Journal of Horticulture
ISSN: 2376-0354

Paul and Mukherjee, J Hortic 2017, 4:3
DOI: 10.4172/2376-0354.1000203

Short Communication Open Access

Cypselar Anatomy of Two Species of the Tribe *Anthemideae*, Family *Asteraceae*

Sourav Paul* and Sobhan Kumar Mukherjee

Department of Life Sciences, Central University of Tamil Nadu, Tamil Nadu, India

Abstract

The family *Compositae* is the largest and most successful among the angiosperms because of its adaptability in wide variety of ecological habitats and the family owes its biological and commercial success to certain morphological, anatomical and physiological characters in their flowers and fruits. The tribe Anthemideae is one of the most primitive tribe of the Asteraceae. The anatomical features of the species have been investigated to establish their potential usefulness in taxonomy. This study is important for showing how the family owes its biological and commercial success to certain morphological, anatomical and physiological characters in their flowers and fruits. The significant anatomical features of cypselas are cypselar shape in T.S., cypselar cuticle, ribs or elevations no., size of the ribs, thickness of cypselar wall (in µm) at ribs and furrow, pericarp thickness (in µm) at ribs and furrow, tissue differentiation of epicarp, epicarpic cell shape, epicarpic cell wall thickness, orientation of epicarpic cell, tissue differentiation of mesocarp, mesocarpic parenchymatous cell, mesocarpic sclerotic braces, mesocarpic vascular bundle, mesocarpic resin cavity, mesocarpic cavity, presence of endocarp, testa thickness (in µm), testal attachment with pericarp, tissue differentiation of testa and layers, cell content of testa, testal cell shape, thick walled cells of testa, crystals and their distribution, testal palisade cells, orientation of testal cells, endosperm in mature cypsela, non–cellular pellicle, nature of mature embryo, resin ducts/secretory ducts in each cotyledon and relative size of the secretory ducts etc., have been examined. These characters of cypselas serve as reliable taxonomic marker in systematic study. Based on these above features, an artificial key is prepared for easy identification.

Keywords: Anthemideae; Compositae; Anatomy

Introduction

The value of cypselar features in the classification *Compositae* has been employed since the work of Schultz Bipontinus (1844 a, b) [1,2]. The *Anthemideae Cass* is one of the premier tribe where the application of morphological and anatomical features of cypselas has been employed for characterization of taxa [3-10]. have been attracted and fascinated by the tribe Anthemideae and have incorporated the characters of cypsela either from morphological or from anatomical observation or both, using light microscope but most of them have not presented any key to the species and genera considering the differences in the morphology of the cypselas. The present paper deals with the detailed studies of cypselas in 2 species under 2 genera, belonging to the tribe Anthemideae, and preparation of a key on that basis for the identification.

Materials and Methods

Dried mature cypselas were procured. Dry cypselas from each species were boiled in water to which few drops of any one compounds, i.e., glycerol, tepol sodium-hypochlorite solution has been added, depending on the natures of pericarp. After that's oftened cypselas were stored in FAA. For each species atleast two mature cypselas were critically studied and all sections were taken usually from middle part of cypselas. FAA preserved cypselas were cleaned in 5-10% KOH solution and stained in a solution of 0.5% aqueous safranin, for the proper identification of vascular bundles in the pericarp. For anatomical study, dry and FAA preserved cypselas were sectioned and were stained in safranin-fast green combination.

Specimens

1. *Artemisia vulgaris* L. KAL-1273.
2. *Chrysanthemum coronarium* L. KAL-104.

Observations

Cypselar anatomy

Artemisia vulgaris L.: Cypsela oval in transection cotyledon plano-convex. Pericarp very thin; consists of unequal rectangular to square thick-walled cells wall of which are dark reddish brown in colour; mucilage cells present throughout the pericarp surface (Endosperm uniseriate).

Chrysanthemum coronarium L.: Cypsela more or less circular in transection; cypsela bi-ribbed; cotyledon plano-convex in outline. Pericarp parenchymatous with resin dusts restricted only at the furrow regions of cypsela.

Testa is represented by uniseriate compactly arranged, rectangular thick–walled sclerotic cells; endosperm uniseriate, containing barrel shaped tangentially elongated cells; endosperm situated beneath the testa (Figures 1 and 2).

Results and Discussion

This tribe has been reviewed from the systematic point of view by Haywood and Humphries (1977). The authors have pointed out the following character of the cypsela as the tribal features:

***Corresponding author:** Sourav Paul, Department of Life Sciences, Central University of Tamil Nadu, Tamil Nadu, India, Tel: +919836595839, +918902783694; E-mail: souravpaul.136@gmail.com

Received July 19, 2017; **Accepted** July 25, 2017; **Published** August 08, 2017

Citation: Paul S, Mukherjee SK (2017) Cypselar Anatomy of Two Species of the Tribe *Anthemideae*, Family *Asteraceae*. J Hortic 4: 203. doi: 10.4172/2376-0354.1000203

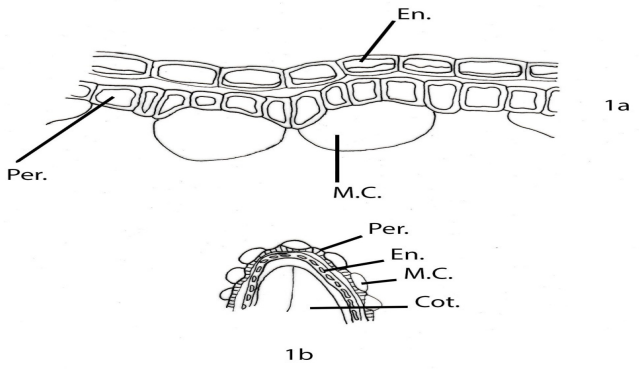

Figure 1: *Artemisia vulgaris* L.: (1a and 1b) Parts of Cypsela Transection.

