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STUDY ON ACHENE MORPHOLOGY OF FIVE SPECIES OF *SPILANTHES* Jacq. (HELIANTHEAE) COMPOSITAE FROM SOUTH INDIA

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Achene morphology of five species of *Spilanthes* Jacq. is investigated by light microscopy and scanning electron microscopy. Characters studied are highly useful as a taxonomic tool for delimiting the taxa, both at generic and species level. Based on the characters studied an artificial key for the closely related species of *Spilanthes* Jacq. is provided.

Key words: Achene morphology, Delimitation of taxa, LM and SEM

Spilanthes Jacq. with 30-40 species, is mainly distributed along the new and old world tropics. The genus *Spilanthes* Jacq. is represented by five species in India (Sivarajan and Mathew 1984, Sivarajan and Ramesan 1987).

Many workers (Dittrich 1966, 1968, 1970, Kynclova - Petrocyova 1970, Borgen 1972, Chaudhary and Pandey 1995) have considered achene characters for segregation of species. According to Kynclova Petrocyova (1970) the general shape of achenes, the presence or absence of wings, carinac, ribs and border, and the colour are all reliable and stable distinguishing characters. Dittrich (1968) found that the shape of carpogonium ,the hairiness of the fruit are important characters for the identification of genera.

The identification of some species of *Spilanthes* Jacq. is problematic due to their morphological plasticity . In the present study both light as well as scanning electron microscopic studies were done with a view to explore more characters of individual taxa and to assess and establish the taxonomic significance of them.

MATERIALS AND METHODS

Achenes of five species of *Spilanthes* Jacq. were collected and examined under the light microscope and scanning electron microscope. Mean values of characters of twenty five achenes were presented for light microscopic studies . For SEM, the specimens were mounted on specimen stub using double sided sticky tape, coated with gold in vacuum coater and viewed with Hitachi S -450 stereo scan and photographed.

RESULTS

In the present investigation, shape of the fruit, nature of pappus, position of carpogonium, and surface sculpturing varies in different species studied (Table 1, Fig.1). Colour of achene is black., monomorphic in *S.oleracea* L. and *S.calva* DC. and dimorphic in the other three species studied. In dimorphic achenes, marginal ones are trigonous and inner ones are laterally compressed. Length, breadth, and pappus length of achenes also varies (Table 2). Pappus: epappose in *S. calva* DC., modified into bristles in four species; margin of the achene eciliate in *S. calva* DC., and ciliated in all other four species. Surface reticulate in *S. radicans* Jacq., ridged in *S. oleracea* L. and striate in other three species.

DISCUSSION

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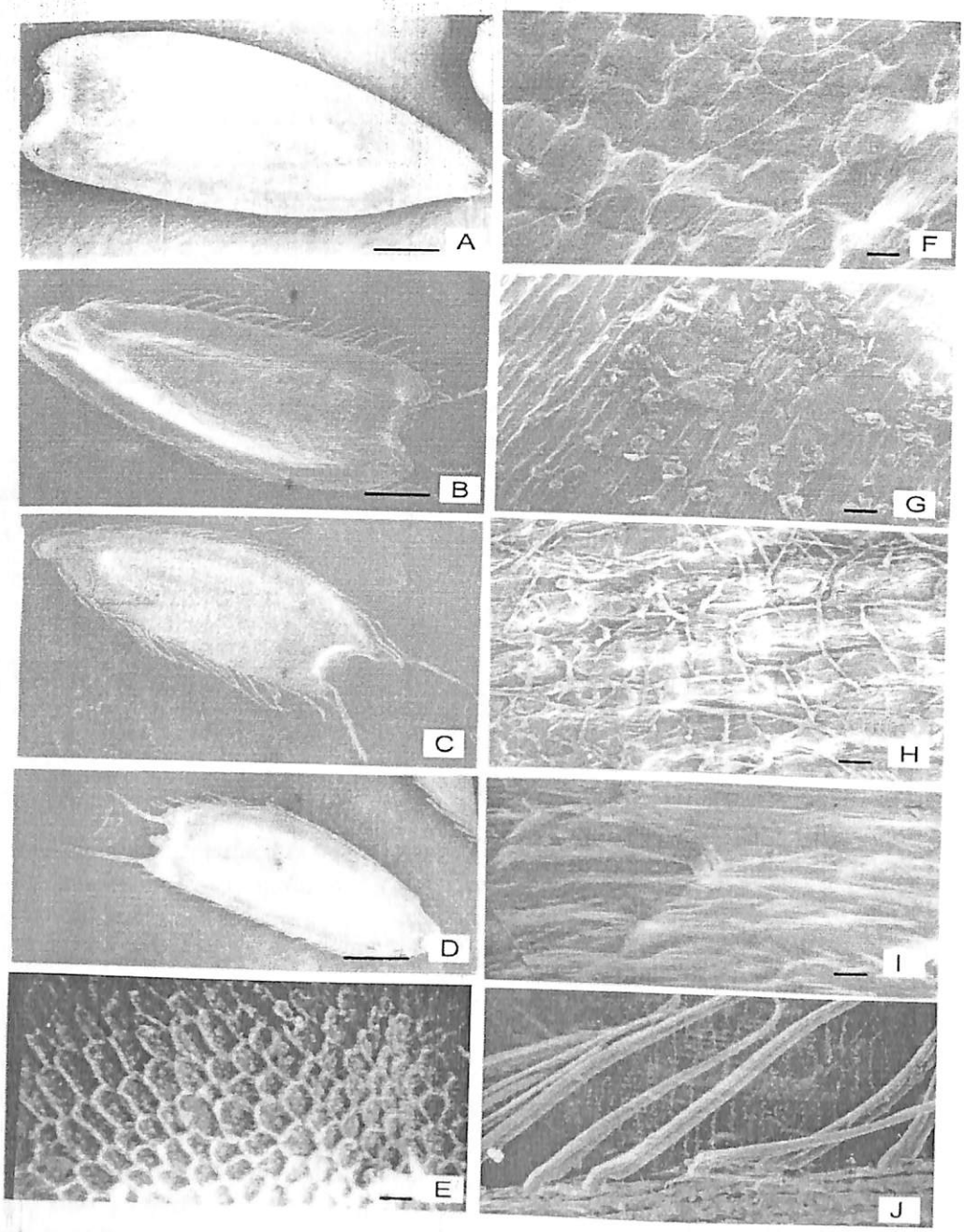

