INFLUENCE OF SUPPLEMENTARY POLLINATION ON SEED SET AND SEED QUALITY IN SUNFLOWER HYBRID KBSH-1 SEED PRODUCTION

P.R. Renganayaki, R. Vigneshwari and V. Krishnasami
Department of Seed Science and Technology, TNAU, Coimbatore-3, Tamilnadu, India

ABSTRACT

Sunflower KBSH-1 hybrid seed production, parental lines raised during September didn’t require supplementary hand pollination due to presence of high number of pollinators(honey bees) with coated pollen effectively supplies the pollen grain to pollinate and fertilize the receptive stigma.

Sunflower (*Helianthus annuus* L.) (2n = 34) is the second most important oil seed crop of the world next to soybean. Sunflower is a protein rich oil seed crop ranking second in world production of edible oil with high amount of linoleic acid. In view of non-cholesterol and anti-cholesterol properties, demand for sunflower oil is increasing day by day in the market.

Cultivation of sunflower in India was started during 1972 with the introduction of Russian varieties, such as Peredovick (EC 68414) and Armavirskl (EC 68415). KBSH-1(Karnataka Bangalore Sunflower Hybrid - 1), is one of the most popular hybrids released from University of Agricultural Sciences, Bangalore. Because of its superior performance, it has been adopted in all sunflower growing areas of the country (Anonymous, 2001). In order to achieve high percentage of seed set, supplementary pollination by rubbing the flower heads is followed. Depending upon the flowering duration, number of bees present per head, numbers of hand rubbings of flower heads were vary. To know the effect of supplementary pollination and to determine the number of rubbings to be given to achieve high seed yield, studies were carried out in the parental line (CMS 234 – A and 6-D-1) seeds of sunflower hybrid KBSH – 1.

Breeder seeds of parental lines [CMS 234 A (female) and 6D-1 (male- restorer)] obtained from Agricultural Research Station, Bhavanisagar of the TNAU, Coimbatore constituted the basic material for this study.

A field trial was raised during rabi season with the parental lines viz., CMS 234-A (female) and 6 D-1 (male) in 4:1 ratio with early sowing of male parent by six days before the female in four replications.

The following hand pollination treatments were given to the female parent in addition to open pollination from initiation to completion of flowering.

- T1 - Open pollination
- T2 - Hand pollination daily
- T3 - Hand pollination on alternate days
- T4 - Hand pollination at three days interval
- T5 - Hand pollination at four days interval
- T6 - Hand pollination at six days interval
- T7 - Hand pollination only once during complete opening of the florets

Hand pollination was done in the morning hours from 8 to 11 am by gently touching the capitulum of the male and female plants alternatively by palm covered with muslin cloth as per the treatments detailed above and allowed for open pollination.

The following observations were recorded in ten randomly selected female plants in each plot:

**Seed Filling (%)** : Seed filling was worked out by counting the number of filled seeds to the total number of seeds per head and expressed in percentage.

**Number of seeds head** : The heads of ten randomly selected plants from each plot were harvested, threshed and cleaned and number of filled seeds per head was counted and mean of ten heads were recorded.
Seed yield plot: The heads of female plants were harvested from each plot, dried, threshed, cleaned thoroughly and hybrid seed yield was recorded in kg plot⁻¹.

100-seed weight (g): Hundred seeds in eight replications were weighed and mean weight of eight replications was expressed in g.

Seed germination: Estimated as per (ISTA, 1999).

Though significant variations due to treatments for seed filling, number of seeds head⁻¹ and 100-seed weight were observed, seed yield and germination showed no significant variation due to treatments.

The treatment T₂ (daily rubbing) recorded maximum seed filling per cent (98.7), number of seeds (977) with more 100 seed weight of 5.57 g and minimum per cent of seed filling (90.8 per cent) and number of seeds (769) was recorded by T₇ and lighter seeds were recorded in T₄ (5.41 g). Seed yield ranged from 2.07 to 2.69 kg plot⁻¹ and seed germination per cent ranged from 89 to 92 in different treatments (Table 1).

Sunflower is a highly cross pollinated crop and pollination is mostly favored by insects. The timely visit of bees coinciding with anthesis and stigma receptivity for effective pollination and fertilization are very important. The lack of pollination resulting in poor seed filling was responsible for reduction in seed yield (Kandil et al., 1987 and Khanna, 1972). Unless sufficient population of honey bees are coated with pollen grain and frequency of visit are more the seed filling will be poor (Goyal and Atwal, 1973 and Krishnaveni, 1997).

In the present study the crop was foraged by sufficient number of four species of honey bees viz., Apis dorsata, Apis cerana indica, Apis florea and Mellifera irridipennis. At peak flowering stage i.e. five days after flowering, the number of bees visiting female flower was maximum and more bees visited during morning hours. Since, sufficient number of pollinators (bees) visited the flowers with coated pollen grains; the supplementary hand pollination didn’t show much variation in terms of quality and quantity of seeds.

REFERENCES