

Table 1 Fecundity, longevity and sex ratio of *B. brevicornis* on different food sources*

Food Source	Fecundity (No. of cocoons)		Longevity (in days)		Sex ratio	
	Range	Average	Range	Average	Male	Female
Nectar	115-277	148.3	40-51	45.9	53 : 47	
Diluted honey	28-105	68.7	21-37	30.8	53 : 47	
No food but larvae of <i>Corcyra cephalonica</i> were provided	12-81	44.0	14-27	20.9	57 : 47	
S. Em.		0.03		0.09	—	
C. D. at 0.05		0.16		0.27	—	
C. V. %		26.63		7.11	—	

* : Based on 18 females studied.

that for the optimum egg production, additional feeding is essential. Sex ratio of the parasite was not affected when fed on nectar. Thus, it would be worth growing *Justicia jendurosa* in the vicinity of coconut orchards and studying whether supplemental feeding increases natural control of *O. arenosella*.

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ONTOGENY AND THE STRUCTURE OF THE MATURE SEED COAT OF *ENTADA SCANDENS* BENTH

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THE structure of any seed coat could clearly be understood if studied developmentally¹. The variation and the constancy of the seed coat structure are helpful in taxonomic studies² and are of great value in

determining taxonomic relationships³. The present study, therefore, deals with the ontogeny and the structure of the mature seed coat of *Entada scandens* Benth.

Materials collected from Yercaud, Kodaikanal and Kolli hills were fixed in FAA. In addition to microtome sections, free hand paradermal and transverse sections also were prepared. Following Schult's method⁴ mature seed coat bits were macerated. The micropreparations, stained in aqueous safranin, were mounted in glycerine or glycerine-jelly⁴. To support the observations, camera lucida drawings and photomicrographs were prepared. All measurements were on an average of 30 readings.

In trans-sectional view, the seed coat exhibits: (a) thick cuticle ($\pm 3\mu$ thick), (b) a palisade layer composed of compactly arranged macrosclereids ($17.76\mu \times 1.2\mu$), (c) a distinct layer of osteosclereids with intercellular spaces and (d) several layers (80-100) of thick-walled parenchyma cells (figures 1-3). This inner parenchymatous zone is composed of three regions: (a) the outer part (about 15 layers) made up of compactly placed and tangentially extended cells (figure 4), (b) the middle part (about 34-40 layers) of armed parenchyma having large inter-cellular spaces and (c) the inner part made up of compactly arranged thick walled parenchyma cells. Of these three parts, the outer and the inner parts exhibit comparatively smaller cells, while the cells of the middle part show larger cells with arms and conspicuous intercellular spaces (figure 5). Generally, all the parenchyma cells possess certain coloured and granular substances in the protoplast.

It is interesting to note the ontogeny of the seed coat. The outer epidermis of the young seed coat

