# Role of honeybees and other insects in enhancing the yield of *Brassica campestris* var. *sarson*

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## Abstract

**Qualitative and quantitative effects of pollination on fruit set; number of seeds per siliqua and mean weight of 100 seeds were compared in controlled and open pollinated plants of sarson. Percent fruit set, number of seeds per siliqua and mean seed weight of 100 seeds were significantly (P<0.01) higher in open pollinated viz., 8.09, 9.37 and 141.86 than in controlled ones. Moreover, seeds of open pollinated plants were larger in size and viable than controlled ones. The crop was visited by many insect pollinators but *Apis dorsata* followed by *Apis mellifera* and *Apis cerana* were observed to be the most common pollinating species.**

**Keywords:** *Pollination, Brassica campestris* var. *sarson, Apis dorsata, A. mellifera, A. cerana.*

## Introduction

Rapeseed mustard is the second most important edible oilseed crop in India after groundnut. Among rapeseed, *Brassica campestris* var. *sarson* is a self compatible crop and is generally considered to require insect pollination for better seed production (Mc Gregor, 1976; Free, 1970). These insects belong to orders viz., Hymenoptera, Diptera, Lepidoptera, Coleoptera and Thysanoptera (Michener, 1974). Of these, Hymenopterans are the most important agents because of their high energy requirements and tendency for collecting provisions for their brood in the form of pollen and nectar. It is considered that services rendered by bees in pollination of fruits, vegetables, legume and other seed crops are worth many times the return, which bee keepers receive in the form of honey and bee wax (Mattu *et al*., 1994). Bees provide the most suitable conditions for pollen selectivity, thereby, increasing the viability, weight and germination of the seeds (Kozin, 1972). Alderman and Angelo 1933, also suggested the role of pollinating insects in getting good quality crops.

## Materials and Methods

Studies were conducted at Hiranagar in district Kathua, Jammu division to know the qualitative and quantitative effects of pollination on sarson flowers in terms of fruit set, number of seeds per siliqua and seed weight (Verma and Partap, 1993).

Flowering started in the second week of January 2006.One colony each of *Apis cerana* F. and *Apis mellifera* L. were placed in the field when 15-20% of the flowering had already occurred. Plants with unopened floral buds were enclosed in insect mesh nets for self and wind pollination and open flower buds left for self pollination, pollination by wind and insects. Two sites were randomly selected in the field area having 10-12 plants, for each of the experimental designs as under:-

**1) Affect of pollination on fruit set;**

$$\frac{Number\ \ of\ \ fruits\ \ (Siliqua\ \ )}{Number\ \ \ of\ \ buds} X\ 100$$

**2) Affect of pollination on number of seeds per siliqua;**

The number of seeds per siliqua was counted before harvesting period.

**3) Affect of honeybees and other insect on fruit quality;**

Qualitative effect of honeybees and other insect pollinators on fruit quality was studied by collecting the ripe seeds. It was assessed in terms of increase in weight of seeds, measured with the help of micro electric balance. For this, 100 seeds were collected from each experimental design and mean weight of 10 samples with 100 seeds was found. The data so obtained was analyzed statistically.

## Results and Discussion

Seed yield data so obtained is presented in the Table 1, which reveals that fruit set was 79.96% in controlled experiment, while it was 88.05% in open pollinated flowers. This shows an increase of 8.09% in open pollinated flowers as compared to controlled ones. Similarly, mean number of seeds/siliqua was 10.24 and 11.20, while mean weight of 100 seeds was 0.172 and 0.416 gm in controlled and open pollinated experimental designs respectively. These figures show an increase of 9.37% of seeds/siliqua and 141.86% of mean weight of 100 seeds in open pollinated flowers than controlled ones.

These results are in conformity with the already recorded observations of Chand and Singh (1995) on *Brassica juncea* and Mishra *et al.* (1988) on *Brassica campestris* var. *sarson.*

Further, Khan and Chaudhary (1988) emphasized upon the view that insect pollination led to the formation of well shaped larger grains and more viable seeds than self pollinated plants. The present investigator, also reconfirms these observations of the *op. cit.* workers, where the seeds of open pollinated plants are larger and viable than net caged ones. Some similar observations were reported by Singh (1997) on *Brassica juncea* and Singh *et al*., (2004) on var. *toria.*

**Table-1: Qualitative and quantitative effect of open pollination upon control pollination of plants of *Brassica campestris* var. *sarson**

| Parameter | Control | Open pollinated | Per cent Increase* |
|---|---|---|---|
| Fruit set | 79.96 | 88.05 | 8.09 |
| Number of seeds per siliqua | 10.24 | 11.2 | 9.37 |
| Weight (g) | 0.172 | 0.416 | 141.86 |

*= Open pollinated > control (P< 0.01)

## Conclusion

Qualitative and quantitative data reveals significant (P<0.01) increase in percent of fruit set, number of seeds/siliqua and mean weight of 100 seeds in open pollinated flowers than in controlled flowers, covered with muslin cloths. Thus insects, especially the bees are the cheapest source for increasing the yield of oilseed crops.

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