Figs. 9, 10. Megaspore triads with the lower functional megaspore forming a 2-nucleate embryo sac. Figs. 11–14. Megaspore dyads with the lower dyad directly developing into a 2-nucleate embryo sac with a uni or bi-nucleate upper dyad. Fig. 15. Twin mature embryo sacs.

any nuclear division (Fig. 7). The division of the lower dyad results in the formation of a small middle cell and a large lower cell (Fig. 8). The middle cell degenerates and the lower functional megaspore develops into an 8-nucleate embryo sac (Figs. 9, 10, 15). Thus only a 'triad' is formed and no instance of tetrad formation was noticed in such ovules.

In the ovules undergoing Allium type of embryo sac development, the nuclear division in the lower dyad is not followed by wall formation and the two nuclei lie close together surrounded by dense cytoplasm (Figs. 11, 12). The upper dyad may degenerate as such (Fig. 12) or its nucleus may show a division (Fig. 13). Further development results in a 2-nucleate embryo sac (Fig. 14) and ultimately a 8-nucleate embryo sac. The latter organizes itself into an egg apparatus, two polar nuclei and three antipodal cells. The antipodal cells are ephemeral and degenerate prior to fertilisation. Twin embryo sacs occurring side by side have also been frequently observed (Fig. 15).

Variation in the embryo sac development with the co-existence of the Polygonum and Allium types reported here has also been observed in *Pueraria lobata*[1], *Wisteria sinensis*[2] amongst the Papilionoideae and in *Benincasa cerifera*[3], *Cassiope martensiana*[4], *Erigeron* sp.[5], *Ethretia laevis*[6], *Sanvitalia procumbens*[7], *Tridax trilobata*[8], and *Euphorbia characias*[9].

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A MODIFIED TECHNIQUE FOR THE CLARIFICATION OF SOMATIC CHROMOSOMES

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Several modified techniques for root tip squashes have been presented from time to time by different workers[1–3]. Due to the difficulties encountered in hydrolysing the middle lamella of the root tip cells of *Physalis minima* L. (family Solanaceae), the conventional N. HCl was replaced by digestive fluid of *Pila globosa* (water-snail). The method of extraction is the same as was employed earlier in the case of *Helix pomatia* (land-snail[2]).

The healthy root tips of *P. minima* were excised between 10·30–11·00 A.M. and immersed in a saturated solution of *p*-dichlorobenzene at 4°C for 5 minutes and then changed to 18±2°C for 2·30 hr. The pre-treated root tips were washed with running water and then fixed overnight in a mixture 1:3 acetic-alcohol. The root tips were then rinsed with water and dipped in the freshly collected snail-stomach-juice for 5 min at room temperature (26±2°C). After the enzyme (stomach-juice) treatment the roots were washed and returned to freshly prepared fixative (1:3) for 1 hr. The squashes were then made with 1% acetic-orcein mixture. The well-separated and properly flattened somatic cells revealed $2n=48$ (Fig. 1). The acetic-butanol method was applied to make the slides permanent[4].

Fig. 1. Root tip cell, showing 48 chromosomes × 1600.

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REPRODUCTIVE POTENTIAL OF *TROGODERMA GRANARIUM* EVERTS DURING DIAPAUSE

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FOOD reserves in larvae enhanced the fecundity in *Trogoderma granarium*[1]. Its larvae in diapause which weigh double the normal last instar[2–3] showed profound increase in fecundity when the adults derived from such population were allowed to mate[4–6]. However, the larvae in diapause without food for 390 days, when allowed to become adults, laid about 59% less number of eggs than the adults derived from normal diapause larvae[6]. On the other hand, a decrease in fecundity has been recorded as a result of larval diapause in some insects[7]. It is possible that factors other than food are also involved. Further, it is also not clear if only one sex or both the sexes are affected. In view of this the effect of diapause on the reproductive potential in *T. granarium* was studied.

The larvae of *T. granarium*, normal and in diapause were allowed to become adults. The larvae in diapause utilized in the present studies were either obtained by exposing 15-day old normal larvae to diapause inducing conditions without food for 20 days or 15-day old larvae kept in diapause inducing conditions with food for three months. The conditions for inducing diapause have been described earlier[8]. The purpose of getting larvae in diapause without food was to prevent the accumulation of food reserves in their body. Hence adults derived from such larvae were somewhat smaller in size compared to adults derived from non-diapause larvae. Sex was determined by the criteria utilized by several authors[4,9,10]. The crosses used in the present studies are given in Table I. In each cross ten males and ten females were used. All the crosses were maintained at 35° ± 1° C till the death of both the males and females. All the crosses were examined daily under the binocular microscope to remove the eggs laid, if any. Eggs laid per female was taken as fecundity. The eggs from each cross were incubated at 35 ± 1° C in petri dishes for hatching. The influence of diapause on reproductive potential was evaluated from fecundity and per cent hatchability observed from each cross. Three replicates were used in each case.

Mating of *T. granarium* adults derived from normal larvae produced 42 eggs per female. There was an increase in fecundity from 42 to 91 eggs per female when adults derived from larvae previously kept under diapause for three months in presence of food, were allowed to mate (Table I). Similar increase in fecundity has also been observed by Karnavar[4–6]. However, when adults obtained from larvae under

TABLE I

Fecundity and hatchability of T. granarium *adults obtained from normal larvae and larvae in diapause**

Nature of cross	Fresh body weight of larva in mg		Total eggs laid	Eggs laid per ♀	% hatchability
	♂	♀			
N[1] ♂ × N ♀	1·08±0·03	1·89±0·02	417	41·7	94·5
D[2] ♂ × D ♀	2·19±0·03	4·25±0·02	912	91·2	96·4
d[3] ♂ × d ♀	0·89±0·002	1·30±0·002	747	74·7	94·0
D ♂ × N ♀	2·19±0·03	1·89±0 02	561	56·1	96·3
N ♂ × D ♀	1·08±0·03	4·25±0·02	790	79·0	95·5
N ♂ × d ♀	1·08±0·03	1·30±0·002	700	70·0	96·7
d ♂ × N ♀	0·89±0·002	1·89±0·02	550	55·0	95·0

* Ten pairs of adults were used in each case.
[1] From normal larvae. [2] 15 day old larvae kept in diapause inducing conditions with food for 3 months.
[3] 15 day old larvae kept in diapause inducing conditions without food for 20 days.