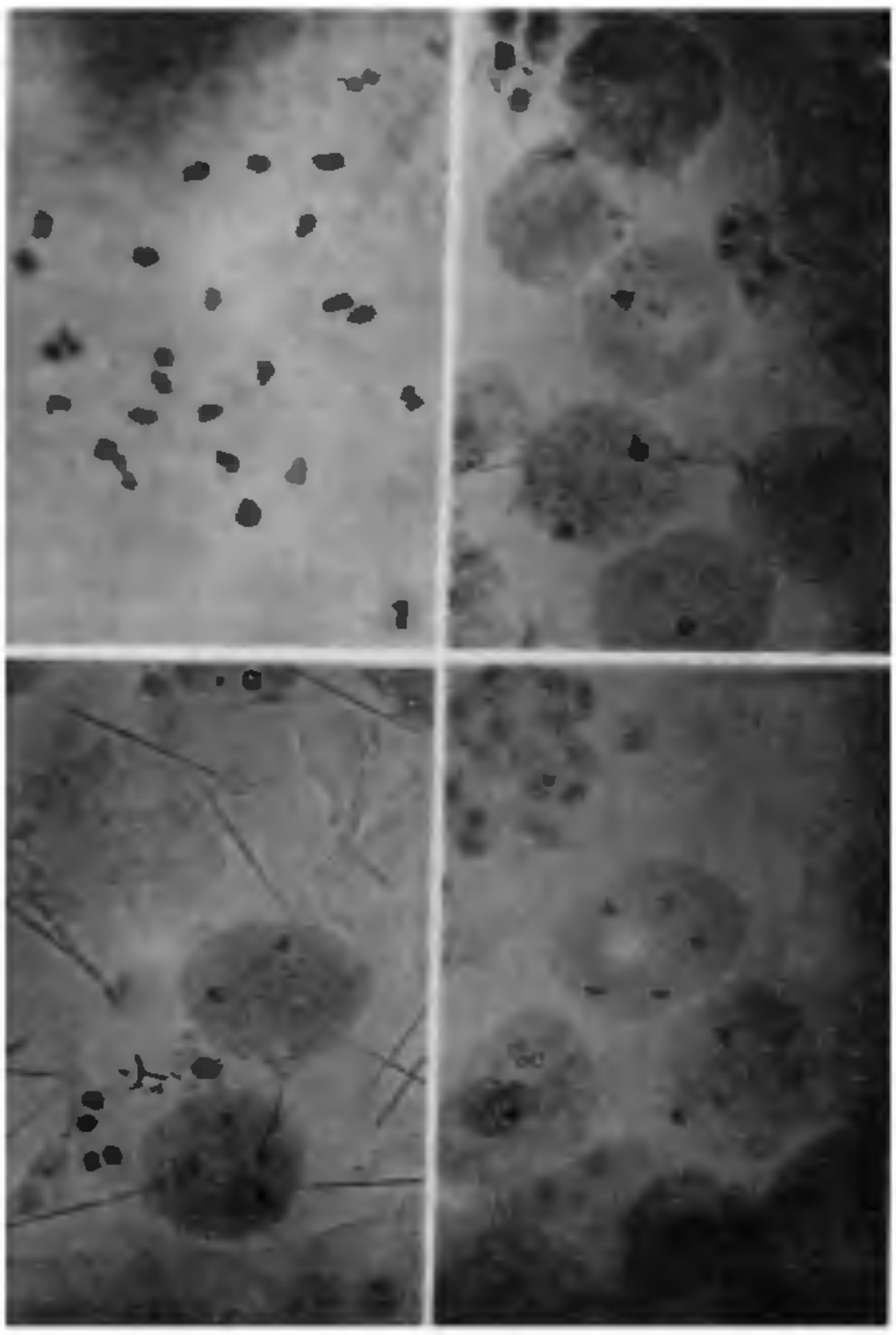

Figures 1-4 .*Cissus discolor* Blume. **1.** PMCs at M_1 showing 24 bivalents (×1126) **2.** PMCs at diplotene stage showing cytoplasmic interconnections and transfer of nucleolus to the neighbouring cell (×563) **3.** PMCs at T_2 showing transfer of chromosomes from one cell to the other (× 563) **4.** PMC at T_2 showing 5 groups of chromosomes in the recipient cell after cytomixis (× 563).

plant under study has a polyploid chromosome number ($2n = 48$), whereas the majority of species of genus *Cissus* have $2n = 24$. The occurrence of secondary (bivalent) associations is indicative of polyploid nature of the species.

Omara[9], Sarvella[10] and Salesses[14] indicated a possible role of cytomixis in variation through production of aneuploid and diploid gametes. In the present case no surviving gametes with aneuploid chromosomes numbers were observed and as such cytomixis in this species may not have any significant role in evolution. The role of cytomixis as one of the modes of orgin of B-chromosomes as believed by Cheng *et al*[15] finds no support as there are no reports on the presence of B-chromosomes in genus *Cissus* or in the family Vitaceae.

