



**CYPSELAR CHARACTERS OF SOME SPECIES OF THE TRIBE- SENECEONEAE
(ASTERACEAE), ON THE BASIS OF MORPHOLOGICAL STUDY**



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Abstract

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This paper deals with the detail morphological structures of mature cypselas of some species (*Senecio ovatus* (Walter) MacMill.; *Doronicum grandiflorum* Lam.; *Homogyne alpina* Cass.) of the tribe- Senecioneae, with the help of light microscope. Morphologically, special emphasis has been given on some exomorphic features including number, shape and size of the ribs and furrows; distribution and types of surface twin hairs; structure and thickness of cells in carpodia and type and distribution of pappus bristles.

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INTRODUCTION

The Senecioneae is cosmopolitan, (Bremer, 1996) and one of the largest tribes in the family Asteraceae with 100 genera (Nordenstam, 1977, Jeffrey, 1992) and 3,400 species (Hind, 1993). In this tribe secondary compound (pyrrolizidine alkaloids) is present (Mabry and Bohlmann, 1977). Exomorphic character of cypselas have been applied for better identification purposes in conventional taxonomic description of different genera and species of the tribe Senecioneae (Nordenstam 1977, Jeffrey and Chen 1984, Hind 1993). The purpose of the present study is to show the detail morphological characters of studied cypselas.

MATERIALS AND SOURCES:

Mature, identified, disease free cypselas were collected from foreign Herbarium, which are given in the table- 1

Methods:

Morphological study

For morphological study, cypselas were softened by boiled in water, then they were soaked in 2N KOH solution for one to three days depending on the amount of mechanical tissue within the pericarp. Softened cypselas were crushed "and

stressed for measurement of relative thickness of ribs and furrows. Different parts of cypselas were mounted in phenol glycerine after staining with 0.1% aqueous safranin solution.

RESULTS

Doronicum grandiflorum

Morphology (Fig. 1 D-G)

Cypselas heteromorphic. Ray cypselas 9 mm x 1 mm including pappus, 4 mm x 1 mm excluding pappus, yellow brown, narrow oblong, straight, upper part truncate whereas lower part tapered. Disk cypselas 6mm x 0.5 mm including pappus, 3 mm x 0.5 mm excluding pappus, yellow brown, linear, straight. More or less rounded in cross section. Surface pubescent. Surface hair inclined in orientation with the cypselar wall, made up of body and basal cells, approximately 30 μ in length. The tip portion of body cells are arranged in different plain. Surface containing 11 ribs, conspicuous, alternating with furrow. Furrows wider than ribs. At the upper portion of cypselas, pappus present; homomorphic, represented by 35-42 barbellate pappus bristles, unequal in

length, white yellow in colour. At the upper portion of cypsela, stylopodium present, inconspicuous, fully immersed in the nectary. At the basal region of cypsela, carpodium present, same as the diameter of the base of cypsela, basal in position, symmetric, complete ring like. Carpodial cells with thick - walled, square, large, not pitted, arranged in single row.

Homogyne alpina

Morphology (Fig 1 H-J)

Cypsela homomorphic, 10 mm x 0.5 mm including pappus, 5 mm x 0.5 mm excluding pappus, dark brown, oblong-linear, straight, tapered at both the ends, rounded in cross sectional configuration. Surface rough and glabrous, containing 8 ribs, alternating with furrow. Furrows wider than ribs. At the upper portion of cypsela, stylopodium present; inconspicuous, fully immersed in to the nectary. Pappus homomorphic, represented by 35-40, unequally arranged, barbellate pappus bristles, white, arranged in single circle. At the basal region of cypsela, carpodium present; narrow than the base, symmetric, ring like. Carpodial

cells with thick walled, not pitted, large, barrel shape, arranged in single circle.

Senecio ovatus

Morphology (Fig 1 A-C)

Cypsela homomorphic, 5 mm x 1 mm, yellow brown, oblong, slightly curved, upper part truncate whereas lower part tapered, ellipsoidal in cross sectional configuration. Surface rough and glabrous, containing 9 ribs, alternating with furrow. Furrows wider than ribs. The distance between 2 ribs 6 μ . Surface hair absent. At the upper part of cypsela, stylopodium present; enlarge, dome shape, partially immersed in the nectary. At the upper part of cypsela, pappus absent. At the basal part of cypsela, carpodium present, narrow than the base, ring like. Carpodial cells with thick-walled, more or less quadrangular, small, not pitted, arranged in 3 rows.

