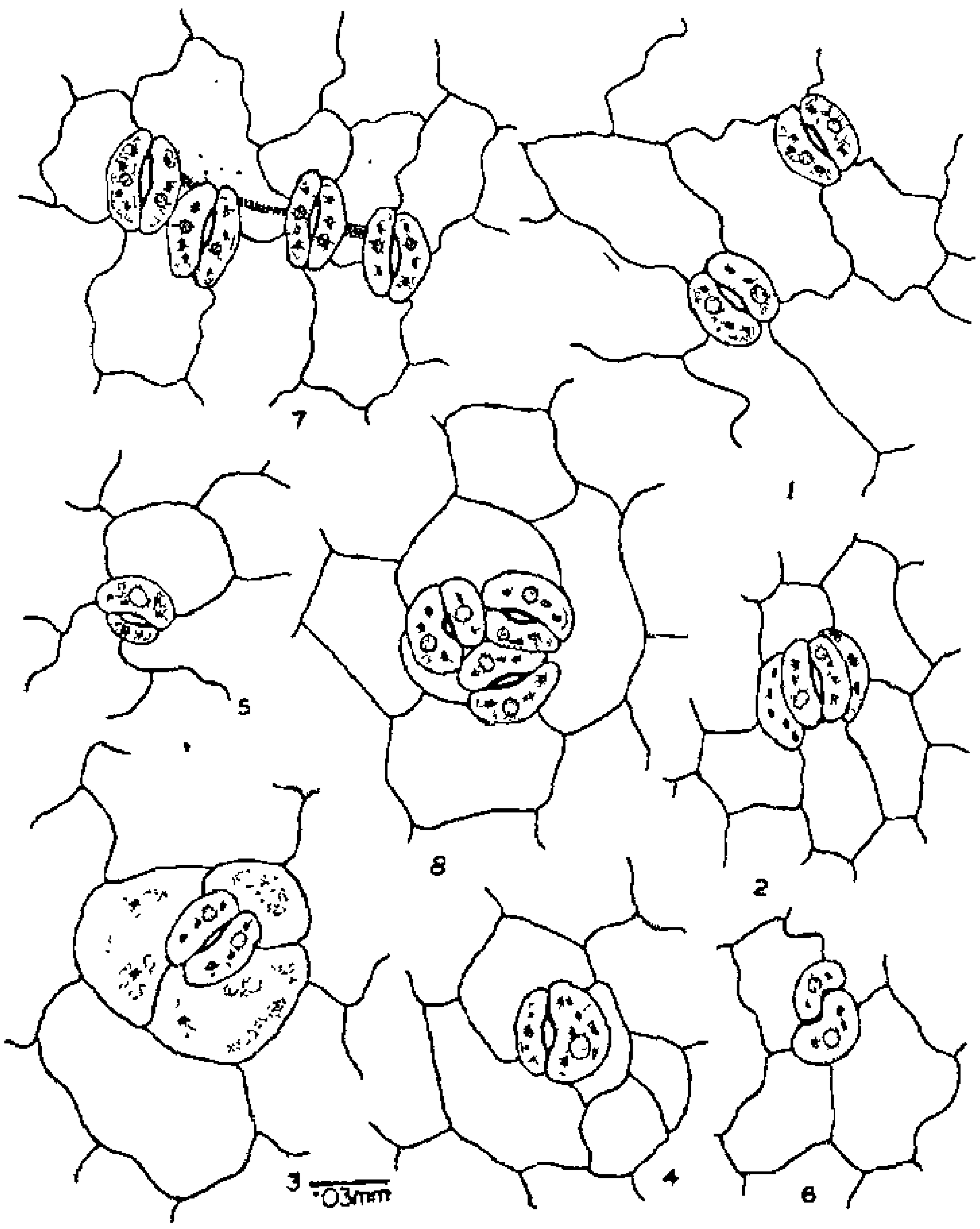
stained in Delafield haematoxilin and a few with propiono carmine, and mounted in 40% glycerine. The slides were sealed with a synthetic mountant, DPX.

