tions. *Rhizophora*, which dominates the vegetation, is represented by *R. apiculata* Bl., *R. mucronata* Lam., *R. stylosa* Griffith, and the rare, recently reported *R. lamarckii* Montr. Microsporogenesis in *R. lamarckii* is presented here, stressing the uniqueness of the genus. The flowers of *R. lamarckii* were collected from the Pichavaram Reserve Forest since 1983, and preparation of the slides was by the customary methods of microtomy.

Flowers in the same plant possess different numbers of stamens (7–16). The short filament bears a stout and conical anther. In transection, the anther is triangular in shape, with the short arm placed abaxially and devoid of sporangia. Along the two long arms are series of sporangia arranged in a row. The cells of the abaxial side and the central connective region are large and impregnated with tannin (figure 1).

The cells of the hypodermal layer become arranged in a distinct linear row and divide to produce 2–4 layers of cells. Several distinct groups of cells, characteristic of archesporium, can be recognized in this hypodermal region. In other words, no linear rows of archesporial cells are differentiated. These groups of cells are the archesporial cells that originated from the archesporial initials, the previous generation of cells.

The archesporial cells give rise to 2–4 concentric rings of tapetal cells peripherally. The tapetal cells are uninucleate and are of the secretory type. The entire tissue is digested layer by layer, centripetally, beginning from the tetrad stage of the microspores (figure 2).

The sporogenous cells undergo a limited number of mitotic divisions and form a compact mass of spore mother cells, withdrawn from the tapetum. Simultaneous reduction divisions in the microspore mother cells result in tetrads of tetrahedral configuration. In some of the tetrads one or two of the spores degenerate resulting in tetrads of three cells (figure 3). The dissolution of the callose wall leads to the liberation of the microspores from the tetrads which have already attained the spherical shape.

At maturity, one or two layers of fibrous endothecium run along the anther and also between a few pollen sacs. In open flowers, the pollen grains are uninucleate (figure 4).

The occurrence of multilocular sporangia derived from distinct units of archesporium in an anther is unique to angiosperm embryology. The multisporangiate condition reported in Gentianaceae and Loranthaceae[1] and in several other families[2] results from progressive sterilization of the sporogenous tissue or by partitioning of other tissues, but not by distinct groups of archesporial cells. In *Aegiceras corniculatum*[3] and *Xylopia nigricans*[4], even though the archesporial cells are in separate groups, the anther in transection appears as a tetransporangiate anther. The multisporangiate anther of *R. lamarckii* is unique among angiosperms.

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EFFECTS OF FEEDING *TRICHOSANTHES DIOICA* (PARVAL) WHOLE FRUITS ON BLOOD GLUCOSE, SERUM TRIGLYCERIDE, PHOSPHOLIPID, CHOLESTEROL AND HIGH DENSITY LIPOPROTEIN-CHOLESTEROL LEVELS IN THE NORMAL ALBINO RABBITS

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For a long time *T. dioica* (Parval) fruits have been described to possess anthelmintic, antipyretic, diuretic, aphrodisiac, laxative, cardiotonic, stomachic, fattening, appetising, expectorant and antirheumatic effects in the indigenous system of medicine. These are considered to be useful in the treatment of fever, bronchitis, headache, leprosy, ulcers, heart and blood diseases[1–5]. There are no reports regarding biochemical effects of feeding these fruits in the human subjects or animals.

An attempt has been made in this laboratory to study the effects of regular feeding of whole fruits of *T. dioica* on blood glucose, serum triglycerides (TG), phospholipids (PL), total cholesterol and high density lipoprotein cholesterol (HDL cholesterol) in the normal albino rabbits.

Fresh fruits of *T. dioica* bought from the local market were washed, cut into small pieces, air-dried, powdered at room temperature in an electrical grinder and stored in glass-stoppered bottles.

Table 1 *Effects of feeding Trichosanthes dioica whole fruit powder (1%) in the raw form for eight weeks on blood glucose, serum triglyceride (sTG), phospholipids (sPL), cholesterol and high density lipoprotein (HDL) cholesterol in the normal albino rabbits*

	Control group+	Experimental group+			
		Week ends			
		1st	3rd	4th	8th
Blood glucose	79 5 ± 10.5	73.9 ± 8.8** (7.0)	70.1 ± 6.5** (11.9)	67.9 ± 6.8** (14.6)	64.7 ± 6.3* (18.6)
sTG	206.2 ± 25.0	179.5 ± 23.3* (12.9)	160 2 ± 23.3* (22.3)	153.2 ± 20.6* (25.7)	135 6 ± 19.1* (34.2)
sPL	81.2 ± 6.8	88.0 ± 7.3* (8.4)	95.0 ± 6.9* (17.0)	98.4 ± 6.0* (21.2)	106.5 ± 6.6* (31.2)
Serum cholesterol	99.2 ± 4.1*	85.3 ± 4.2* (14.0)	77.1 ± 3.9* (22.3)	72.5 ± 3 1* (26.9)	63.0 ± 2.4* (36.5)
HDL-cholesterol	23.8 ± 2.7	28.1 ± 1.9* (18.1)	31.6 ± 1.7* (32.8)	33.5 ± 1.6* (40.8)	37.6 ± 2.6* (58.0)

(Values are mean ± SD expressed in mg/dl); +Sample size in each case was 8; Figures in parentheses indicate per cent change; * $P < 0.001$; ** $P < 0.01$.

