

A STUDY OF BLOSSOM BIOLOGY IN *SOLANUM KHASIANUM* CLARKE.

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Solanum khasianum Clarke is now an economically important species because of the presence of glyco-alkaloid solasodine in its fruits which may serve as a starting material for the commercial manufacture of steroid hormones. Much work has been done in recent years on different aspects (Bakshi & Hamied, 1971; Bhatt, 1972; Chauhan *et al.*, 1975; Dutta, 1971; Singh *et al.*, 1975) with the object of successfully domesticating this wild species and cultivating it on large-scale as a regular crop. However, the knowledge of blossom-biology, which is a necessary pre-requisite particularly for planning effective and successful hybridization programmes, is still lacking. Present investigation aimed at studying the blossom-biology of *S. khasianum*.

Two single plant selections, i.e., JRL-28 and JRL-12, selected from the collections maintained at RRL Jorhat, were used for this study. JRL-28 was found to be relatively resistant to Wilt caused by *Fusarium oxysporum* under field conditions, and produced relatively more flowers and fruits per bunch. S₁₂ had deeply lobed leaves with margins turned upward and the immature berries were darker with darker and distinct notching. The seeds were first sown in sand on 7.10.76, and then 25 plants of each selection were transplanted in the field on 17.11.76 and uniform cultural practices were followed. The observations were recorded on bud emergence and development, blooming period, anthesis and dehiscence, morphology, size, viability and artificial germination of pollen grains and stigmal receptivity.

Bud emergence and development

The initiation of floral buds was observed on 9.1.76 and 22.1.76, in case of JRL-28 and JRL-12, respectively. JRL-28 required 28 days for complete development of the buds from emergence to just one day prior to anthesis, whereas JRL-12 required 25 days for the same.

Blooming period

The first fully opened flowers were noted 110 and 125 days after the seeds were sown in case of JRL-28 and JRL-12, respectively. 130 days was recorded as the blooming period (Number of days from first flower to more than 50% flowering) for JRL 28, whereas for JRL-12 was 150 days. The duration of flowering (Number of days from first to last flower) was the same for both the selections and was 100 days.

Anthesis and dehiscence

Fifteen fully developed buds were observed each day at irregular intervals for 10 days to record the time of anthesis, full opening of flower and the time another dehiscence. Although the anthesis started at 5.00 A.M. and continued upto 8.30 A.M., the flowers fully opened between 7.30 A.M. and 9.45 A.M. The anthers dehiscid between 8.00 A.M. and 10.30 A.M.

Pollen studies

(a) *Morphology and size of pollen grains*:—The pollen grains, stained with acetocarmine were round in shape with three distinct germ pores. The normal pollen grains were measured for the size and the same varied between 25.2 and 29.4 μ in JRL-28 and between 25.2 and 36.6 μ in JRL-12.

(b) *Pollen viability*:—The viability (%) was determined by staining the pollen grains with acetocarmine (Johanson, 1940). The deeply-stained and normal looking pollen grains were counted as normal, whereas the shrunken, weakly or non-stained pollen grains were categorised as non viable. The viability was assessed on two different dates during the season i.e., 19.2.76 and 23.2.76 and was found to be 95.67%-97.21% and 91.16%-96.92% in case of JRL-28 and JRL-12 respectively.

(c) *Artificial germination of pollen grains*:—The freshly collected pollen grains were artificially germinated by keeping them soaked with sucrose solution of different concentrations, i.e., 0.5, 10, 15, 20 and 25 per cent. The observations were recorded at different intervals. The results were similar for both the selections. Maximum germination (56.25%) was recorded four hours after the treatment with 15% sucrose solution.

Stigmatal receptivity

(a) *Visual observation*:—The shiny surface of stigma was considered to be the sign of stigmatal receptivity. On this basis, it was observed that the stigma became receptive 12 hours before anthesis and continued to be receptive upto 12 hours after anthesis.

(b) *Fruit set method*:—The stigmatal receptivity was recorded on the basis of fruits set (%) following controlled pollinations starting from 12 hours before to 12 hours after anthesis. The success recorded is presented in Table 1. The results indicated that the stigmas were highly receptive at the time of anthesis and 73.33% of the pollinated flowers set fruits. The success (%) before as well as after anthesis was low and the flowers pollinated 12 hours after anthesis did not set fruits at all.

