

## Morphological and floral biological variability in *Plantago ovata* and its allied species

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### SUMMARY

Morphology and floral biology of six *Plantago* species was studied. Highly significant differences for the morphological and floral biological characters were recorded among different species. *P. coronopus* and *P. lanceolata* were better in terms of spike length, number of flower per spike, days to maturity and days to 50% flowering. *P. indica*, *P. arenaria* and *P. psyllium* were having more number of spikes per plant and longer duration of stigma receptivity. *Plantago lanceolata* was found to be self incompatible species, whereas *Plantago coronopus* and *Plantago indica* were self compatible. Maximum overlapping in flowering period was found between *P. ovata* and *P. coronopus*. *P. coronopus* also had better pollen characteristics such as viability, size, germination and tube length. *Plantago ovata* and *Plantago coronopus* were more near to each other than any other species for their morphological and floral biological traits. By taking the advantage of overlapping flowering periods, anthesis and duration of stigma receptivity; it may be possible to transfer some important traits to *Plantago ovata* from *P. coronopus* by direct crossing or using it as a bridge species for gene introgression from other less related species.

**Key words :** *Plantago*, morphology, floral biology, introgression.

**P***lantao ovata* (Isabgol) commercially known as blonde psyllium is an important medicinal plant. The genus *plantago* comprises of 200 species, of which 10 occur in India. However, *Plantago ovata* is the only cultivated species and is main source of Isabgol seed and husk for use in medicine. It is an annual, ascaulescent herb native to Indian subcontinent and is extensively cultivated in the North Gujarat region. It has narrow genetic base on account of less chromosome number ( $2n=8$ ), small size of chromosomes, lot of heterochromatin and low recombination frequency. These features have restricted the variability in the crop. Conventional methods of breeding have not been very successful with this crop. Therefore, genetic enhancement of Psyllium may be attempted through interspecific hybridization, which can help in transfer of some desirable genes from wild allies to the cultivated species. Though chromosome number among different species does not match but alien addition lines (AALs), alien substitution lines (ASLs) and other chromosomal variants such as trisomics, monosomics or nullisomics are reported to occur in nature and have been produced artificially also by different workers (Sharma *et al.*, 1985; Sharma and Koul, 1984; Dhar *et al.*, 1990).

Cross pollination in *Plantago* species is facilitated by protogyny, versatile adnation of anthers, extended surface of the plumose stigma, abundance of dry, smooth-walled pollen and self-incompatibility. Extensive cross-pollination accounts for the enormous inter-population variability in many species. Many allied species have desirable genes which may be introgressed into *Plantago ovata* for its improvement. However, prior to any such attempt, information on floral biology and breeding behaviour of cultivated and the allied species is very important. Thus, a comparative study on the morphology and floral biology of *Plantago ovata* and its five allied species was carried out.

### MATERIALS AND METHODS

Six *Plantago* species viz., *Plantago ovata*, *Plantago coronopus*, *Plantago lanceolata*, *Plantago indica*, *Plantago arenaria* and *Plantago psyllium* formed the material of study. The seeds of these species were obtained from ICAR unit on Medicinal and Aromatic Plants at B.A. College of Agriculture, Anand Agricultural University, Anand. The crop was sown in the field in first week of November, 2005 in RBD layout with three replications. Observations were recorded in respect to various morphological and floral biological characters. Ten plants from each of the six species were selected randomly from all the replications. The observations were recorded on plant height (cm), number of tillers or branches/plant, spikes/plant, spike length (cm), number of flowers/spike, days to maturity, 1000-seed weight (g), husk content (%), seed weight/plant (g), days to 50% flowering, duration of

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