5.5

Trait	Locality (LOC)	Accession (ACC)	Interaction LOC-ACC	CV (%)
WSF	41 036.3**	934.8**	916.5**	5.5
VW	9 687.2**	2 176.8**	1 422.6**	4.3
WHS	1 273.4**	25.9**	16**	6.2

**= Statistical significance 0.01; ns= not significant; CV= coefficient of variation.

The significance observed in the evaluated traits for the factor (LOC) indicates that the analysis of variance should be performed for each locality, as recommended by Balzarini *et al.* (2015). This is due to the influence of the environment on the expression of agronomic traits, as pointed out by Moreno *et al.* (2002).

The lowest coefficient of variation was recorded at SLE with 2.9%, whereas the highest was observed in FRL with 14.9%. Both values are considered acceptable and lower compared to the work carried out by Sánchez *et al.* (2004) in a study on the evolution of genotypes of *C. argyrosperma* Huber, where the coefficients of variation ranged from 0.73% (DFF) to 44.95% (pulp flavor).

PH was higher in Espiritu Santo (58.7 cm) compared to Nexnopala (36.3 cm), which is attributed to differences in soil texture (clay loam and sandy) and the amount of precipitation recorded in the climatological stations near the evaluation sites from April to September, as shown in Figure 2. These conditions had a significant effect on the response of most of the traits evaluated in Espiritu Santo, except for VP, PED, PEL, SLE, and SWI. These results coincide with what has been reported in other studies (Sánchez *et al.*, 2004).

Trait correlation

The correlation between traits was analyzed by locality due to the significance ($p < 0.01$) of the LOC-ACC interaction. In Nexnopala, WF showed a significant positive correlation for FRD, PUT, PED, SLE, SEF, WSF, and WHS with values of $r = 0.6^{**}$, 0.5^{**} , 0.4^{**} , 0.47^{**} , 0.41^{**} , 0.62^{**} and 0.44^{**} , respectively, as Villanueva *et al.* (2013) report in their research.

There were high positive and significant correlations between the FYIE and SEYIE traits, with ($r = 0.9^{**}$), and these showed intermediate and significant positive correlation with SEF ($r = 0.34^{**}$ and 0.4^{**}) and WSF ($r = 0.44^{**}$ and 0.46^{**}), respectively, which indicates that the higher the fruit yield, the higher the seed yield per hectare, as Villanueva *et al.* (2013) report in their study.

In addition, SEF and WSF were positive and significant with PUT ($r = 0.38^{**}$ and 0.42^{**}), respectively. SEF with WSF ($r = 0.75^{**}$) and WSF with WHS ($r = 0.57^{**}$), which indicates that the higher the weight of the fruit, the greater the expression in pulp thickness and number and weight of seeds per fruit. For its part, the higher seed weight is due to the increase in the weight of one hundred seeds, as reported by Berenji and Papp (2000).

Large fruits with greater weight, thick pulp, and seed number and weight indicate that they are more productive; therefore, these traits should be considered as selection criteria, as suggested by Bezerra *et al.* (2006), in the improvement of accessions in this study.

There was a positive and significant correlation between PUT and WF ($r = 0.5^{**}$), FRD ($r = 0.69^{**}$), FRL ($r = 0.5^{**}$), SLE ($r = 0.4^{**}$) and WSF ($r = 0.42^{**}$), which reinforces the findings by Villanueva *et al.* (2013) regarding the fact that pulp thickness, fruit length and diameter, and seed length are directly related to an increase in fruit weight and seed weight per fruit.

The PED trait had an intermediate positive correlation and significance with WF ($r = 0.4^{**}$) and WSF ($r = 0.47^{**}$); Soblechero *et al.* (2005) indicate that this characteristic guarantees the physiological maturity of the fruit and increased the dry matter of the seed, which results in greater weight.

There was also an intermediate positive correlation of PEL with MVL ($r = 0.49^{**}$), SLE ($r = 0.41^{**}$), and SEF ($r = 0.43^{**}$), so it is noted that peduncle length correlates directly with longer vines, greater seed length and number of seeds per fruit. The above should be considered for seed selection, considering fruits with long peduncles for sowing with the alternating furrow method.

In Espiritu Santo, FYIE and SEYIE were positively and significantly correlated with ($r = 0.9^{**}$); regarding FYIE, it presented a positive and significant correlation with WF ($r = 0.6^{**}$), FRD ($r = 0.49^{**}$), PUT ($r = 0.47^{**}$), WSF ($r = 0.56^{**}$), and WHS ($r = 0.59^{**}$) and SEYIE is positively correlated with SEF ($r = 0.43^{**}$), WSF ($r = 0.62^{**}$) and WHS ($r = 0.59^{**}$), as reported by Sánchez *et al.* (2006), which indicates that both yields correlated directly with these fruit and seed variables because they are the yield components.

