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ECOBIOLOGY OF THE AK GRASSHOPPER (*POEKILOCERUS PICTUS* FAB.) IN INDIAN DESERT

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INTRODUCTION

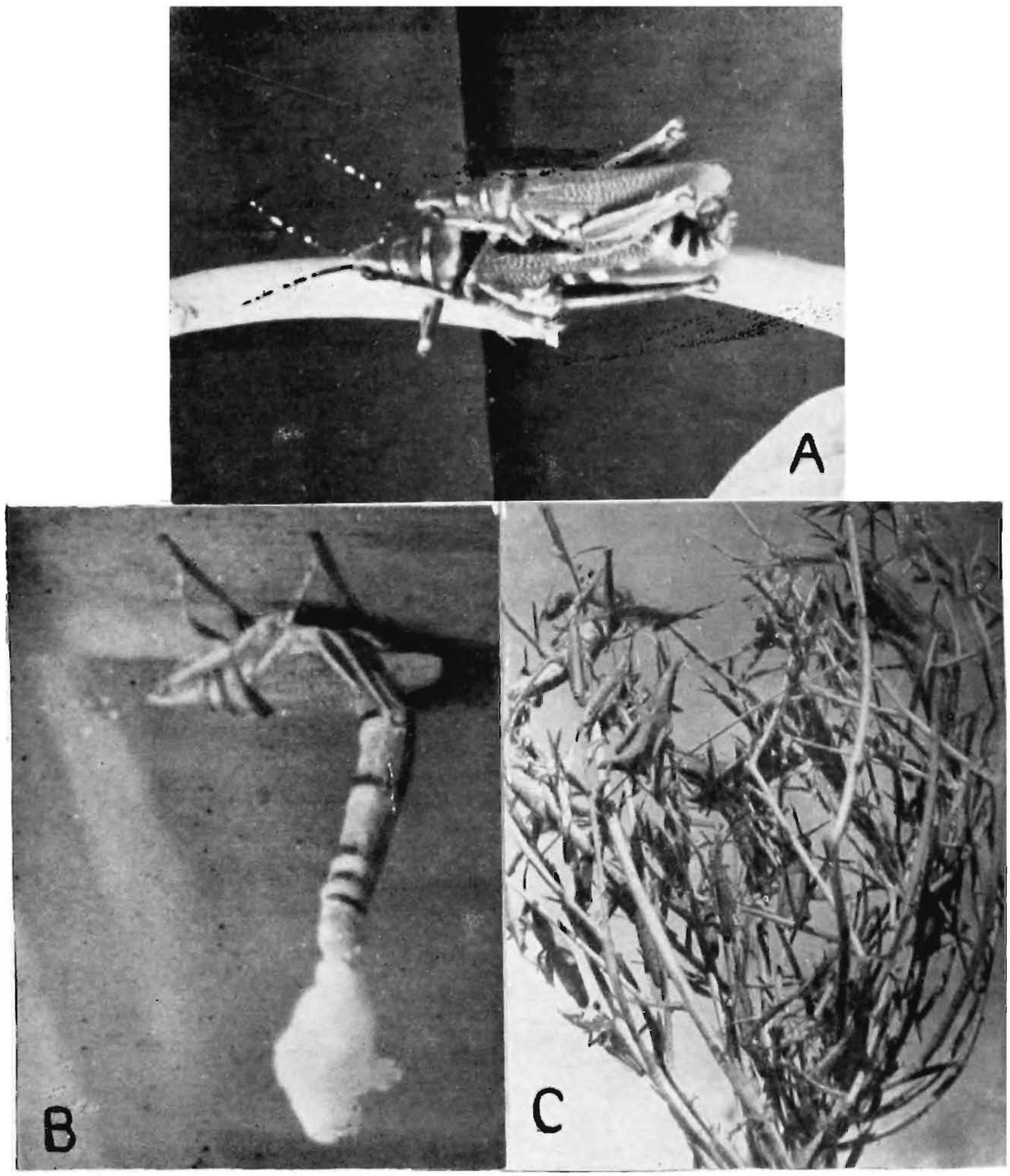
Poekieocerus pictus is widely distributed in the drier parts of Indo-Pakistan sub-continent (Popov and Kevan 1979). This grasshopper has been recorded as a pest of some crops (Pruthi and Nigam, 1939, Ghouri, 1975 and Khurana, 1975). Except in the quiscent period whilst in the egg state, the Ak hopper do damage throughout their periods of growth and development and also during their adult condition. But very little is known on ecobiology of this grasshopper.and hence to fill up the lacuna of information on life stages and population trend, the study was undertaken at Jodhpur and is presented in this paper.

MATERIAL and METHODS

For life history study adults of both sexes were collected during May around Jodhpur and bred in wooden rearing cages (*cr.* 45 × 45 × 45 cm.) with wire gauze sides and wood bottom in which tubes about 15 cm. long and 2·5 cm. in diameter were sparsely fitted. The tubes were filled with sterilized moist sand for egg laying. With a view to observe their development the newly emerged hoppers were transferred single to 10 cm. long wide mouthed bottles and fed with *Calotropis* leaves.

