

## Variation of seed characteristic from natural and artificial selection in the genus *Papaver*

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Papaveraceae is a mediterranean plant family with an important scientific, commercial and ethnobotanical interest. Includes wild species, which are distributed throughout the Spanish territory, as *Papaver rhoeas*, *P. dubium*, *P. bracteatum*, *P. hybridum* and the wild type of *P. somniferum*, which are representatives of the natural selection. The species with the greatest commercial interest is *P. somniferum*, whose management through improvement lines reflects the most profitable plant characteristics obtained by artificial selection: fast and vigorous growth, multiple flowers and big size capsules (1), traits that increase the production of morphine, codeine and thebaine among others opiates derived from the capsule leachate. Occasionally, some breeding lines of *P. somniferum* shown wild features, such as capsule dehiscence or extended germination time. *Papaver* becomes, thereby, an interesting plant genus to analyze the differential evolution experienced through natural and artificial selection. In this regard, previous studies reported that seed surface patten can be used in taxonomic classification of Papaveraceae family members (2).

The main goal of this project was to characterize several seed traits variation among wild and cultivated samples. Seed size and shape was characterized using images analysis from macrophotography and the software ImageJ. Seed color, defined in the L, a\*, b\* color space, was recorded with an automatic colorimeter. Electron scanning microscopy (SEM) micrographs were used to study seed surface crosslinked patterns. Finally, confocal scanning microscopy allowed a preliminary approach to the internal seed tissue structure. The results shown that wild species seeds have deeper color than *P. somniferum* breeding lines but even among those it is possible to distinguish at least four main differentiated groups by color. Likewise, even if all breded *P. somniferum* samples had larger seeds than wild species, probably as the results of artificial selection, there were clear variation among them. We discuss if the variations in these seed characteristics was the unintended result of the artificial trait breeding selection with agronomic interest.

\* (1) Small, E. (2004), Narcotic Plants as Sources of Medicinals, Nutraceuticals, and Functional Foods

\* (2) Gunn & Seldin, 1976. Seeds and fruits of North American Papaveraceae.

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