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A compact sunflower line produced after cross *Helianthus annuus* x *Verbesina encelioides*

Research Article

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Abstract: Intergeneric cross was made between the cultivated sunflower inbred line HA89 and an accession of wild *Verbesina encelioides* tolerant to drought and high temperature. The line was a BC_2F_5 progeny. The most remarkable feature of the plants was their compact architecture due to short petiole length and also, rather specific bright-yellow inflorescences. Similar plant architecture did not exist in either the wild or the cultivated parent. For sunflower, it is considered as a favourable and potentially useful adaptive trait. The line was multi-branched of medium type branching and possessed good agronomic characteristics. The overall characteristics of HA-VERBENC line make it a useful plant material for research on wide hybridization.

Keywords: *Antioxidants • Crown beard • Cultivated sunflower • Intergeneric cross • Introgressive hybridization • Wide hybridization*

1. Introduction

Wide hybridization is frequently used as a tool to improve valuable agronomic traits of cultivated sunflower *Helianthus annuus* [1-5]. The range of wild *Helianthus* available to use is extensive while the genus comprises 51 species, 14 annual and 37 perennial, which are diploids, tetraploids and hexaploids [6]. The majority of wide hybridization studies have examined interspecific hybridization between closely related *Helianthus* species, while limited information is available on intergeneric hybridization and the barriers that prevent hybrid production [7-11].

The present work is a portion of a sunflower research program. Its objective is production and evaluation of new interspecific and intergeneric hybrids for transferring desirable traits from wild relatives to cultivated sunflower lines, developing germplasm pools having wild *Helianthus* genes in domestic background, and evaluating sunflower evolution and interspecific/intergeneric relationships. *Verbesina encelioides* [(Cav.) Bentham & Hooker fil. ex Gray] or golden crown beard was chosen due to its drought tolerance, early flowering and resistance to high temperature. It is an annual species, propagating by seeds, which are produced in abundance. Its seeds exhibit remarkable endurance to climatic extremes and survive under extremely high temperatures (38-46ºC) and soil drought during which they lie dormant in soil desiccated to below 5% moisture content [12]. *V. encelioides* is differentiated from the cultivated sunflower by the opposite leaves on the lower part of the plant, as well as smaller flower heads [13]. Besides its ornamental value, some studies pointed out the medicinal and economical importance of various fractions of *Verbesina encelioides*, which demonstrate considerable antibacterial, antifungal, antiviral, antitumor, hypoglycemic and anti-implantation activities [14]. Intensive pharmacognostic and pharmacological investigations are in a progress to ascertain therapeutic properties and medicinal use of *V. encelioides* roots for diabetes [15].

In the course of our study on wide hybridization *Helianthus* x *Verbesina*, we obtained a suite of diverse recombinants which reveal intermediate morphology and phenotype [9], or even novel features such as tubular ray flowers [16]. Indeed, intergeneric hybridization involving *Verbesina* ssp. is a genuine source of new sunflower hybrid

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