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## Modern Variety Breeding for Present and Future Needs

Editors

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## Breeding value of germplasm of grain amaranths (*Amaranthus cruentus* L.)

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**ABSTRACT:** Since ancient times, grain amaranths have been cultivated by the natives cultures in central and south states of Mexico. There are two species cultivated for grain: *Amaranthus hypochondriacus* and *Amaranthus cruentus*. *A. cruentus* is more adapted to warm conditions and it is possible to harvest it twice during a year. Eleven landraces of *A. cruentus* collected in Guerrero, Morelos and Puebla were evaluated in Marín N.L. under field conditions. It was possible to obtain grain from seven landraces and their breeding value was evaluated using genetic parameters. There were landraces from highland regions of Guerrero that were affected by the photoperiod when sown in the lowlands of the north of Mexico. According to the breeding values obtained in this study, landraces from Puebla and Morelos, which are located in the central states of the country, do not have any problem when cultivated in lowlands of the north of Mexico and are not affected by the photoperiod. Landraces of Morelos and Puebla showed better response to selection and were not affected by environmental conditions. These landraces may be selected for setting up a breeding programme for this species in the lowlands of the north of the country.

**Keywords:** *Amaranthus cruentus*, landraces, response to selection, heritability.

### Introduction

Grain amaranths (*Amaranthus* spp.) are a native crop from México, It has been cultivated since 5000 years (Sauer, 1993). Ancient cultures in Mexico grew this crop, and the Aztec Empire used this grain as food and also for ceremonial purposes. During the discovery of the New World many native crops were substituted by European species and cultivation of grain amaranth declined (Williams, 1995; Paredes, 1994). There are two species cultivated for grain in Mexico: *Amaranthus cruentus* and *A. hypochondriacus*, each of which has different requirements for climatic conditions. *A. hypochondriacus* grows well in template climate of highlands in a range of 1700 to 2500 masl. *Amaranthus cruentus* is well adapted to warm regions in a range of 200 to 1500 masl (Alejandre and Gispert, 2004). Most of the areas where this grain is cultivated are located in the central and south states of México.

There exists a great variability in the landraces of these two species, such as plant height, seed colour, stem colour, panicle colour, leaf colour (Grubben and Sloten, 1981). Both species have different agronomic characteristics and are used for human consumption. Within landraces of both species there is also great variability, and this is a handicap for