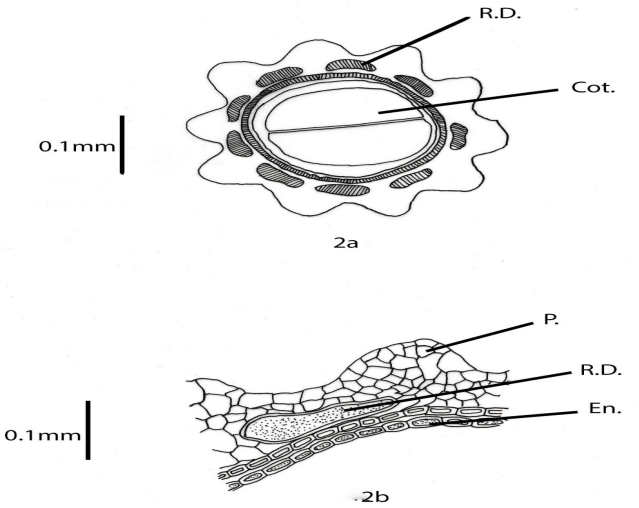

Figure 2: *Chrysanthemum coronarium* L.: (2a) Transsection of cypsela (Diagrammatic); (2b) A part of Cypselar Transsection.

"Cypselas variable; hetero- to homorphic, with 2-10 ribs or 1-3 wings, circular or angled, terets to strongly dorsiventrally to laterally compressed. Pappus are apical palalaceous coronal rim to cup shaped corona, auricle or apical annulus, occasionally absent, with or without pericarp modifications such as myxogenic mucilage cells, secretory canals and other lacunae".

The systematic grouping of the genera of the tribe is complex and some systematic groupings are established in the tribe. Present study deals with only a few species of *Artemisia, Chrysanthemum*. The cypselar structure of the materials studied reveals that in *Artemisia* cypselas are heteromorphic (ray cypselas slightly larger than disc cypselas; no other differences observed), glabrous, very small, ellipsoidal with very fine longitudinal parallel striations; pappus with indistinct undifferentiated *Carpopodium*. Presence of mucilage cells on pericarp is a diagnostic character of Artemisia. In *Artemisia vulgaris* the columnar mucilage cells with bulbous tips are present throughout the cypselar surface.

In studied species of *Chrysanthemum* the cypselas are, ribbed and glabrous.

Presence of myxomatous slime cells or mucilage cells is common diacritical characters of these genera and the tribe Anthemideae. Absence of pappus is also a common feature of *Artemisia*.

Conclusion

Based on the above observations, it can be concluded that the members of the tribe Anthemideae are with diverse macro as well as micro morphological features of cypselas. These characters are a mixture of both primitive and advanced features. However, their value as taxonomic criteria will be greatly increased in combination with other lines of evidence.

References

1. Schultz Bipontinus CH (1844) Ueber die Tanaceteen. Neustadtander Hddrdt.
2. Schultz Bipontinus CH (1844) Anthemideae. In: Webb PB and Berthelot G (eds.) Phytographia Canariensis 1: 244-304.
3. Briquet J (1916) Etudescarpologiquessu rle sgenresde Composeesanthemis, Ormenis et Santolina. Ann Conserv Jard Bot Geneva pp: 257-313.
4. Horvatic S (1963) Genus *Leucanthemum* flora Yugoslavia. Acta Bot Croat Zegreb 22: 203-219.
5. Heywood VH, Humphries CJ (1977) Anthemideae systematic review. Food and Agriculture Organization of the United Nations. AGRIS. In: Heywood VH, Harborne JB, and Turner BL (eds.) The Biology and Chemistry of the Compositae. Academic Press, London 2: 799-830.
6. Kynclova M (1970) Comparative morphology of Achenes of the tribe Anthemideae Cass. (Asteraceae) and its taxonomic significance. Preslia 42: 33-53.
7. Hegi G (1918) Illustrierte Floravo n Mitteleuropa. Wien Munchen 6: 535-544.
8. Giroux M (1933) Note sur la positon systematique *Chrysanthemum cinerarifolium* (Rev.) vis.suivie de quelques remarques sur les characters carpologiques desTanacetum.Bull. Soc Hist Nat Afr Nord 24: 54-62.
9. Mari K (1985) Fruit structure and generic delimitation oi Athanasia (Asteraceae-Anthemideae) and related South African genera. Nord J Bot 5: 527-542.
10. Weberling F, Reese H (1988) On the growth form and fruit anatomy of Salvia Ruiz, and Pav. and Isoetopsis Turcz. (Compositae). Peitr Biol Pflanz 63: 289-312.