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# Title: Genetic diversity, classification and Racial distribution of native maize in Puebla state, México

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# Introduction

**Mesoamérica is one of the centers of primary diversity and the possible origin center and y domestication of maize**

**Maize in México, presents genetic diversity and it have had an important role in developing the modern landraces. Thus, there were identified landraces in maize; Wellhausen *et al.* (1951) described 25 and seven without definition; Hernández and Alanis (1970) added five more; Ortega (1991) identified 41 and Sánchez *et al.*, (2000), grouped 59 different landraces. It was shown that México overcome to each country in maize diversity.**



## **Objectives**

**To know the diversity and actual distribution of the native maize in Puebla state, México**

**To Characterize and identify to race level the native maize and keeping the genetic resources the permite to use this variability in actual or future maize breeding.**

# Methodology

**Site of collecting.** The criteria for collecting, were the importance of the maize crop and those locations were the native varieties are planted.

From may 2009 to june 2010, there were collected native maize varieties in high, intermediate and lowlands in Puebla state.

**There was considered a sample between 20 and 50 ears and was utilized the pasaporte leaves with information of the cultivar, farmers, and the site of collecting. It was registered North latitude, west longitude and the altitude above sea level, common name of the cultivar and name of the farmer**

# Results

**During 2009 and 2010, in the principal regions in Puebla state, in altitudes from 54 to 2804 meters, there were collected 756 samples of native maize, which of them were identified to race level, characterized in ear and sent for conservation to germplasm bank, located in Valley of México experiment station, INIFAP. In the samples of native maize collected, there were identified 16 landraces. It indicates the importance and the genetic diversity present in native maize (Hernández, 1971; Kato *et al.*, 2009).**

## High Valleys Region with altitude higher than 2000 meters above sea level

For high Valleys Region, there were collected 461 samples of native maize, which of them, 116 correspond to Cónico race, 76 to Elotes Cónicos, 60 Chalqueño, 41 Arrocillo amarillo, 18 Cacahuazintle 4 highland Nal Tel, and 158 mixture of races (Wellhausen *et al.*, 1951; Hernández y Alanís, 1970; Ortega, 2003; Sánchez *et al.*, 2000).



## Intermediate Región in altitude between 1300 and 2000 meters above sea level

From intermediate región, there were collected 88 samples, which of them 31 correspond to Coscomatepec race, 17 to Celaya, 4 Bolita, 1 Pepitilla and 35 mixture of races; These landraces present variation in color, texture of grain, adpatation and uses, (Wellhausen *et al.*, 1951; Hernández y Alanís, 1970; Ortega, 2003; Sánchez *et al.*, 2000).



## Tropical Region in altitude between 0 and 1300 meters above sea level

For tropical region, there were collected 207 samples of native maize, which of them, 113 belong to Tuxpeño race, 28 to Olotillo, 3 Ratón, 2 Tepecintle and 61 Mixture of races: 26 Tuxpeño Olotillo, 9 Tuxpeño-Tepecintle, 9 Olotillo Tepecintle, 6 Olotillo-Tuxpeño, 9 Ratón-tepecintle, 1 Ratón-Bolita, 1 Tepecintle-Olotillo. Tuxpeño is the most important race in the southeast of México. (Reyes, 1971; Reyes, 2000; Sierra *et al.*, 2004 y Sierra *et al.*, 2008).





## Uses of native maize

In Puebla state, the majority of farmers plant maize for self consumption through different ways in human consumption, forage, and animal feeding (Betanzos *et al.*, 2003). In High Valleys and intermediate Region, these native maize varieties are planted under rainy season conditions, the majority of them are tolerant to drought and pest in storage, ya que tienen un solo ciclo de siembra al año, que generalmente va desde los meses de febrero y marzo hasta noviembre y diciembre.

For tropical region located in In the east part of Puebla, in Tuxpeño and olotillo races farmers have found samples of maize with longer and more quality of ear leaves (Totomoxtle) which represents an additional value for maize production that the farmers have defined as “Hojero”; farmer select, and sell this leaves (Andrés *et al.*, 2014)



# Conclusions

**There were collected 756 samples of native maize in the principal ecological regions in Puebla estate, which of them were identified 16 landraces**

**In high Valleys Region, the most important races were: Cónico, Elotes cónicos, Chalqueño, Arrocillo amarillo, Cacahuazintle y Nal Tel de altura; For intermediate region, the most frequent races found were Coscomatepec, Celaya, Bolita and Pepitilla, while, for tropical area there were found Tuxpeño, Olotillo, Ratón and Tepecintle races.**

**In relation with grain colour, from all collected samples, 43.90% had white colour, 18.57% creme, 12.47% yellow, 14.73% black, 5.97% red and 4.38% mixed colour.**

**In the east part of Puebla, there were found samples of maize with longer and more quality ear leaves (Totomoxtle) which represents an additional value for maize production.**

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