SHORT COMMUNICATIONS

INHERITANCE OF SEQUENTIAL FLOWERING PATTERN IN THE MUTANTS OF GROUNDNUT CULTIVAR ROBUT 33–1

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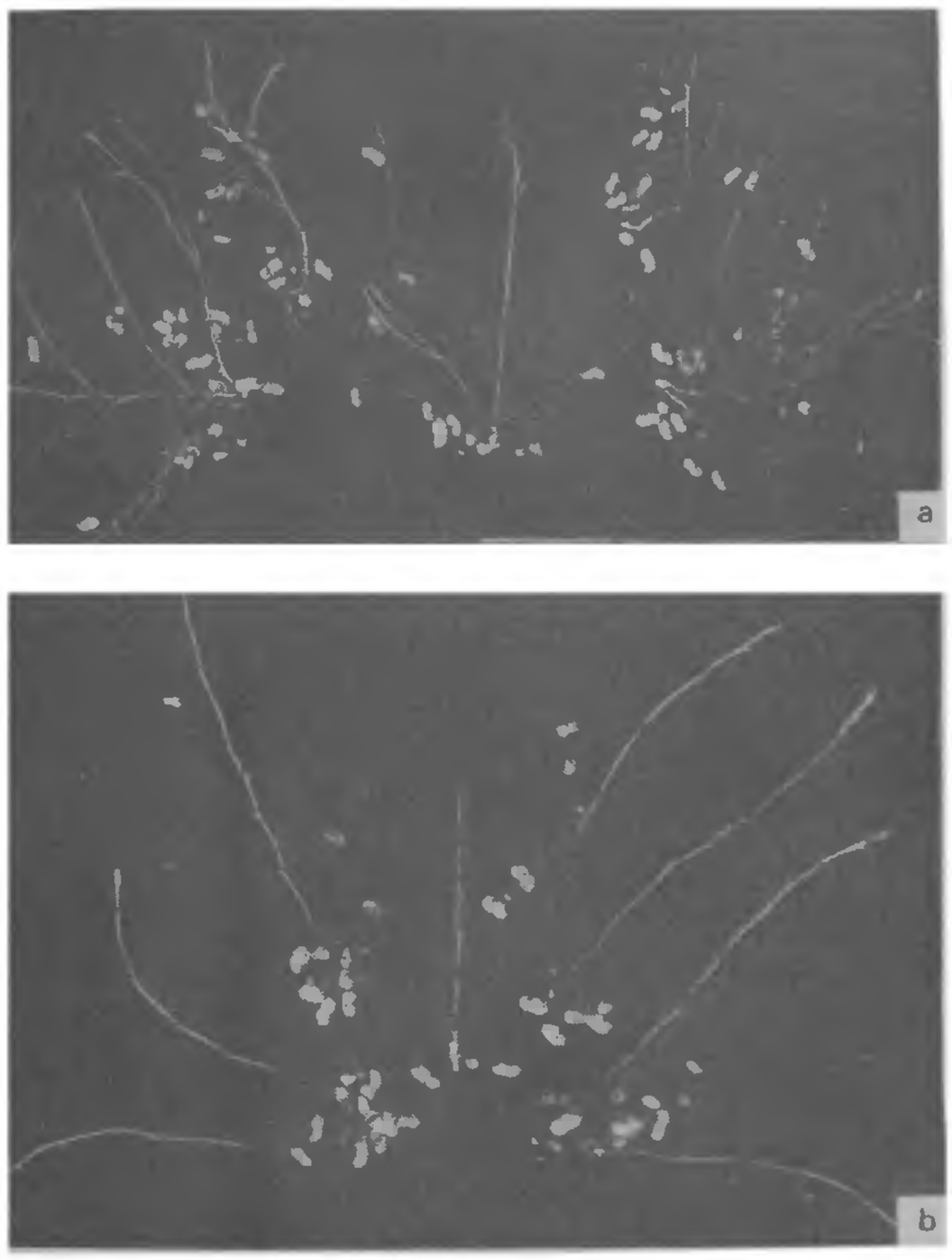
GROUNDNUT (*Arachis hypogaea* L) variety Robut (R) 33–1 is recommended as a check in the yield trials of the All India Coordinated Research Project on Oilseeds[1]. It has the characteristics of ssp hypogaea, Virginia bunch type viz profuse branching, alternate flowering pattern, absence of inflorescence on stem nodes (figure 1a), medium size pods and long seed dormancy. A spontaneous and two gamma-ray-induced mutants isolated in this variety had morphological characters similar to ssp fastigiata, spanish bunch cultures, namely smaller number of branches and leaves, sequential flowering pattern, inflorescence on stem nodes (figure 1b) and non-dormant seed. Morphological features and inheritance of these mutants are reported here.