Table 1.

*The fruits set at different times of pollination indicating stigmatal receptivity in *Solanum khasianum*.*

Time of pollination	Number of flowers pollinated.	Fruits set	
		Number	%
12 hrs. before anthesis	15	5	33.33
8 " " "	15	6	40.00
4 " " "	15	9	60.00
At Anthesis	15	11	73.33
4 hrs. after anthesis	15	7	46.66
8 " " "	15	3	20.00
12 " " "	15	—	—

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SUMMARY

A study of blossom biology was carried out in two selections, i.e., JRL-28 and JRL-12, of *S. khasianum*. The development of flowers after the emergence of buds required 20 and 25 days, and blooming period were 130 and 150 days in case of JRL-28 and JRL-12, respectively. The duration of flowering was recorded to be 100 days. The anthesis occurred between 5 00 A.M. and 8 30 A.M., and the flowers fully opened between 7.30 A.M. and 9.45 A.M. The pollen grains were 25.2-29.4 μ and 25.2-33.6 μ in size, having 95.67%-97.21% and 91.16%-96.16% viability in JRL-28 and JRL-12, respectively. The stigmas were most receptive at the time of anthesis.

सोलैनम खसियानम क्लार्क की पुष्पन जैविकी का अध्ययन

लेखक एस०पाल व के०के० सिंह

सारांश

सो० खसियानम के दो प्रवरणों अर्थात् जेआरएल-28 व जेआरएल-12 की पुष्पन जैविकी का अध्ययन किया गया। कलियां निकलने पर पुष्पों का विकास होने में 20 और 25 दिन लगे तथा पुष्पन अवधि जेआरएल-28 व जेआरएल-12 में क्रमशः 120 व 150 दिन रही। प्रफुल्लन 5.00 बजे पूर्वाह्न से 8.30 बजे पूर्वाह्न के बीच हुआ तथा 7.30 बजे पूर्वाह्न और 9.45 बजे पूर्वाह्न के दरम्यान फूल पूरी तरह खिल गये। परागकण जेआरएल-28 व जेआरएल-12 में क्रमशः 25.2 से 29.4 μ और 25.2 से 33.6 μ आकार के, तथा 95.67 से 97.81 प्रतिशत और 91.16 से 96.16 प्रतिशत जीविष्णुता वाले पाए गए। प्रफुल्लन के समय कुक्षियां अत्यधिक ग्राही पाई गईं।

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ZUSAMMENFASSUNG

Eine Studie der Blütenbiologie war auf zwei Auswahlen d.i. JRL-28 und JRL-12 der *S. khasianum* geleitet. Die Entwicklung der Blüten nach dem Austausch der Knospen versorgten 20 und 25 Tage, und die Blütenperioden waren 130 und 150 Tage bzw. für JRL-28 und JRL-12. Die Dauer der Blümezeit war 100 Tage aufgezeichnet. Die Blümezeit kommt zwischen 5.00 vormittags und 8.30 vormittags, vor und die Blüten geöffnet sich zwischen 7.30 vormittags und 9.45 vormittags voll. Die Blütenstaubkörner waren 25,2 zu 29,4 μ und 25,2 zu 33,6 μ groß, seine Verjüngbarkeit für JRL-28 und JRL-12 bzw. war 95,67 zu 97,21% und 91,16 zu 96,16%. Die Narben waren bei der Blümezeit meist empfänglich.

Etudes de la biologie de fleuraison Chez *Solanum khasianum* Clarke.

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Résumé

Une étude a été faite sur la biologie de fleuraison Chez *S. khasianum*. Pour ce but on a choisi deux réserves, à savoir JRL 28 et JRL 12. Le développement des fleurs suivant l'apparition des bourgeons a eu lieu après 20 et 25 jours et la période de fleuraison a duré 130 et 150 jours, dans le cas de deux réserves respectivement. Le temps de fleuraison a duré 100 jours. L'anthèse a eu lieu entre 5.00 am et 8.30 am et les fleurs s'étaient toutes ouvertes entre 7.30 am et 9.45 am. La grosseur des pollens a été à peu près de 25,2 et 29,4 μ et de 25,2 et 33,6 μ respectivement pour les deux réserves. La viabilité des pollens pour les deux réserves est restée entre 96,67 et 97,21% et entre 91,16 et 96,16% respectivement.

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