DISCUSSIONS

Three species of the tribe Senecioneae have been studied to observe the detail morpho-anatomical characters of cypselas. In the cypsela of *Doronicum grandiflorum*, heteromorphism is present whereas in remaining studied cypselas are

homomorphic in nature. In the cypselas of studied species, shape, size, colour etc. are also variable. Though, any one character among them is not an important morphological character. Presence of pappus bristles is an important morphological character. The function of pappus is to the dispersal of cypselas of Asteraceae. Another function of pappus structure is the protection against predation on the fruits or ovaries, as discussed by Stuessy & Garver (1996). The pappus structure is also variable in the family Asteraceae. It may be scabrid setose, simple setose, serrulate setose, barbellate setose, plumose setose, paleaceous setose etc. Among the studied cypselas, in case of the cypselas of *Doronicum grandiflorum* and *Homogyne alpina*, barbellate pappus bristles are present whereas in case of the remaining cypselas (*Senecio ovatus*) pappus is absent. The pappus is a taxonomically important and useful organ

in Asteraceae, as noted by many synantherologists including, of course, Cassini (e.g., 1827). Stylopodium is another morphological character which is present at the upper part of cypselas. It is actually the modified style base. In the cypselas of *Senecio ovatus*, stylopodium is enlarged and dome shape. In the cypselas of remaining studied species, stylopodia are inconspicuously developed. At the basal region of cypselas, carpopodium is present. It is a meristematic zone, by which; cypselas is attached with thalamus. In case of the studied cypselas, carpopodia are always symmetric and carpopodial cells are varies from 1-3 rows. From the above morphological observations, we can clearly separate the studied cypselas.

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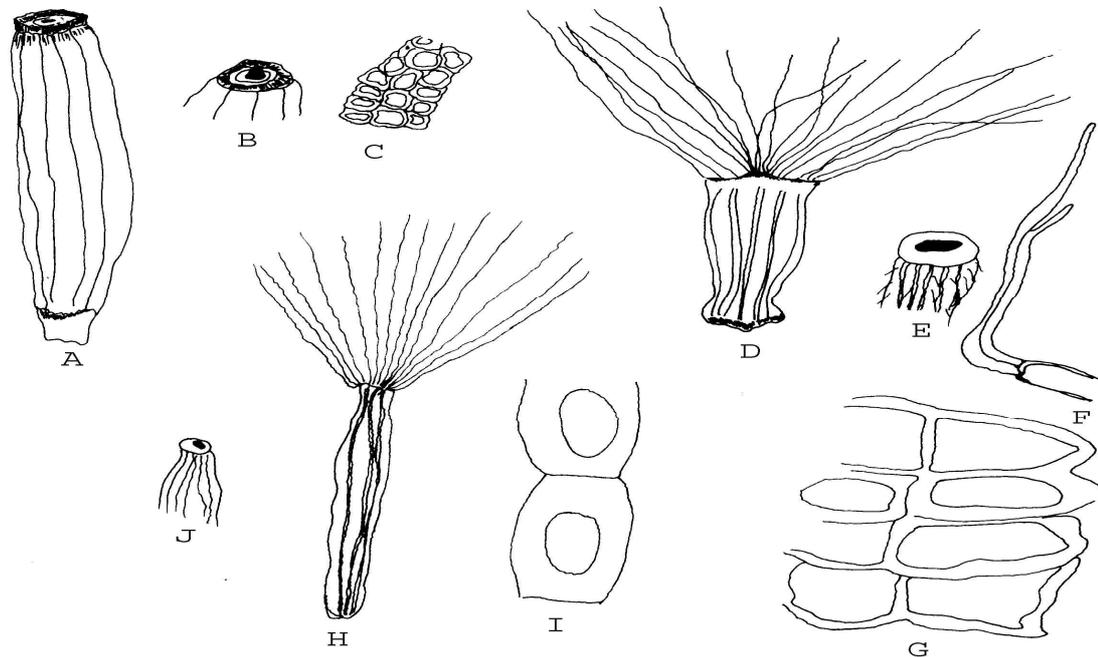


Fig. 1. Different morphological parts of cypsels
 A-C- *Senecio ovatus*: A-Cypsela, B-Upper part, C-Carpopodial cells; D-G-*Doronicum grandiflorum*: D-Ray cypsela, E-Basal part, F-Surface hair, G-Carpopodial cells; H-J-*Homogyne alpina*: H-Cypsela, I-Carpopodial cells, J-Basal part of cypsela.

————— C, F, G, I. 0.05 mm
 ————— A, B, D, E, H, J. 1mm

Table 1

Materials	Sources
1. <i>Doronicum grandiflorum</i> Lam.	Botanischer Garten der Universität Zurich (Z). CHOZ 20031709
2. <i>Homogyne alpina</i> Cass.	Botanischer Garten der Universität Zurich (Z). CHOZ 20042004
3. <i>Senecio ovatus</i> (Walter) MacMill.	Botanischer Garten der Universität Zurich (Z). CHOZ- 20080790

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