Seeds of the variety R 33–1 with Virginia characters now described as RV were obtained from ICRISAT. Dry seeds with moisture content of 5% were exposed to 25 kR Gamma rays. In the M_2 population, two progenies segregated for RV type and mutant plants with sequential flowering pattern in the proportion of 23:6 and 25:1 respectively. Occurrence of these proportions in M_2 is well discussed[2]. Only the former progeny segregated again for the mutant. Since the mutants occurred in two progenies, they were considered two independant mutations and designated as Robut Sequential flowering-I (RS-I) and RS-II. The two mutants with sequential flowering pattern bred true subsequently. RV was crossed to the spontaneous mutant, designated as Robut Sequential flowering (RS) and mutants, RS, RS-I and RS-II also were crossed among them to test the inheritance of the mutation of flowering pattern. Hybrid plants of all the crosses were grown and compared with both the parents RV and RS at harvest. All plant progenies in F_2, F_3 and M_3 were planted to study the inheritance of the flowering pattern.



Figures 1a and b. a. Plant RV with profuse branching (9+19+2), its branches separated from stem showing without peg and pods on stem nodes (centre) indicating absence of inflorescences. Primary branches (around) with secondary branches alternating two nodes with pegs and pods reveal alternate flowering pattern. **b.** Plant RS with less branching (5+3+0), its stem and branches separated showing pegs and pods on stem nodes (centre) indicating presence of inflorescences. Primary branches with pegs and pods in sequence denotes sequential flowering pattern.

The morphological characters were similar in RS, RS-I and RS-II, except pod and seed size (table 1). The hybrids of cross between RS, RS-I and RS-II resembled RS parent and that of RS × RV were like RV and dissimilar from the mutants. The plants in F_2 progeny of intermutant crosses were alike with fastigiata growth habit and flowering indicating that the mutants were allelic. Similarity of RV and its hybrids suggested the dominance of RV characteris-

Table 1 *Comparative characteristics in RV, RS, RS-I and RS-II and their hybrids*

Character	RV	RS	RS × RV	RS-I	RS-II	RS × RS-I RS × RS-II
Height (cm)						
Stem	42.5 ± 1.5	46.4 ± 1.3	45.4 ± 1.2	45.6 ± 1.9	44.9 ± 2.9	44.1 ± 2.9
Branch	62.9 ± 2.2	59.4 ± 1.9	57.6 ± 2.4	56.9 ± 3.2	54.0 ± 3.1	58.4 ± 3.9
Branch No.						
P + S + T	9 + 19 + 2	5 + 4 + 0	12 + 23 + 2	5 + 5 + 0	5 + 4 + 0	5 + 5 + 0
Inflorescence on stem	Absent	Present	Absent	Present	Present	Present
Flowering pattern	Alt	Seq	Alt	Seq	Seq	Seq
No. of pegs	161 + 3	220 + 3	164 + 4	211 + 4	219 + 5	222 + 4
No. of Pods 1 + 2 seeded	8 + 52	8 + 64	10 + 54	7 + 59	6 + 49	8 + 61
Pod wt (g)	61.29	57.64	67.15	48.95	45.65	61.27
Shelling %	79.39	78.92	78.64	80.12	79.67	78.86
Hkw (g) selected	64.8 ± 0.8	58.8 ± 0.7	58.8 ± 0.9	43.5 ± 0.9	48.9 ± 1.0	57.1 ± 0.9
Days to maturity	125	120	125	115	120	120
Oil %	49.29	50.60	50.20	48.29	46.29	—
Dormancy	Present	Absent	Present	Absent	Absent	Absent

P: primary; S: secondary; T: tertiary; Alt: alternate and Seq: sequential flowering.