Fig. 1

Figure.1. Achenes of *Spilanthes* Jacq. A – *S. calva* DC.; B – *S.uliginosa* Sw; C – *S. radicans* Jacq. ; D – *S. oleracea* L. (scale bars = A&D = 0.5cm; C & B = 0.25cm). E – *S. ciliata* H.B.K. – surface hexagonal reticulum; F – *S. calva* DC. – surface striate; G – *S. uliginosa* Sw. – surface ridged with verrucate projections; H – *S. radicans* Jacq. – surface tuberculate; I – *S. oleracea* L. – surface striate; J – *S. radicans* Jacq. – cilia with bulbous base and bifurcated ends. (scale bars = E – I, 5µm).

Table 1. Qualitative features of achenes of five species of *spilanthes* Jacq.

Sl. No.	Name of the Taxa	Shape of Fruit	Colour	Nature of pappus	Surface sculpturing	Carpogonium	Achenes
1.	*Spilanthes calva* DC.	Obcordate	Black	Epappose	Striate	Basal, obliquely placed at the proximal end	Monomorphic, laterally compressed
2.	*Spilanthes ciliata*.H.B.K.	Oblong	Black	Bristles	Striate	Basal	Dimorphic, marginal ones trigonous, inner ones laterally compressed
3.	*Spilanthes oleracea* L.	Obcordate	Black	Bristles	Ridged	Basal, oblique, la-longate	Monomorphic, laterally compressed
4.	*Spilanthes radicans* Jacq.	Ellipsoid	Black	Bristles	Reticulate	Marginal	Dimorphic, marginal ones trigonous, inner ones laterally compressed
5.	*Spilanthes uliginosa* Sw.	Oblong	Black	Bristles	Striate	Basal, obliquely placed	Dimorphic, marginal ones trigonous, inner ones laterally compressed

Table 2. Quantitative data of achenes of five species of *Spilanthes Jacq.*

Sl no.	Name of the taxa	Length(mm)	Breadth(mm)	Pappus length(mm)
1	*Spilanthes calva* DC.	2.92±0.12	1.25 ± 0.01	Epappose
2	*Spilanthes ciliata* .H.B.K.	2.19 ± 0.24	0.82± 0.03	0.5 ± 0.01
3	*Spilanthes oleracea* L.	2.75 ± 0.03	0.92 ± 0.12	1.25 ± 0.2
4	*Spilanthes radicans* Jacq.	2.18 ± 0.14	0.83 ± 0.09	0.83 ± 0.08
5	*Spilanthes uliginiosa* Sw.	1.49 ± 0.02	0.71 ± 0.07	0.14 ± 0.06

The morphological characters such as shape, colour, position of carpogonium, nature of pappus and surface sculpturing patterns are usually stable and reliable and hence they are taken into consideration for taxonomic treatment (Saklani *et al.* 2000).

Achene morphological studies furnish valuable data for formulating the systematic and evolutionary concepts in angiosperms and for differentiating closely related species of the genera. Based on the achene morphological evidences of the present work, an artificial key is provided for the taxa under study.

Key to the species

Achenes dimorphic
Carpogonium basal
Margins ciliate
Size-2.19mm×0.8mm
Pappus bristles 2-3; 0.5mm in length
Surface striate *S. ciliata* H.B.K

Size-1.49mm×0.71mm
Pappus bristles 2-3; 0.14mm in length
Surface ridged, at places verrucate
S. uliginosa Sw.

Carpogonium marginal
Size-1.8mm×0.83mm
Pappus bristles 2-3; 0.83mm in length
Surface tuberculate
S. radicans Jacq.

Achenes monomorphic
Carpogonium basal
Margins eciliate

Size 2.92mm×1.25mm
Surface striate with cavae placed end to end
—*S. calva* DC.

Margins ciliate
Size-2.75mm×0.92mm
Pappus bristles 2; 1.25mm in length
Surface striate, stria
narrow and lirae broad
—S.*oleracea* L.

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