

Study of Trichomes in Some Plants of Solanaceae of Satna District

Abstract

The current research began as an investigation of the trichomes leaves as they related to chemical changes during curing (Akers 1975). In the course of the study it become apparent that knowledge of the internal structure of these trichomes would be useful in assessing the chemical finding. The trichomes studied can be used as taxonomic parameter for the taxa.

Keywords: Trichomes

Introduction

Various types of epidermal cells varies in different plants. The ordinary cells of the epidermis, single cells or groups of cell with special structure, cells connected stomata, epidermal appendages are called trichomes.

The first level of complexity lies at the surface of cells. The outermost layer of cuticle i.e. The epicuticle, produces various elements such as wax crystals (Samuel et.al.2008). Their diversity is almost as great as the number of species on which they are encountered as they can be single cell or multicellular, curve or straight, non-secretory or glandular and with many more descriptive criteria possible (Werkers 2000). On the contrary a study on basal angiosperm suggest that trichomes may have evolved from stomata several times independently (Carpenter 2006). Phylogenetic analysis indicates that glandular trichomes have evolved three times independently (Chauveau et.al.2011).

Aim of the Study

Glandular trichomes also have an important metabolic capacity and may be considered as true cell factories. The purpose of this review is to provide an update on the method and technologies which have been used to investigate glandular trichomes and to propose new avenues of research to deepen our understanding of these specialized structures.

Material & Method

Satna is between 23^o to 24^o of North latitude and 80^o to 81.5^o of east latitude, and is 316 meters above the sea level. It's total area is 7,495 square Kilometre which is 1.8% of the total area of Madhya Pradesh

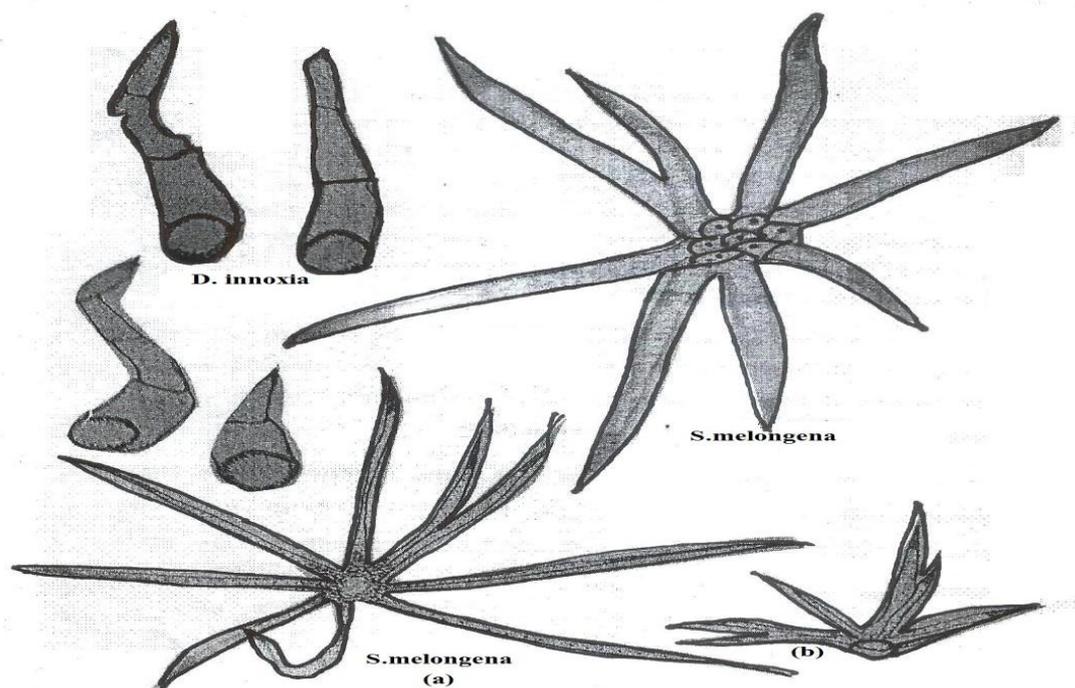
Materials of species for the present investigation were collected from the different area of Satna and fixed in F.A.A. Leaves were cleared in 2.5 to 5.1 NaOH solution followed by Sodium Hypochloride. The preparation were stained in saffranin and mounted in glycerine. Camera Lucida drawings were made, the size of leaf was measured. Photomicrographs were taken.

Epidermal peels of fixed mature leaves were taken by scraping with scalpel. For difficult materials, the double treatment method of "Leelavathi and Ramayya (1975)" was employed the peels specimens were studied from base middle and apex regions, covering from mid vein to the margin, where leaves are small, the peels represented the entire leaf surface. These were stained mounted in saffranin glycerine (Ramayya and Rajgopal - 1968) and observed at low and high magnifications.