Stomata are present on both the adaxial and abaxial surfaces of leaves of *C. roseus*. They are usually evenly scattered and irregularly oriented. Among the three stomatal types: anomocytic (figure 1), paracytic (figure 2) and anisocytic (figure 3), the anomocytic type is of frequent occurrence, while anisocytic type is rare. Thus the 3 types of stomata have not been reported so far in any taxa of the family Apocynaceae. In addition, there are also abnormal types of stomata with unequal guard cells where (figures 4, 5, 6) one guard cell is 2–3 times larger than the other normal one (figure 4), and stomata with reduced guard cell where (figure 5) one guard cell is smaller than the other guard cell. Rarely, there occur stomata with unequal guard cells but without pore since the two unequal guard cells meet each other in the end to middle position and not the usual end to end position (figure



Figures 1–8. Stomatal peculiarities of *Catharanthus roseus*. **1.** Anomocytic. **2.** Paracytic. **3.** Anisocytic. **4.** Stoma with one 'Giant' guard cell and a normal guard cell. **5.** & **6.** Stomata with unequal guard cells. **7.** Stomata connected by cytoplasmic strands. **8.** Three contiguous stomata.

6). Another abnormal form observed in this plant is stomata connected by cytoplasmic strands. In this case, cytoplasmic strands on one side connect one guard cell of a stoma to a member of a contiguous stoma, and strands on the other side join to a discrete stoma. Similarly, cytoplasmic strands have also been observed connecting the two members of a pair of laterally contiguous stomata (figure 7). Although cytoplasmic connections between the guard cells of neighbouring stomata have earlier been reported by few workers[3,4], the existence of cytoplasmic strands between the contiguous stomata is a new report for the family. Another abnormal but interesting peculiarity is the rare occurrence of contiguous stomata in threes (figure 8) which appear closely packed. The contiguous margin of these closely abutting cells have undergone distortion.

On the basis of the present study, it is obvious that these abnormalities are not induced by ecological or physiological factors since leaves collected from the plants growing in various localities of Delhi regularly showed the same stomatal peculiarities.

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OCCURRENCE OF TENSION WOOD IN VERTICAL SHOOTS OF *POLYALTHIA LONGIFOLIA* (SONN.) THW