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1. Gates, R. R., *Ann. Bot.*, 1911, **25**, 909.
2. Cheng, K. C., *Acta. Genet. Sin.*, 1974, **1**, 117.
3. Whelan, E. D. P., *Can. J. Bot.*, 1974, **52**, 1219.
4. De Nettancourt, D. and Grant, W. F., *Cytologia*, 1964, **29**, 191.
5. Velibekov, M. D., Patseka, D. I. and Volkova, T. K., *Referativnyi Zho.*, 1975, **11**, 55.
6. Cooper, D. D., *Am. Nat.*, 1952, **86**, 219.
7. Marechal, R., *Bull. Inst. Agron.*, Gembloux, 1963, **31**, 223.
8. Mendes, E. J. and Rijo, L., *Port. Acta. Biol.*, 1951, Series A3, 211.
9. Omara, M. K., *Chromosoma*, 1976, **55**, 267.
10. Sarvella, P., *Cytologia*, 1958, **23**, 14.
11. Tarkowska, J., *Acta. Soc. Bot. Pol.*, 1965, **34**, 27.
12. Tarkowska, J., *Acta. Soc. Bot. Pol.*, 1966, **35**, 25.
13. Morisset, P., *Canad.J. Genet. Cytol.*, 1978, **20**, 383.
14. Salesses, G., *Ann. Amelior. Pl.*, 1970, **20**, 383.
15. Cheng, K. C., Nieh, H. W., Yang, C. L., Wang, I. H., Chou, I, S. and Chen, J. S., *Acta. Bot. Sin.*, 1975, **17**, 60.

NUCELLAR SEEDLING FROM POLYEMBRYONIC MANGO STONES

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IN mango orcharding, the rootstock has profound effect on the vigour, precocity, productivity and longivity of the plant. Mango is still propagated commercially on assorted seedling rootstocks. In mango, even stones collected from a single tree have high variability in their performance due to cross pollination. It is, therefore, essential to employ uniform clonal stock to eliminate variation in the tree performance.

Some of the mango varieties are polyembryonic in nature and produce more than one seedling from a single stone in which zygotic and nucellar seedlings are possible. However, it is difficult to identify these

TABLE 1

Germination studies in some polyembryonic varieties.

Varieties	Stones procured from South India			Stones procured from North India		
	Germination %	Number of embryos per stone (range)	Number of seedling per stone (range)	Germination %	Number of embryos per stone (range)	Number of seedlings per stone (range)
Bappakai	57.5	3–8	1–6	85.4	2–7	1–4
Chandrakaran	56.7	2–8	1–4	—	—	—
Goa	58.3	4–9	1–6	79.0	4–9	1–6
Kurukkan	62.2	3–7	1–5	82.4	3–6	1–3
Moovandan	55.4	2–8	1–7	87.5	3–8	1–6
Mylepalian	67.8	2–6	1–3	72.0	3–5	1–5
Nekkare	40.6	4–8	1–5	78.7	3–7	1–4
Olour	75.9	4–8	1–5	80.2	4–8	1–6
Pahutan	57.4	3–7	1–4	—	—	—
Vellai Columban	62.0	5–10	1–7	—	—	—

seedlings. Attempts were therefore made to differentiate these two types of seedlings from individual polyembryonic stones.

The stones for the present experiment were procured from various Fruit Research Stations, Andhra Pradesh (Kodur and Sangareddy), Karnataka (Ullal and Bangalore), Kerala (Ambalvayal), Tamil Nadu (Periakulam), Maharashtra (Vengurela), Bihar (Sabour) as detailed elsewhere[1]. These stones were examined for the embryo counts in the laboratory after the soaking treatment. The germination and number of seedlings per stone (table 1) recorded under field condition, showed that the number of embryos per stone ranged from 2 to 10 while the number of seedlings ranged from 1 to 7 in the polyembryonic stones. Maximum germination was in cv. Olour (75.93%) followed by Mylepalian (67.82%) and was the lowest in Nakkare (40.57%). Moovandan and Vellai Columban cultivars produced the largest number of seedlings per stone followed by Bappakai, Kurukkan and Olour. Polyembronic stones collected from North India as well as from this station produced 3–9 embryos and 1 to 6 seedlings per stone. The highest germination was recorded in Movandan (87.5%). From the results it was seen that stones procured from North India had greater germination as compared to stones collected from South India. Poor germination in stones from South India may be due to high infestation of stone weevils. It was also seen that polyembryonic varieties, irrespective of the place where they were grown, produced polyembryonic stones and all embryos of a particular stone did not germinate under field conditions.

