OCCURRENCE OF COLLETERS IN *CARICA PAPAYA* L. (CARICACEAE)

Carica papaya shows pearl glands on petioles (Dave & Patel, 1974) and a row of colleters present on either side of the petiole-lamina juncture. Metcalfe and Chalk (1972) originally used the term 'glandular hairs' for the colleters of *Carica*. But in Rubiaceae the term 'glandular hairs' (Metcalfe & Chalk, 1972) is later replaced by colleters (Lersten, 1974; Dave *et al.*, 1988). *Carica* colleters show morphological as well as anatomical identity with the colleters of other angiosperms (Lersten & Curtis, 1974; Dave *et al.*, 1988; Thomas & Dave 1989; Kuriachen & Dave, 1989). So far the occurrence of colleters in Caricaceae and their detailed structural, developmental and

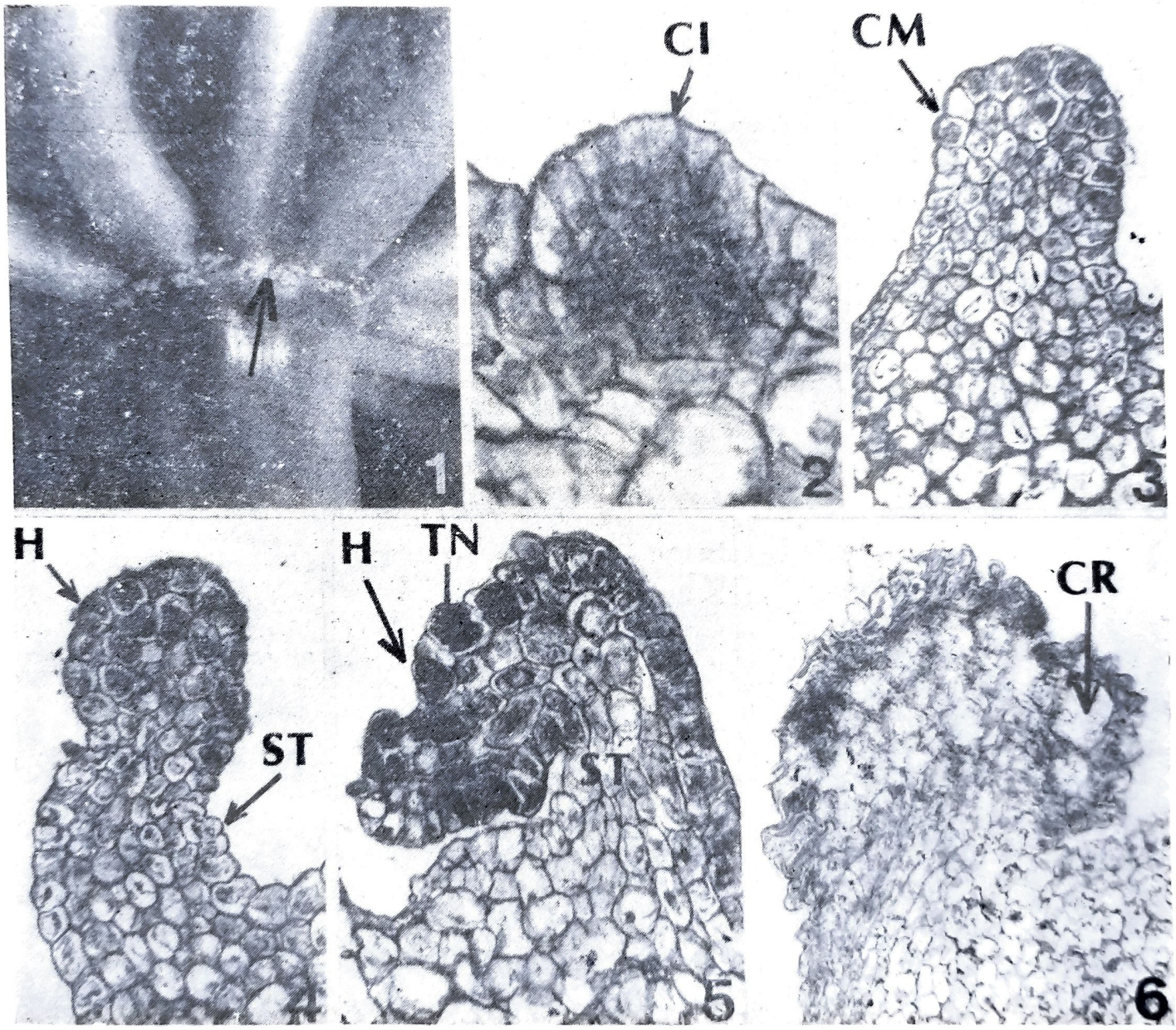

Figure 1. Colleters on the lower side of the leaf (arrow). × 1; 2,3,4. Developmental stages of the colleter in longitudinal sections, X 340; × 284; × 225; 5. A mature colleter is curved and differentiated into a head and stalk. Note the tannin contents in the epidermal cells of the head, × 192; 6. A senescent colleter showing numerous druse crystals in the central cells, × 264.

CI, colleter initial; CM, colleter meristem; CR, crystal; H, head; ST, stalk; TN, tannin.

histochemical studies have not been recorded, hence it is considered necessary to publish this report.

A row of long club-shaped colleters is present on the adaxial and abaxial sides of the lamina, and at the juncture of lamina and petiole (Fig. 1). Colleters are pale yellow when young turning brown at maturity. Development of colleter is from a group of epidermal and hypodermal initials distinguishable from surrounding cells by their denser stain (Fig. 2). These initials divide both antipericlinally to form a protuberance (Fig. 3) from which a mature colleter develops (Figs. 4,5). Mature colleter is finger-shaped and curved, measuring 200 μm in length and 25 μm in diameter. Outermost cells of the colleter are rectangular or radially elongated, covered externally with a cuticle. Presence of tanniniferous contents is noticed in the epithelial layer (Fig. 5).

Lersten (1974) recognized six types of colleters in Rubiaceae. Colleters of *Carica* are of standard type with a central core of thin-walled parenchyma cells surrounded by epithelial cells in the non-nodulating members of Rubiaceae (Lersten, 1974). Similar internal organization of tissue is noticed in the colleters of Apocynaceae and Asclepiadaceae (Dave *et al.*, 1987; Thomas *et al.*, 1989; Thomas & Dave, 1989; Kuriachen & Dave, 1989). Like many colleters of Rubiaceae and Apocynaceae, *Carica* colleters are also non-vascularized.

Among the metabolites, lipid is predominant in the secretary stage of the colleter, while starch in the pre-secretary stage as also noticed in Apocynaceae (Thomas & Dave, 1989). Presence of abundant lipid globules in the secretary stage is more characteristic of resin glands (Rachmilevitz & Joel, 1976), oil secreting glands (Arumugasamy *et al.*, 1989) and colleters (Thomas & Dave, 1989). Freshly harvested colleter exudate of *Carica* is sparingly soluble in water and gives positive result for sugar. Presence of sugar in the colleter exudate is noticed in *Aganosma* (Dave *et al.*, 1987), *Allamanda* (Thomas & Dave, 1989), *Roupelia* (Thomas *et al.*, 1989).

After secretion the colleter shows senescence which initiates prior to the maturity of the leaf. Both epidermal and inner cells of the colleter become irregular in shape and show the presence of calcium oxalate druse crystals (Fig. 6). Cuticle becomes thick, irregular and disrupted. The dead colleters persist for a long time with the leaf.

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