The FRD had a positive correlation and significance with PUT ($r = 0.63^{**}$), PED ($r = 0.56^{**}$), WSF ($r = 0.48^{**}$), and WHS ($r = 0.57^{**}$); there was also a correlation of FRL with SEF ($r = 0.47^{**}$), indicating that the greater the diameter and length of the fruit, the greater the thickness of the pulp, the diameter of the peduncle, the weight and number of seeds per fruit and the weight of one hundred seeds.

There was a positive and significant correlation between PUT and SEF ($r = 0.41^{**}$), WSF ($r = 0.52^{**}$), and WHS ($r = 0.51^{**}$), which reinforces the findings by Villanueva *et al.* (2013) regarding the fact that the thickness of the pulp is directly related to the increase in the number and weight of seeds per fruit and the weight of one hundred seeds.

SEF correlated positively and significantly with WSF ($r = 0.74^{**}$) and VW ($r = 0.49^{**}$) due to the larger size of the fruits that were obtained in this locality in the western region of the state, so at a larger fruit size, there were more reserves that allowed a better filling of the seed and therefore greater volumetric weight, as indicated by Soblechero *et al.* (2005). The behavior of the traits is attributed to the interaction with the environment according to Sánchez *et al.* (2006); Reyes *et al.* (2017), where the environment with the best response was Espiritu Santo due to the better climate and soil conditions.

Conclusions

The present study allowed us to analyze the genetic variability and the genotype $\times$ environment (G $\times$ E) interaction in *Cucurbita moschata* accessions grown in two localities with different soil and climatic conditions in Tlaxcala, Mexico.

It was found that the agronomic response of the native accessions varied significantly among environments, being better in the western region than in the eastern zone, which justifies the need to evaluate the accessions in more localities per environment to confirm the replication of the agronomic and morphological behavior before their incorporation into genetic improvement programs.

The information generated can contribute to the conservation of the genetic diversity of *Cucurbita moschata* and to the optimization of production systems, ensuring a better comprehensive use of stable and productive native accessions in conventional, intensive and agroecological management contexts.

With this evaluation, it was possible to identify accessions with lower variability and greater response in productivity and quality in the test environments, where correlations between agronomic and morphological traits that allow determining greater stability of fruit and seed yield were obtained.

Bibliography

- 1 Ayvar, S. S.; Mena, B. A. J. A.; Duran, R. J. A.; Cruzaley, S. R. y Gómez, M. N. O. 2007. La calabaza pipiana y su manejo integrado. Centro de estudios profesionales. Colegio Superior Agropecuario del Estado de Guerrero. Iguala, Guerrero, México. 27 p.