Stones of two varieties *i.e.* Moovandan and Bappakai were obtained from Fruit Research Station, Sangareddy in 1977. Different seedlings of a particular stone based on the emergence, were marked from 1 to 5. The emerging seedlings were planted separately where one to five seedlings germinate from a single stone. The 15 treatments were replicated thrice in both the varieties. Mainly three characters *viz.* emerging leaf colour, influorescence colour and fruit characters were considered. It was found that in Bappakai variety, all the plants gave uniform characters, whereas in Moovandan, only one plant gave distinct character from all other plants. It showed that whichever seedling germinates from polyembryonic stones produced all the nucellar seedling under field condition. This finding has been confirmed by others[1-3]. From the germination record, it has also been confirmed that all the embryos have not germinated, thus indicating the posibility of the zygotic embryo having been suppressed by nucellar embryos during germination. It is finally suggested that polyembryonic seedlings can be used as rootstock in mango.

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1. Srivastava, R. P., Singh, N. P. and Chadha, K. L., *Indian J. Hort.*, 1980, **37**, 343.

2. Juliano, J. S., *Philos. Sci.*, **54**, 553.
3. Juliano, J. S., *Philos. Agric.*, 1937, **25**, 749.
4. Singh, L. B., *The mango*, Leonard Hill, London, 1960.

A SIMPLE METHOD FOR COLLECTING EGGS OF *STROMATIUM BARBATUM* FABR. (COLEOPTERA:CERAMBYCIDAE)

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STROMATIUM barbatum Fabr., a long-horned borer of about 350 species of seasoned timber[1], is found throughout India[2]. In nature, eggs are laid on rough surfaces and in holes or shallow depressions of wood[2,3]. Fresh, clean and healthy eggs are essential for biological investigations of economically important insects. Raros and Holdaway[4] described a simple method using pads of nylon-netting for obtaining large numbers of eggs of *Diabrotica longicornis* (Say), an economically important Chrysomelid beetle. Keeping these in view, the authors describe a simple method for collecting large numbers of eggs of Cerambycid beetles, especially *S. barbatum*. Infested branches of *Shorea robusta* were collected from Rajabasa village in Similipal forest, Orissa and kept in the laboratory. Adult beetles were collected upon emergence from these infested branches during June-July of 1981 and 1982. One hundred pairs of freshly emerged bettles were equally distributed in ten paper boxes (25 × 20 × 10 cm), the sides of which were punctured for aeration. The beetles were kept in a dark room, at 30° ± 2°C and RH 80 ± 2%. Numerous materials *viz.*, craft paper, newsprint and newspaper, surface-scratched blotting paper, thin corrugated cardboard, cellophane paper, waxed paper, wads of cotton, nylon, silk and cotton cloth of various textures were tested for suitability as an oviposition substratum. Each test material mounted by wire staples on a thick cardboard base was placed in each box containing the beetles. The feeding of the adults was not essential for survival and reproductive lives for 9 days or more for both sexes[2] when most of the eggs were laid by the females. Water-soaked absorbent cotton was kept in a small watch glass and placed in each box. Among the materials tested, females were found to oviposit most readily in the layers of dry craft paper. Further tests with this material showed that a single layer was preferred to 2,3 and 4 layers. Another 100 pairs of beetles confined in 10 such test boxes were found to lay eggs on loosely-held layers but not on the portions where the material was tightly held.

The number of eggs laid per day on the material by the said pairs of beetles was recorded to be 1484 on an average. The eggs can easily be obtained and counted by this method. Eggs so obtained are clean and free from any mechanical injury and can be used directly for experimental work.

However, the present finding indicates that a smooth surface is also preferred for oviposition by this species and it does not corroborate Beeson's report[2] that completely smooth surfaces are avoided for oviposition.

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1. Beeson, C. F. C. and Bhatia, B. M., *Indian For. Rec. Ent.*, 1939, **5**, 174.
2. Beeson, C. F. C., *Ecology and Control of Forest Insects of India and Neighbouring Countries* (Vasant Press, Dehra Dun) (1961 Ed. Govt. of India Press, Manager of Publications, Delhi-1), 1941, 159.
3. Sen-Sarma, P. K., *Indian J. Entomol.*, 1977, **39**, 284
4. Raros, R. S. and Holdaway, F. G., *J. Econ. Entomol.*, 1968, **61**, 1767.

EFFECT OF SUMITHION ON THE OVARIES OF FRESHWATER FISH *GARRA MULLYA* (SYKES).

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PESTICIDES have been recognised as serious pollutants of the aquatic ecosystem with deleterious effects on the associated organisms. So far, very few attempts have been made to study the effects of pesticides on the reproductive potency of fish[1,2]. The present work describes the effect of sublethal concentration of commonly used insecticide Sumithion (Fenitrothion) on the ovaries of the food fish, *Garra mullya*.

In the breeding season sexually mature fish were caught locally and acclimatized to the laboratory conditions. Thereafter 20 fish with average weight 12.5 g and an average total length 10 cm were exposed to 1 ppm. Sumithion (Rallis India Ltd. Bangalore) for 30 days at 25° ± 1° C. Appropriate controls were kept only in the aged tap water. They were fed on fresh lettuce. Water was changed every 2 days and fresh dose of the insecticide was added. The length and