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Trichomes of various plants

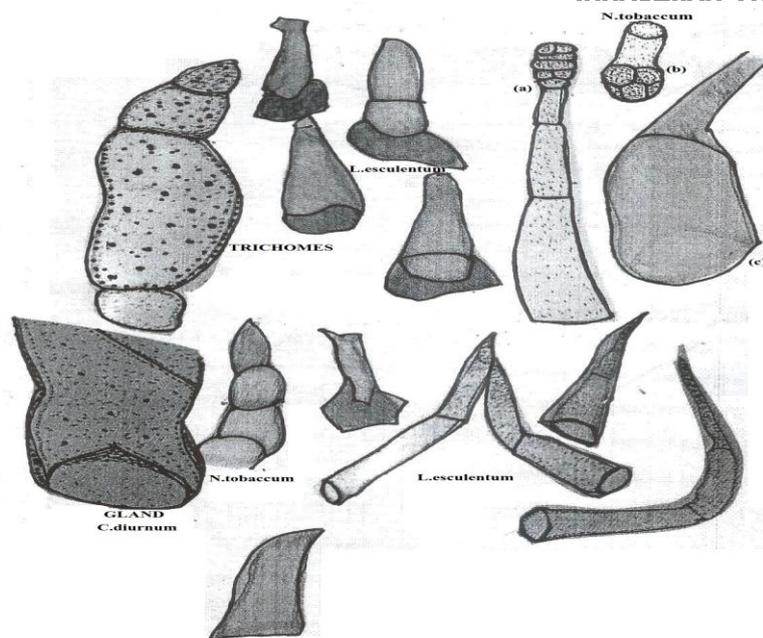
Results & Discussion

Similarly the comparative observations of hair also suggests that in genus *Capsicum annum*, *Cestrum diurnum*, *Datura innoxia*, *Lycopersicum esculentum*, *Nicotiana tobaccum* *Solanum xanthocarpum* and *Solanum nigrum* glandular hairs are found but in genera *Solanum nigrum* and in *Solanum xanthocarpum* they are very small glandular as well as stellate while they are one or two celled large in *Nicotiana tobaccum* and *Lycopersicum esculentum* either they are one celled long or elongated in *Nicotiana tobaccum* but two celled long in *Lycopersicum esculentum* but in *Capsicum annum*, *Cestrum diurnum* and *Datura innoxia* they are almost glandular and 2 celled long but in *Solanum melongena* the hairs are non glandular and stellate.

Lycopersicum esculentum, *Nicotiana tobaccum*, *Solanum xanthocarpum* and *Solanum*

nigrum glandular hairs are found, but in genera *Solanum nigrum* and *Solanum xanthocarpum* they are very small glandular as well as stellate while they are one or two celled large in *Nicotiana tobaccum* and *Lycopersicum esculentum* either they are called long or elongated in *Nicotiana tobaccum* but 2 celled long in *Lycopersicum esculentum* but in *Capsicum annum*, *Cestrum diurnum* and *Datura innoxia* they are almost glandular and 2 celled long But in *Solanum melongena* the hairs are non-glandular and stellate.

Indian workers have stuignificance of trichomes died occurrence, structure, development and taxonomic (Inamdar, 1970; Shashikumar & Paliwal, 1978,1982; Singh & Jain, 1975 and Ahmad, 1974 a,b,c; 1975 a, b; 1976, 1978a,b 1979). The present authors extended investigation of foliar trichomes of solanaceae. the results of which are being communicated in this paper.



Trichomes of various species

References

- Akers C.P. (1975) 1, Tobacco Leaf trichomes, ultra structure of glandular trichomes. 2, Chemical changes in trichomes during flue curing. Ph.D. Desertation. Department of Botany North Carolina State University Raleigh.
- Ahmad, K. J. (1975b). Cuticular studies in some Acanthaceae and Solanaceae. *New Botanist*, 2(2) : 94-100.
- Ahmad, K. J. (1976). Epidermal studies in some species of Hygrophda and Dyschoriste (Acanthaceae). *J. Indian Bot. Soc.*, pp. 41-52
- Ahmad, K. J. (1978a). Epidermal hairs of Acanthaceae. *Blumea.*, 24 : 101-117.
- Ahmad, K. J. (1978b). Epidermal studies in *Fittomina coemans* (Acanthaceae). *Feddes Repert*, 89(5/6) : 369-374.
- Ahmad, K. J. (1979). Taxonomie significance of epidermal characters in Acanthaceae. *Progress in plant research. Today nd Tomorrow's Printers and Publishers. New Delhi, Vol. 1.*
- Carpenter K.J. 2006. Specialized structure in the leaf epidermis of basal angiosperm: morphology, distribution and homology. *Am. J. Bot.* 93,665-681
- Chauveau et.al.2011 Evolution of oil producing trichomes in iridaceae insight from the first comprehensive philogenetic analysis of the genus *Ann. Bot.* 107,1287-1312.
- Inamdar, J. A. (1970). Epidermal structure and ontogeny of caryophyllaceous stomata in some Acanthaceae. *Botanical Gazette*, 131(4) : 261-268.
- Rajagopal, T. and Y. Pochaiah (1983). On spatial relationship between trichomes and stomata. *Indian J. Bot.*, 6(1) : 37- 39.
- Ramaya, N. (1962). Studies on the trichomes of some compositae I. General structure. *Bull. Bot. Surv. India*, 4 : 177-178.
- Samuel Et.al.2008 Sealing plant surface: cuticular wax formation by epidermal cells. *Annu. Rev. Plant. Biol.*59,683-707, Palo Alto:Annual reviews
- Shashikumar and G. S. Paliwal (1975). Foliar anatomy of the family Acanthaceae II. The tribe *Thumbergieae* and *Nelsonieae*. *Acta. Botanica Indica*, 3 : 121-131.
- Singh, V. and D. K. Jain (1975). Trichomes in Acanthaceae I. General structure.' *Indian Bot. Soc.*, 54 : 116-127.
- Werkers. E (2000) Tricome diversity and development. In *advances in Botanical Research Incorporating Advances in Plant Pathology*, Vol. 31: *Plant Trichomes* (Hallahan, D.L. and Gray, J.C., eds). San Diego/ Boston/London:Academic Press, pp. 1-35.