

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<sup>3</sup> reported tetragenic control for the absence of inflorescence on the stem nodes and a suggestion<sup>4</sup> 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.

4 January 1986; Revised 8 August 1986

1. Thote, S. G., Zade, N. R., Deshmukh, N. S. and Reddy, P. S. *J. Oilseeds Res.*, 1984, 1, 115.
2. Gottschalk, G. and Wolff, G. In: *Induced mutations in plant breeding*, Springer-Verlag, Berlin, Heidelberg, New York and Tokyo, 1983.
3. Hammons, R. O., *Crop Sci.*, 1971, 11, 570.
4. Chandra Mouli and Kale, D. M. *Oleaginaux*, 1982, 37, 583.

## ANTIGONADOTROPIC ACTIVITY OF VICOLIDE B IN ALBINO RATS

T. SUSAN, MUZAFFER ALAM and  
K. K. PURUSHOTHAMAN

Captain Srinivasa Murti Drug Research Institute for Ayurveda, Madras 600 106, India.

THE plant *Vicoa indica* locally known as 'Banjauri' is used by tribal population in the Bihar State as a contraceptive agent in women<sup>1</sup>. Vicolide B, a sesquiterpene lactone isolated from *Vicoa indica* showed antifertility activity in female albino rats and was antiestrogenic in nature<sup>2</sup>. Vicolide B also exhibited abortifacient activity but was neither progestational nor antiprogestational<sup>3</sup>. 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<sup>4</sup> was adopted with the following modifications. The ovariectomized female rat was united to another ovary intact female rat surgically (parabiosis).

The ovariectomy 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  $6\mu$  and stained with haematoxylin and eosin 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<sup>5</sup>. 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.

**Table 1** Effect of vicolide B on the ovarian weight and vaginal state of intact partner in Parabiosis (Values are mean  $\pm$  S.D.)

Group	Sex partner and state	Treatment	Dose mg/kg body weight	Ovarian weight mg/100 g body weight	Percentage of increase in ovarian weight vs control	vaginal state
1	♀ ♀	Standard control	—	44.33 $\pm$ 2.41	—	Closed
2	♀ ♂	Solvent control (0.5% CMC)	—	198.6 $\pm$ 3.68	348.3	Open
3	♀ ♂	Vicolide B	50	95.13 $\pm$ 1.22	114.6	Closed
4	♀ ♂	Vicolide B	100	90.8 $\pm$ 0.820	104.9	Closed

♀ Intact female partner; ♂ Ovariectomized female partner;  $P < 0.001$  vs control;  $P < 0.001$  vs solvent control; Values are significant when  $P < 0.05$ .

### Histopathology

**Macroscopic:** In drug-treated parabiotic group there was no alteration in the size of ovaries when compared to that of standard control parabiotic groups, whereas in vehicle-treated parabiotic control group an enormous increase in the size of ovaries was observed.

**Microscopic:** Haematoxylin and eosin section of ovaries of the standard control group and vicolide B-treated groups exhibited a few follicles in different stages of development without ovum, which is a very characteristic feature of immature ovary. Luteal change is not prominent. But in parabiotic control group (vehicle) plenty of mature Graffian follicles with fully developed ova inside were present. Numerous corpora lutea were also seen—a picture like that of mature ovary.

Parabiosis is shown to be useful in studying gonadal pituitary feedback relationships. When an immature female rat is united in parabiosis with an ovariectomized or orchidectomized immature rat, the ovaries of intact rat undergo hypertrophy. This has been attributed to the hypersecretion of gonadotrophins by the pituitary of ovariectomized rats, the hormones of which pass directly via anastomosis to the intact partners where they stimulate ovaries.

It is believed that gonadotrophins which increase in concentration in the ovariectomized female or orchidectomized male are largely follicle-stimulating hormone<sup>6,7</sup>. The post ovariectomy elevation of FSH has been measured in the ovaries of immature parabiotic rats<sup>8</sup>. This observation can be further

supported histologically (increase in the number of follicles in ovary). Since the increase in the ovarian weight of intact partner is followed by vaginal opening and also the presence of numerous corpora lutea the possible role of lutenizing hormone (LH) cannot be ruled out.

Grateful thanks are due to Dr Ramesh Kumar, for useful suggestions in histopathology and also to the Director, Central Council for Research in Ayurveda and Siddha, New Delhi for financial support.

11 June 1986; Revised 2 August 1986

- Gandhi, M., Sankaranarayanan, A., Ramesh Lal and Mathur, V. S., *Indian J. Med. Res.*, 1983, **78**, 724.
- Susan, T., Alam, M. M. and Purushothaman, K. K., *Indian Drugs*, 1985, **22**, 512.
- Susan, T., Alam, M. M. and Purushothaman, K. K., *Indian Drugs*, 1986, **23**, 452.
- Bunster, E. and Meyer, R. K., *Anat. Record.*, 1933, **75**, 339.
- Biddulph, C., Meyer, R. K. and Gumbreck, L. G., *Endocrinology*, 1940, **26**, 280.
- Greep, R. O., *Proc. Soc. Exp. Biol. Med.*, 1940, **44**, 214.
- Biddulph, C. and Meyer, R. K., *Proc. Soc. Exp. Biol. Med.*, 1946, **63**, 92.
- Johnson, D. C., *Acta. Endocrinol (Kbh.)*, 1966, **51**, 269.