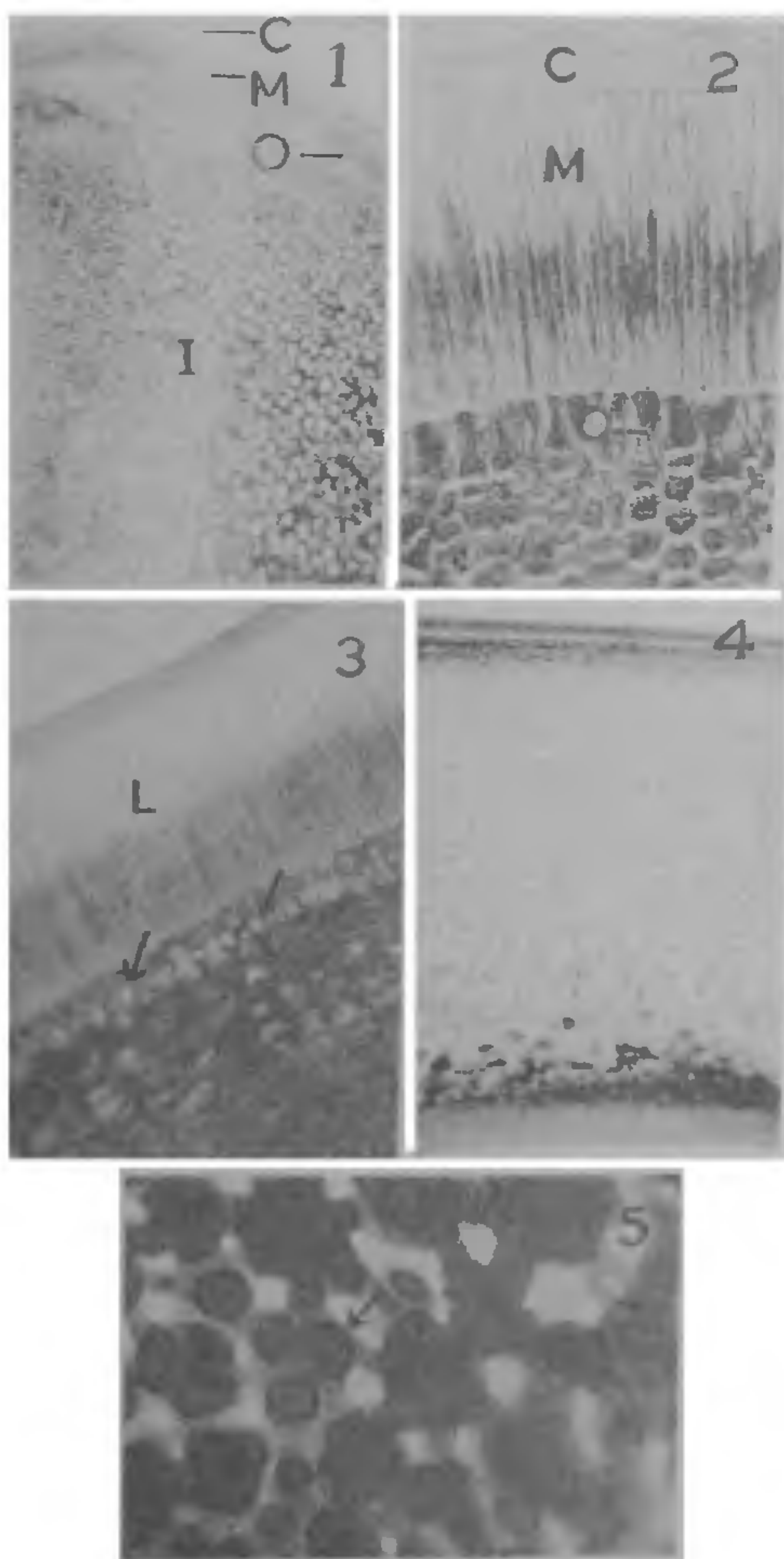
undergoes only repeated anticlinal divisions. As development proceeds, the anticlinally divided daughter cells gradually elongate in the radial direction to differentiate into the palisade layer of macrosclereids (figure 3). At full maturity the macrosclereids develop a thin septa more or less at the middle of the cells. Prior to this, the protoplast seems to get accumulated at this region (figure 2). Finally, the septa of all the macrosclereids jointly form the "light layer" (figure 3).

During differentiation of the parenchyma, first, the cells located in the centre (figure 4) namely, the future armed parenchyma, become vacuolated and develop intercellular spaces. This process proceeds in a bidirec-

tional manner towards the interior as well as exterior of the seed coat. The osteosclereid layer develops from the subepidermal cells, which are located below the epidermis, after periclinal divisions. During the differentiation of osteosclereids, the initials undergo certain cellular readjustments to develop the conspicuous intercellular spaces by the dissolution of the middle lamella in the middle part and the bulbous expansion on either ends. This is how the osteosclereids later on attain the dumb-bell shape (figure 3). The mature armed parenchyma cells exhibit several arms and large schizogenous intercellular spaces. In sectional view some of the arms (which are facing the observer and away from the observer) appear in the form of small circles or ovals (figure 5).