Eight normal healthy albino rabbits (1.2 to 1.8 kg) were maintained on control diet (Hindustan Lever Gold Mohr rabbit feed) for a month. The animals had free access to food and water, and their daily consumption of food was between 95 and 100 g. Fasting samples of blood were collected twice during this period. Subsequently, the same group was fed experimental diet containing *T. dioica* whole fruit powder at 1 g per cent level along with control diet *ad libitum* for eight weeks. No significant change occurred in the amount of experimental diet consumed by the animals. Fasting samples of blood were collected after 1st, 3rd, 4th and 8th weeks.

Blood samples were analysed for sugar (FBS)[6], TG[7], PL[8], total cholesterol[9] and HDL-cholesterol[10].

It was revealed that FBS levels decreased progressively by 7, 11.9, 14.6 and 18.6% with increasing time of feeding. Serum TG decreased by 12.9, 22.3, 25.7 and 34.2% in the corresponding periods. The total serum PL exhibited increase of 8.4, 17, 21.2 and 31.2%. Total serum cholesterol levels decreased by 14, 22.3, 26.9 and 36.5%. HDL-cholesterol showed increase of 18.1, 32.8, 40.8 and 58%, respectively. Upon statistical evaluation applying Mahlanabis *d* test, *P* values for all such changes were found in the range < 0.001 to < 0.01 showing that the changes observed in the FBS, TG, PL, cholesterol and HDL-cholesterol levels are significant.

T. dioica fruit is used as a seasonal vegetable in Indian dietaries. Preliminary work done in this laboratory reveals that regular feeding of this fruit shows marked and significant hypoglycemic, hypotriglyceridemic, hypocholesterolemic and hyperphospholipidemic effects in the normal albino rabbits. HDL-cholesterol is significantly increased. Since total cholesterol shows decrease and HDL-cholesterol shows increase, obviously, low density and very low density lipoprotein-cholesterol are expected to decrease. Such effects are clinically very important. Lowering of total cholesterol, TG and LDL-cholesterol, and increase in HDL-cholesterol and PL is a very desirable biochemical state for prevention of atherosclerosis and ischaemic conditions[11-14]. A similar study of such effects of *T. dioica* fruits in normal, diabetic and ischaemic human subjects may prove to be of considerable value.

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NEW RECORDS OF NATURAL ENEMIES ASSOCIATED WITH THE BROWN PLANTHOPPER, *NILPARVATA LUGENS* (STAL)

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NATURAL enemies of the brown planthopper *Nilparvata lugens* (Stal) pest of rice (*Oryza sativa*) have been reported from Karnataka[1], Andhra Pradesh[2] and other regions in India[3,4]. However not much work on the natural enemies of the brown planthopper has been done in Tamil Nadu.

In September 1987, an outbreak of the brown planthopper was reported from Tirupanandal Taluk, Tanjore District in Tamil Nadu. Severe damage was caused to the fully mature crop and subsequently the infestation spread to nurseries and the freshly transplanted crop. A thorough search for predators based on the actual feeding activity on the brown planthopper was carried out to confirm its predatory role.

The following predators were observed feeding on brown planthopper nymphs and adults:

Spiders

(a) Tetragnathidae, *Tetragnatha andamanensis* Tikader (b) Lycosidae, (i) *Lycosa poonaensis* Tikader, (ii) *Pardosa birmanica* Simon, (iii) *Pardosa sumatrana* (Thorell), (iv) *Pardosa shyamae* (Tikader).

Insects

(a) Miridae *Cyrtorhinus lividipennis* Reuter, (b) Nabidae *Stenonabis tagalica* Stal. *Iinnavuori* Kerzner, (c) Reduvidae, (i) *Polytoxus femoralis* Distant, (ii) *Polydidus armatissimus* Stal. (iii) *Staccia diluta* Stal., (d) Coccinellidae *Coccinella arcuata* Fabricius, (e) Carabidae, (i) *Casnoidea* indica (Thunberg), (ii) *Clivina tranquebarica* Bonelli (iii) *Colliuris fuscipennis* Chaudoir, (iv) *Elaphropus fumicatus* Motschulsky.

Except for *Crytorhinus lividipennis* and *Coccinella arcuata* all other species constitute new records of predators of the brown planthopper in India.

The population density of four species viz. *Tetragnatha andamanensis, Crytorhinus lividipennis, Stenonabis tagalica* and *Polydidus armatissimus* which were present in large numbers was studied. Within an area of 50 cents, 70 plants of the rice var TKM 9 were selected at random and the number of predators in each hill was counted at 10-day intervals beginning with 40 days after transplanting (DAT).

The first observation revealed that only the spider and nabid were present at the rate of 0.22 and 0.32/ hill respectively. At 50 DAT, there was a sudden spurt in the activity of *C. lividipennis* to the extent of 18.65 nymphs/hill. However the population of the spider and nabids reduced to 0.17 and 0.07/hill respectively. At 60 DAT, the reduvid, *P. armatissimus* had increased to 1.67/hill displacing the nabid completely. Also, the population of *C. lividipennis* reduced slightly to 13.15/hill while the spider population increased to 0.54/hill. It was also observed that the activity of *C. lividipennis* was more pronounced in the early hours of the morning compared to afternoon hours. The observation for the incidence of BPH nymphs on the same plants revealed a mean population of 63.87, 125.86 and 84.83 nymphs/hill at 40, 50 and 60 DAT respectively. It appears therefore that even if a large and diverse fauna of predators were present, it may not be sufficient to contain the pest once an outbreak situation was attained.

The biocontrol potential of *C. lividipennis* was highlighted by Pophaly *et al*[5] and the role of spiders by Barion and Litsinger[6]. However there is no