POPULATION MOVEMENT

Poekilocerus pictus is a mobile insect and there was a continuous flux of the insects in and out from any aggregations, so that the number present in an area at any one time is the result of a balance between the numbers arriving and those leaving. The insects were commonly roosting on Aak (*Calotropis procera*) plants. They tended



Poekilocerus pictus Fab.

A. Riding type mode of copulation.

B. Ovipositing female with stretched abdomen exuding froth in the breeding cage.

C. Nymphs of different instars perching on the bush in captive breeding.

to remain on those plants as long as they were available. The movement out of these sites was little and it happened with the disappearance of the shrubs (due to cutting of plants for fuel by local people). Changes in the number of insects in different plots indicated that a progressive movement of the population within the site was occurring. The migration occurred within the site due to to and fro flight of adults. These insects are weak fliers and only take off in the hot and calm conditions during a limited period of the adult life. Hoppers of first and second instars moved 10-300 meters away from the hatching site in quest of suitable weeds or grasses to feed upon. Young hoppers (first and second instar nymphs) preferred weeds (*Taphrosia* sp., *Aerva persica*, *Boerhavia diffusa* and the like) over Aak (*Calotropis procera*).

Results and Discussion

Biological Stages: The following post embryonic stages were studied in detail (Table 1 & 2).

I. *Egg pods and eggs*:

Egg pods are elongated, soft and fragile, dark brown in colour, slightly bent at the lower end. Egg pod measured 6·0 cm to 6·5 cm and 1 cm in diameter. Eggs are cylindrical and elongated and both ends are bluntly rounded.

TABLE 1

Poekilocerus pictus F.: Periods taken by isolated hoppers for development, reared at 34 ± 5°C.

	Average duration (days ± SE)						
Sex	1st Instar	2nd Instar	3rd Instar	4th Instar	5th Instar	6th Instar	Average total nymphal duration
Male	8-13	8-13	10-15	12-18	13-24	—	67-79
	11·3±1·2	12·1±·62	13·9±1·0	14·4±·20	17·6±1·1		73·3±1·2
Female	10-16	12-18	14-20	10-17	8-22	8-12	10-96
	14·3±1·2	14·6±0·5	17·5±1·0	11·7±·70	10·8±1·5	10·1±0·5	84·9±2·3

II. *Hatching* :

The average incubation period varies from 51-55 (mean 53±1·3) days. At the time of hatching, the chorion splits longitudinally leaving the vermiform larvae which becomes the first instar hopper by passing through the intermediate moult. The time taken in hatching of eggs from an egg pod ranges from 4-12 hours.

TABLE 2

Poekilocerus pictus F. : Summary of life stages in laboratory at 30±5°C. Eggs were kept at 8% moist sandy soil. Average is given in parenthesis. Data based upon 20 replicates.

Egg hatching (days)	Sex	hatching to eclosion	Pre-copulation	Pre-oviposition	Ovipo-sition	Post ovi-position	Eclosion to death	Total life span
51-55	Female	69-88	6-18	10-18	3-11	2-18	32-56	127-159
53±1·3		(80±1·7)	(12·9±1·0)	14·6±1·2	78±1·7	9·7±1·7	44·2±3·2	145·0±3·6
	Male	55-87	2-12	—	—	—	12-45	108-139
		74·8±2·4	6·9±1·8				32·1±2·3	122·6±1·63

Hopper and adult stages :

There are five to six hopper stages. The total nymphal duration of hoppers were 67-79 (73·3±1·2) for males and 70-96 (84·7±2·3) for female (Table 1).

III. *Copulation*

Male does not copulate immediately after becoming adult but only after 12-20 (mean 16·6) days. Females however are ready for copulation soon after eclosion. The mode of copulation is riding type (Plate 1). The time taken in copulntion varied from 2·5-18 hours.

IV. *Oviposition* :

A female oviposits once or twice in its life time. The time taken in egg

laying varied from 1·5 to 6 hours. An egg pod consists 60-117 eggs. Before laying eggs the females with the help of their ovipositors dig in the sand. While the eggs are laid, a frothy secretion is ejected which is absorbed by the sand particles. After oviposition, the females appeared exhausted and start feeding very quickly. The average preoviposition, oviposition and post oviposition period are 10-18 (14·5), 3-11 (7·8±1·3) anp 2-18 (9·7±1·7). Total period taken in life span by female was about 145 days and male 122 days.

SUMMARY

Poekilocerus pictus has only one generation a year in its natural habitat. The number of nymphal instars is variable from 5 to 6 under laboratory conditions. The average incubation period of eggs is 53±1·3. The mode of copulation is riding type. Average 122 days for males and 145 days for females. The population remained at peak during June and lowest in September. The first and second instar hoppers moved around 10-300 meters away for feeding on weeds and grasses.

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