at anaphase-I and 49·3 of the cells at anaphase-II. Besides normal tetrads, monads (1·6%), diads (4·1%), triads (8·2%) and pentads (0·8%) were also observed. The pollen fertility was 86·5%.

While 16 bivalents were of the highest frequency both at diakinesis and metaphase-I, the maximum configuration was one hexavalent/PMC (Table I).

TABLE I

Chromosome associations and thier frequencies at diakinesis and metaphase–I in A. macrocalyx

Chromosome Associations				Frequencies at	
VI	IV	II	I	Diakinesis	Metaphase-I
1	..	13		5	3
	4	8		2	4
	3	10		2	3
	2	12		7	5
	1	14		17	9
		16		50	17
		15	2	6	8
		14	4	2	2
		13	6	1	6
		92	57		

Average Association :

Diakinesis : $0\cdot05_{VI} + 0\cdot49_{IV} + 14\cdot73_{II} + 0\cdot28_{I}$.

Metaphase-I : $0\cdot30_{VI} + 0\cdot77_{IV} + 13\cdot78_{II} + 1\cdot06_{I}$.

The multivalents observed in the species are of chain type indicating terminal homology of the pairing chromosomes. Higher chromosome associations, ranging from trivalent to decavalent in *A. catechu* and upto quadrivalent in *A. triandra*, have been reported[5]. The chromosome associations in *A. macrocalyx* indicate the probability of autopolyploid origin with restricted multivalent pairing as in the case of *A. catechu* and *A. triandra*[5].

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November 2, 1977.

1. Venkatasubban, K. R., *Proc. Indian Acad. Sci.* (B), 1945, **22**, 193.
2. Sarkar, S. K., *Separata Da Agronomica, Lusitana*, 1956, **28**, 257.
3. Sharma, A. K. and Sarkar, S. K., *Genetica*, 1956, **28**, 361.
4. Bavappa, K. V. A. and Raman, V. S., *J. Indian bot. Soc.*, 1965, **44**, 495.
5. — and Nair, M. K., *Genetica*, 1977 (In press).

POPILLIA SCHIZONYCHA ARROW—A POLLEN FEEDING BEETLE ON RICE IN KARNATAKA

THE beetles belonging to the family Scarabaeidae vary considerably in their size, colour and habits. Many feed on decomposing plant materials; some are serious pests of lawns while others feed on plant foliage, fruits and flowers. The members of the subfamily Rutelinae are called as shining Leaf Chaffers since the adults are very brightly coloured. One of the serious pests in this group is the Japanese beetle, *Popillia japonica* Newman.

Arrow[1] has given the description of another species, *viz., Popillia schizonycha* Arrow, with its habitat in Nilgiri Hills and Bangalore but its host plants are not mentioned. This species is commonly found feeding on rose petals (Mandya, Karnataka). The adults are about 12 mm in length and 6 mm broad. They are metallic green in colour, smooth and shining and moderately convex above; several white spots along the sides of the abdomen and two roundish white spots on the tip of the abdomen are also seen.

During flowering of the paddy crop these beetles were found resting on the foliage. Though no damage to the crop was noticed, close observation revealed that they feed on the pollen of the panicle. There is no earlier report of this species feeding on rice crop.

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1. Arrow, G. J., *The Fauna of British India including Ceylon and Burma, Coleoptera—Lamellicorinae, Part II*, Taylor and Francis, Red Lion Court Fleet Street, London, 1917, p. 88.

EMS-INDUCED STERILE MUTANTS IN REDGRAM

IN self-pollinated crops the plant breeders have always been attempting to find out sterile strains in order to use them as a tool for the production of hybrid seeds. Ethyl methane sulphonate (EMS) is a powerful mutagenic agent and several investigators have observed sterile strains induced by it[1-4]. The present investigation deals with the induction of male sterility in an early maturing var. Pusa Ageti of *Cajanus cajan* (L.) Millsp.

Two hundred seeds of redgram (*Cajanus cajan*) presoaked for each treatment for 14 hours in distilled water at room temperature were treated with aqueous

solutions of 0·1, 0·2, and 0·3% EMS for six hours. The treated seeds, after a thorough washing in running water were sown in the field for obtaining M_1 generation. The seeds were collected on individual plant basis from M_1 generation and sown in the field in randomized-block-single row design.

FIGS. 1–2. Fig. 1. Cone-like condensed inflorescence of mutant. Fig. 2. A. Diadelphous condition in the flower of control. B. Polyadelphous condition in the flower of mutant.

Six male sterile mutants were screened from two individual plant progenies of M_2 generation, obtained from 0·2% EMS. All the mutants stayed green for a longer period than control plants. For the sake of convenience, these mutants are grouped into two types, *viz*: (*a*) TSM (Tall Sterile Mutant) (*b*) SSM (Spread Sterile Mutant).

(*a*) TSM—Five individuals of TSM type exhibit a tendency towards less branching, *e.g.*, 3 or 4 short branches having only 3–6 trifoliate leaves. All these mutants grow tall (in spite of the fact that they are slow growing) attaining a height of 140–155 cm. The trifoliate leaves are tough, waxy and dark green. The internodes of these plants become comparatively shortened.

The flowering on these mutants gets delayed by nearly two months. The floral axis becomes condensed to the extent that it gives an appearance of a cone-like structure (Fig. 1). On one individual mutant, ten to fifteen such structures are produced. A single flower arises near the top of the cone-like inflorescence. The whole inflorecsence, together with the flowers, withers away within a fortnight. The flowers also exhibit mutated characters, such as increased number of sepals (5 to 6), petals (5–10) and gynoecium (1 to 2). The normal papilionaceous condition of corolla is lost. In some flowers the number of stamens reduces to 9 and the diadelphous condition changes either to monoadelphous or polyadelphous. In those flowers, where the number of stamens remains normal, the diadelphous condition changes to polyadelphous (Fig. 2). None of these mutants produces any fruit due to a high degree of pollen sterility (78·06 to 92·13%) as tested by Alexander's method[5].

(*b*) SSM—A single sterile mutant of SSM type was screened from the other plant progenies in M_2 generation. Except for the mode of branching, this type resembles the TSM in all other respects. Several branches, at the apical region of the main axis, grow vigorously in all directions. The mutant also exhibits a high degree of pollen sterility (95–100%).

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R.B.S. College, R. P. SHARMA.
Agra-2 (India), *December* 2, 1977.

1. Heslot, H., *Whea: Information Service*, 1959.
2. Ehrenberg, L., Gustaffson, A. and Lundquist, U., *Acta Chem. Scand.*, 1956, 10, 492.
3. Veen, J. H., Van der and Wirtz, P., *Euphytica*, 1968, 17, 371.
4. Sato, M. and Gaul, H., *Rad. Bot.*, 1967, 7, 7.
5. Alexander, M. P., *Stain Tech.*, 1969, 44, 177.