The structural features of *Entada* seed coat are in complete harmony with earlier reports^{1,3} on the other legumes in having a single layered macrosclereid (with thick cuticle) representing the epidermis, followed by a layer of osteosclereids and the parenchymatous inner zone, except the following: during tissue differentiation only the central, armed parenchyma cells initiate their differentiation earlier than any other cell in the seed coat and that the differentiation proceeds bidirectionally towards the exterior as well as interior. Again, the parenchymatous zone is much larger consisting of 80 to 100 cell layers. It is therefore concluded that not only the presence of large number of cell layers in the parenchymatous zone but also its differentiation into three regions is the characteristic feature of the seed coat of *Entada*.

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Figures 1-5. 1. An oblique section of the seed coat showing the cuticle, the palisade layer of macrosclereids, a single layer of osteosclereids and the undifferentiated inner part. 2. T.S. of outer portion of seed coat. Note the rich protoplast of the differentiating macrosclereids and the differentiating osteosclereids. 3. T.S. of outer portion of seed coat showing the light line and the developing intercellular spaces (arrows) between osteosclereids. 4. T.S. of young seed coat showing the tangentially extended, smaller outer portion of the parenchymatous zone and the larger, armed cells with inter-cellular spaces in the middle portion. 5. Section of the mature armed parenchyma cells. Note the circular and oval outline (arrow) of the arms. (C = cuticle, I = inner part of the seed coat, L = light line, M = macrosclereids, O = osteosclereids) Magnification for all figures: $\times 317$.

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BASIC NUMBER SIX IN *SPOROBOLUS* FROM SOUTH INDIA

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SPOROBOLUS R Br is a large genus consisting of about 100 species which are annual or perennial, erect or prostrate grasses (family Gramineae) and predominantly tropical in distribution. The chromosome numbers of about 32 species known so far range¹ from $2n = 18$ to 72 and the basic numbers^{2,3} of the genus is considered to be $x = 9, 10$ and 12. Only three Indian members have been studied previously⁴ and they show $2n = 20$ or 24. *S. maderaspatanus* collected from South India and studied for the first time shows the haploid number of $n = 6$ in pollen mother cells.

Young spikes of this species were collected from plants growing wild in the coastal areas of Colachel near Kanyakumari. Meiosis was studied from smear-preparations of pollen mother cells after fixation in Carnoy's fluid and staining in acetocarmine. Meiosis was regular and 6 bivalents were observed at metaphase I (figure 1). The plant showed high pollen fertility (90.5%) and regular seed set.



Figure 1. *S. maderaspatanus*. Meiosis, metaphase I. $n = 6$ ($\times 1500$).

The somatic numbers commonly occurring in this genus¹ are $2n = 20, 24, 36, 40$ and 72 which indicate three basic numbers 9, 10 and 12. However Tateoka² has reported $2n = 12$ in *S. molleri* from East Africa and he proposed another basic number $x = 6$ for this genus which is confirmed by the present study of *S. maderaspatanus* from South India. Therefore, the species of *Sporobolus* with chromosomes in multiples of 12 reported so far³ may be considered to have $x = 6$, which is comparatively a rare basic number in the grass family.

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OBSERVATIONS ON FUNGAL INFECTION OF EGGS AND FINGERLINGS OF *CHANNA PUNCTATUS* BL

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DURING a survey of parasitic watermoulds a large number of eggs and fingerlings of *Channa punctatus* Bl bearing fungal infections were collected from the river Rapti, Gorakhpur, during Aug-Sep. 1983. The infection resulted in mass mortality of about 80% of the infected eggs and fingerlings. The infected eggs and fingerlings showed the presence of cottony outgrowths of fungal mycelium on their surface. The transparency of such infected eggs was lost and they did not hatch.

The fungus involved in the infection was isolated from the infected eggs and fingerlings of *C. punctatus* on sterilized boiled hempseeds. Single spore, bacteria-free cultures of the fungus were raised by standard methods¹⁻³. The fungus was identified as *Allomyces arbuscula* Butler (Sparrow⁴). To ascertain the parasitic