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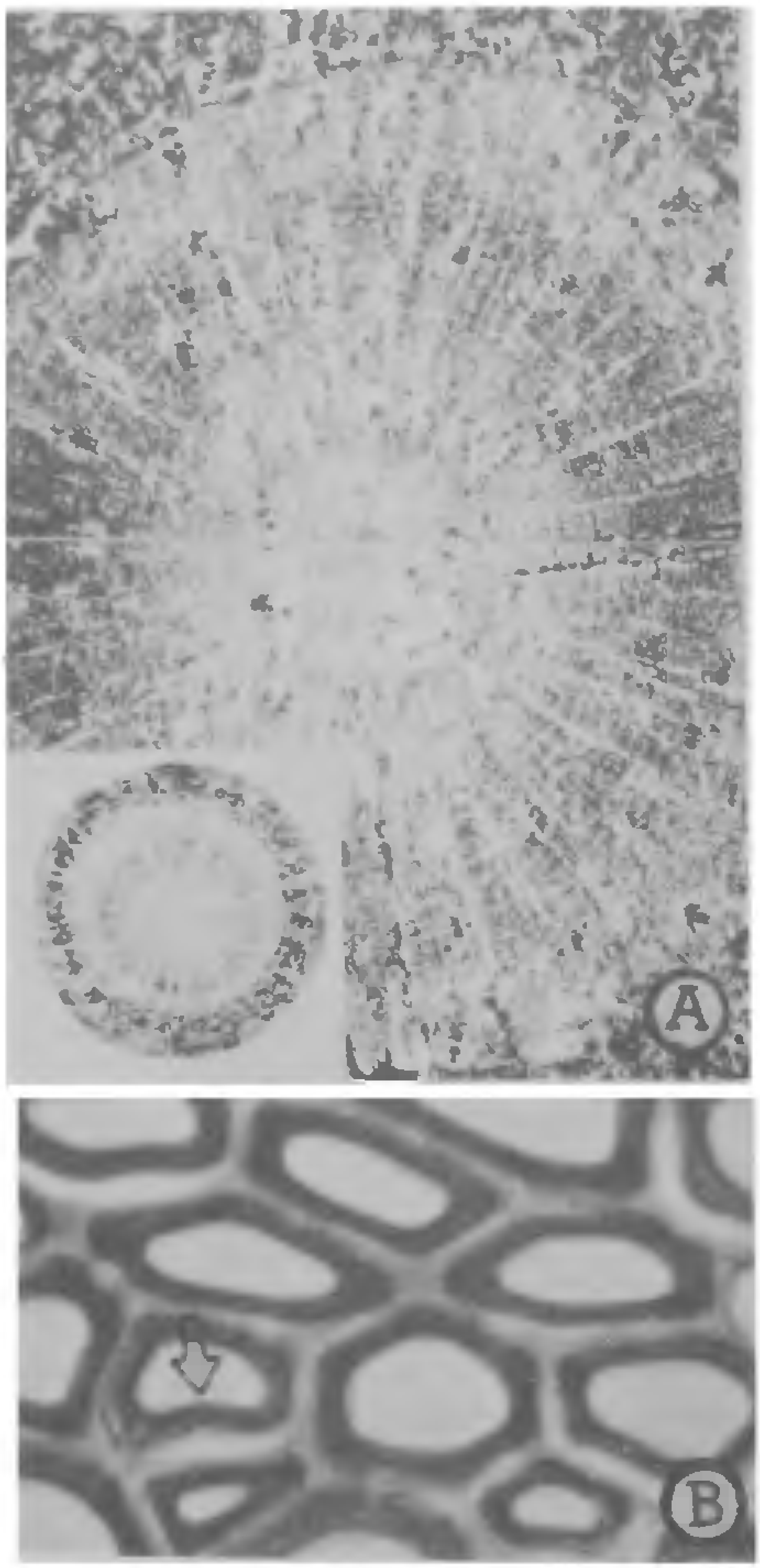
WHEN a tree is brought out of its natural equilibrium state, in terms of space, it begins to produce a special tissue referred to as reaction wood which is supposed to help the displaced axes to bring them back to their original position [1, 2]. Reaction wood formation is also considered as a developmental response which maintains the reoriented or bent axis in its new position[3]. Reaction wood is normally formed on the upper and lower sides of inclined axes in angiosperms and gymnosperms, respectively. Nonetheless, formation of tension wood has also been reported on the lower side of the axes in some species[4], and even in the upright axes[5]. However, the tension wood in the upright axes is of diffused type, and not of compact nature. Some species of the family Annonaceae, including *Polyalthia*, have been reported to be devoid of tension wood even in leaning branches[6]. However, in our investigations we have noticed the formation of tension wood in the upper and lower parts of the inclined axes as well as the upright stems of *Polyalthia longifolia* (Sonn.) Thw. grown under natural conditions. To confirm the presence of tension wood in the vertical shoots in this species, the seedlings were raised in the experimental plots of botanical garden of this university taking care to see that there was no bending and physical stress other than wind. The axis of one-year old seedlings showed a very compact cylinder of secondary xylem with the gelatinous fibres, a characteristic feature of the tension wood (figure 1A). The G-layer of the gelatinous fibres is intact in most of the cases, but it may partially detach from the rest of the wall in a few cases (arrow, figure 1B). This is the first report of the occurrence of a compact reactionwood, without any normal wood fibers, in upright axes in angiosperms. The formation of reaction wood in the vertical axis has been attributed to growth stress or loading stress caused by crown imbalance or a little lean[7, 8]. One year-old seedlings of *P. longifolia* did not have heavy canopy, and did not undergo any leaning. Hence, the only external visible stress was that of wind. This makes us believe that the compact reaction wood in the vertical shoot must be viewed as a normal component of wood in *P. longifolia*.



Figures 1A & B. *P. longifolia* vertical stem axis showing reaction wood. **A**: × 32 (inset × 7.5). **B.** × 15 20.

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