International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Floral Biology in Glycine max Cultivated Around KaranjaGh. District Wardha (M.S.)

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Abstract: ***In present investigation an account of flowering phenology and pollen production in Glycine max were studied. It is annual erect or sub erect or climbing herb. It is commonly known as "Soyabean". The observations on G. max were carried out during the month of August to September in year. The first flower was opened on 2nd August and flowering lasts toward 20th of September. Pollen production per flower was found to be 2112.55 + 212.64, 2175.92 + 184.40 and 2214.71 + 384.42 for three study sites respectively. Observations on pollen viability estimation were found to be 86.22, 81.27 and 86.43 percent respectively for three study sites. Pollen: ovule ratio was recorded as 420.25, 435.39 and 460.94. The stigma becomes receptive during 08.30 am to 09.30 am.***

Keywords: Glycine max, Karanja, Pollen production, pollen ovule ratio

1. Introduction

The timing of sexual reproduction is a critically important determinant of plant reproductive success. Flowering at the optimum time ensures fecundity and good development of seeds and fruits. In general, plant species in their native ranges have coupled the sensitive flowering period to the optimal climatic conditions through natural selection, thus maximizing their reproductive success. The main selective factors acting upon flowering phenology differ between ecosystems (Godoy *et al.,* 2009). Flowering phenology refers to duration of biological events or seasonal timing of flowering. It is of significance for both ecological and evolutionary reason. It provides a mechanism for reproductive isolation or speciation over evolutionary time (Schmitt, 1983). Flowering and anthesis of most of the plants synchronizes with the availability of the pollinators (Sihag, 1993). On the other hand daily flowering has been regarded as an adaptation for regular attraction of pollinators (Faegri and Pijl, 1979). Therefore, looking into an importance of these aspects it felt necessary to study the flowering phenology and flower dynamics of this economically important crop.

2. Methodology

Three study sites were selected, all in around Karanja Ghadge city of Maharashtra state. Observations were taken on cultivated populations. The plant species under study were visited daily or on alternate day, for collection of blooming phenological data from selected study sites. The period from the opening of the first flower up to the last flower was taken as flowering period. The time of anthesis was noted and anther dehiscence was observed. Simple method of Nair and Rastogi (1963) was adopted to know the pollen production per anther/ flower. Pollen viability rates were observed with tetrazolium (TTC) test method (Loken, 1942) to determine the pollen viability in vitro. By dividing the number of pollen grains produced per flower by the number of ovules in the flower the pollen: ovule ratio of plants under investigation was obtained (Cruden, 1977). Selected flowers were observed regularly on flower opining day and the successive days to know the stigma receptivity.

3. Result and Discussion

The present research work was started with the aim to know the role floralbiology on pollination. In present investigation an account of floral biology in Glycine max were studied. It is annual erect or sub erect or climbing herb. In India it is commonly cultivated in Assam, Orissa, West Bengal, Manipur, Utter Pradesh and central Maharashtra. It is commonly known as "Soyabean". Leaves trifoliate, leaflets ovate, acute, rarely obtuse, 5-10 cm long, membranceous. Flower in racemes compact. Calyx 6 mm long densely hairy.Sepals long, corolla red. Seed are used as a food, the bean is high oil content and kernel is rich in protein. Flowering phenology is a critical life-history trait that strongly influences reproductive success (Rathcke and Lacey, 1985). The time of opening of flower synchronizes with the time of maximum activity of the insect showing the insect flowers relationships (Percival, 1965). Flowering phenology in some ornamental plants has been observed by Tidke and Dharamkar (2003). Thus it is found to be notable that flowering phenological data provides sound base for studies in pollination ecology. The observations on G. max were carried out during the month of August to September in year. The first flower was opened on 2nd Augustand flowering lasts toward 20th of September. Full blooming period was found to be from 9th to 30th August. Anthesis and anther dehiscence is most important event in the process of flower development. Patil and Zingre (1976) observed anther dehisces generally in the morning period in majority of the crop plants. The present investigation on flower anthesis started at 07.00 am and flower opens at 07.15 am. Anther dehiscence was at 07.30 am. Pollen production per flower was found to be 2112.55 + 212.64, 2175.92 + 184.40 and 2214.71 + 384.42 for three study sites respectively. Present finding indicates that the pollen production and flower size are positively correlates with each other. The pollen viability means capacity to live, grow, germinate or develop (Lincoln et al., 1982). In present observations on pollen viability estimation was found to be 86.22, 81.27 and 86.43 percent respectively for three study sites respectively. There is a strong correlation between pollen:ovule and breeding system (Cruden, 1977). In present investigation pollen: ovule ratio was recorded as 420.25, 435.39 and

460.94 respectively for three different study sites. The stigma becomes receptive during 08.30 am to 09.30 am, which appear whitish in colour and glossy. It loses the receptivity during 03.00 pm to 05.00 pm, which turn blackish and become dry. During the cloudy and rainy days normally receptive period of stigma is extent up to the third day of flower opening. Stigma receptivity also shows relations with change in flower colour (Gori, 1983). The present findings are in agreement with Dafni (1992). Bees visit the flower to collect pollen and nectar is found to be most valuable process in the pollination. Their frequent visit from one flower to other flower may perhaps help transfer of pollen (Deodikar and Suryanarayana, 1977). During the present investigation no visitors were found on *G. max*, However, only white and red colourthrips occasional visited the flowers.

4. Conclusions

During the present investigations observations on different aspects of floral biology was done. The observations on flowering phenology of the crop, duration of flowering, time of anthesis, anther dehiscence, pollen production etc. were undertaken at different study sites and seasons. For the successful pollination pollen production and availability of matured pollen grains is an essential requirement for fruit and seed-set. Pollen production is found to be influenced by number of environmental factors. The present investigations pollen production in studied varies against their cultivation site and season also. Pollen viability test provides a mean to assess the potential of pollen germination on the stigma. During the present work pollen viability percentage by triphenyltetrazolium chloride (TTC) method was found to be reliable as it has been observed with very minor variations in percentage of pollen viability during the study period at different study sites and seasons. There is a strong correlation between pollen: ovule ratio and breeding system. In Glycine max predominantly self-pollinated crop have shown low pollen: ovule ratio.

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