- 2 Balzarini, M. G.; Bruno, C. I. y Arroyo, T. A. 2015. Análisis de ensayos agrícolas multi-ambientales: ejemplos con Info-Gen. Estadística y biometría. Facultad de Ciencias Agropecuarias. Universidad Nacional de Córdoba, Argentina. 141 p.
- 3 Berenji, J. y Papp, D. 2000. Interrelaciones entre las características de frutos y semillas de calabaza aceitera. In: VII Reunión Eucarpia sobre Genética y Mejoramiento de Cucurbitáceas. Acta Hortícola. 510(17):101-104.
- 4 Bezerra, N. F. V.; Leal, N. R.; Costa, F. R.; Gálves, G. M.; Amaral, J. A. T.; Vasconsellos, H. O. y Mello, M. M. 2006. Análisis biométrico de líneas de calabaza. Horticultura Brasileira. 24(3):378-380.
- 5 CONAGUA. 2022. Comisión Nacional del Agua. Resúmenes mensuales de lluvias y temperaturas (Tlaxcala).
- 6 Dorantes, J. J.; Flota, B. C.; Candelaria, M. B. y Ramírez, M. M. 2016. Calabaza Chihua, alternativa para la alimentación animal en el trópico. Revista Agroproductividad. 9(9):33-37.
- 7 FAO. 1993. Food and Agriculture Organization of the United Nations. Valor nutritivo y usos en alimentación humana de algunos cultivos autóctonos subexplotados de Mesoamérica. Santiago, Chile. Boletín informativo. 634.4(247):66-68. SB185/V35.
- 8 Fornaris, R. J. G. 2012. Características de la planta. Universidad de Puerto Rico, recinto universitario de Mayagüez. Colegio de Ciencias Agrícolas. Estación Experimental Agrícola. Conjunto Tecnológico para la Producción de Calabaza. 155 p.
- 9 Lira, S. R.; Andres, T. C. y Nee, M. H. 1995. *Cucurbita L.* In: Lira, R. Ed. Estudios taxonómicos y ecogeográficos de las Cucurbitaceae latinoamericanas de importancia económica. C., *Sechium*, *Sicana* y *Cyclanthera*. International Plant Genetic Resources Institute. Rome, Italy. 9(1):1-115. ISBN 92-9043-263-2.
- 10 Martínez, G. A.; Zamudio, G. B.; Tadeo, R. M.; Espinosa, C. A.; Cardoso, G. J. C.; Vázquez, C. G. y Turrent, F. A. 2018. Rendimiento de híbridos de maíz grano blanco en cinco localidades de Valles Altos de México. Revista Mexicana de Ciencias Agrícolas. 9(7):1447-1458.
- 11 Moreno, M. M.; Peña, L. A.; Sahagún, C. J.; Rodríguez, P. J. E. y Mora, A. R. 2002. Varianza aditiva, heredabilidad y correlaciones en la variedad M1-fitotecnia de tomate de cáscara (*Physalis ixocarpa* Brot.). Revista Fitotecnia Mexicana. 25(3):231-237.
- 12 Peeters, J. P. and Galgway, N. W. 1988. Colecciones de germoplasma y necesidades de mejoramiento en Europa. Econ. Bot. 42:503-521. <https://doi.org/10.1007/BF02862795>.
- 13 Ramírez, M. H. O.; Tadeo, R. M.; Villegas, A. Y.; Aragón, C. F.; Martínez, G. A.; Rodríguez, O. G.; Carrillo, R. J. C.; Espinosa, C. A. y De la O, O. M. 2023. Diversidad biológica del sistema milpa y su papel en la seguridad alimentaria en la Sierra Mixe. Revista Fitotecnia. 46(2):105-113.
- 14 Reyes, M. C.; Cantú, A. M.; Gill, L. H.; García, O. J. y Mayek, P. N. 2017. Interacción genotipo x ambiente en maíz cultivado en Tamaulipas. Revista Mexicana de Ciencias Agrícolas. 8(3):571-582.
- 15 Rodríguez, A. R.; Montes, H. S.; Rangel, L. J. A.; Mendoza, E. M. y Latournerie, M. L. 2009. Caracterización morfológica de la calabaza pipiana (*Cucurbita argyrosperma* Huber). Agricultura Técnica en México. 35(4):379-389. ISSN 0568-2517.
- 16 Rojas, M. I. y Fernández, S. R. 2024. Tecnología para la producción de pepita de calabaza de temporal en el estado de Tlaxcala. CIRCE-INIFAP. Campo Experimental Valle de México. Sitio Experimental Tlaxcala. Folleto técnico núm. 4. 64 p.
- 17 Ruelas, H. P. G.; Aguilar, C. J. A.; García, P. J. D.; Valdivia, B. R. y López, G. G. G. 2015. Diversidad morfológica de especies cultivadas de calabaza (*Cucurbita* spp.) en el estado de Nayarit. Revista Mexicana de Ciencias Agrícolas. 6(8):1845-1856.

- 18 Sánchez, H. M. A.; Mejía, C. A.; Villanueva, V. C.; Sahagún, C. J.; Muñoz, O. A y Molina, G. J. D. 2004. Selección combinada de genotipos de calabaza pipiana (*Cucurbita Argyrosperma* Huber var. *Stenosperma*) en el sistema milpa. Revista Chapingo Serie Horticultura. 10(1):57-66.
- 19 Sánchez, H. M. A.; Mejía, C. A.; Villanueva, V. C.; Sahagún, C. J.; Muñoz, O. A y Molina, G. J. D. 2006. Estimación de parámetros genéticos en calabaza pipiana (*Cucurbita argyrosperma* Huber). Revista Fitotecnia Mexicana. 29(2):127-136.
- 20 SAS. 2014. Statistical Analysis System. The SAS system for windows version 9.0. SAS Institute, Inc. NC. USA.
- 21 SEMARNAT-CONAFOR. 2014. Secretaría de Medio Ambiente y Recursos Naturales- Comisión Nacional Forestal. Inventario Estatal Forestal y de suelos-Tlaxcala 2014. ISBN: 978-607-8383-21-4. 127 p.
- 22 SIAP. 2016. Servicio de Información Agroalimentaria y Pesquera. <http://www.siap.sagarpa.gob.mx>.
- 23 Soblechero, E.; Hernández, H. A.; Antón, N. I. y Durán, J. M. 2005. La semilla y su morfología. Agricultura: Revista Agropecuaria. 877:612-615. ISSN 0002-1334.
- 24 Villanueva, V. C. 2007. Calabazas cultivadas. Identificación de especies, caracterización y descripción varietal. Universidad Autónoma Chapingo (UACH). Chapingo, Estado de México. 123 p.
- 25 Villanueva, V. C.; Sánchez, H. M. A.; Sánchez, C. I.; Sahagún, C. J.; Parra, B. G. y Villanueva, S. E. 2013. Respuesta a la selección masal participativa en calabaza de dulce (*Cucurbita. moschata* D.) Revista Chapingo Serie Horticultura. 19(2):239-253.



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