Table 2 *Segregation of plants with sequential flowering in the crosses and mutated progenies*

Pedigree	F_1 and M_1 Plants		Number				χ^2	P
			Progeny		Plants			
	Number	Type			RV	Mutants	3:1	(%)
RS × RS-I	5	RS	F_2	5	–	121	–	–
RS × RS-II	4	RS	F_2	4	–	96	–	–
RS-I × RS-II	8	RS	F_2	8	–	206	–	–
RV × RS	5	RV	F_2	5	251	76	0.54	30–50
			F_3	82	2069	–	–	–
				169	4319	1393	1.09	20–30
				76	–	1856	–	–
25 KR, RV	251	RV	M_2	1	23	6	0.29	50–70
				1	25	1	–	–
			M_3	7	203	–	–	–
				16	614	201	0.05	80–90
				6	–	192	–	–

tics. The segregation in F_2 and F_3 progenies of the hybrids and M_2 and M_3 progenies (table 2) showing excellent fit to the phenotypic and genotypic ratios 3:1 and 1:2:1 respectively suggested that the sequential flowering pattern in the mutants is governed by a pair of recessive genes in the mutants.

Hammons[3] reported tetragenic control for the absence of inflorescence on the stem nodes and a suggestion[4] was put forward that the alternate flowering pattern and absence of inflorescence on the stem were governed by the same genes $J_1J_1J_2J_2K_1K_1K_2K_2$. Monogenic inheritance of RS, RS-I and RS-II suggested that the parent RV had $J_1J_1J_2J_2K_1K_1K_2K_2$ genes or one of the three other combinations and their allelic nature confirmed mutational events affected in one among the dominant genes. Large number of mutants with sequential flowering pattern are required to identify and classify the individual genotypes for understanding the genetic nature of flowering pattern in groundnut.

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ANTIGONADOTROPHIC ACTIVITY OF VICOLIDE B IN ALBINO RATS

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THE plant *Vicoa indica* locally known as 'Banjauri' is used by tribal population in the Bihar State as a contraceptive agent in women[1]. Vicolide B, a sesquiterpene lactone isolated from *Vicoa indica* showed antifertility activity in female albino rats and was antiestrogenic in nature[2]. Vicolide B also exhibited abortifacient activity but was neither progestational nor antiprogestational[3]. The present paper deals with the antigonadotrophic activity of Vicolide B in albino rats.

Thirty-day-old immature female rats (40–45 g) from the Institute's animal colony were used for the study. Animals were fed on food pellets (Hindustan Lever, Bombay) and allowed to drink tapwater *ad libitum*. Vicolide B was administered as suspension in 0.5% carboxy methyl cellulose at the doses of 50 mg and 100 mg per kg body weight.

Screening of antigonadotrophic activity

The technique of Bunster and Meyer[4] was adopted with the following modifications. The ovariectomized female rat was united to another ovary intact female rat surgically (parabiosis).

The overiectomy was carried out in one of the partners just before surgical union. Parabionts were divided into 4 groups each consisting of 5 pairs. The rats of control group had intact ovaries but were surgically united with each other.

This group served as standard control and did not receive any treatment. The spayed partners of the second, third and fourth groups received 0.5% carboxy methyl cellulose (vehicle), vicolide B at 50 and 100 mg per kg body weight respectively. The treatment was continued for 10 days. The animals were sacrificed on the 11th day. Ovaries were quickly dissected out and weighed. The state of vagina was checked and the results were recorded. Ovaries were fixed in 10% formal saline sectioned at 6μ and stained with haematoxylin and eosion for histopathological examination. Student's t test was employed for statistical analysis.

The results of antigonadotrophic activity are summarized in table 1. The ovaries were of normal size and the vagina remained closed in standard control group which had intact ovaries in both the partners. There was a marked increase in the weight of ovaries in the solvent control group where the ovaries of only one partner was intact. The vagina was opened in all the intact partners and the smears showed estrous cycle.

Vicolide B-treated animals, irrespective of dose, showed a marked reduction in the weight of ovaries compared to solvent control group ($P < 0.001$). Vagina was closed in all these animals.

The increase of ovarian weight in solvent control group indicates greater release of follicle stimulating hormone[5]. This effect is masked in vicolide B administered animals as there was no increase in the weight of ovaries and also the vagina did not open.