

Pollen Morphology of Genus *Thunbergia*

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Abstract

A Study on the pollen morphology of 6 species of *Thunbergia* from the family Acanthaceae has been undertaken. The aperture type and sculpturing pattern of each pollen grain have been examined by light microscope. The pollen grain of spheroidal shape, faintly reticulate exine ornamentation and spiraperatureate aperture type are found in this genus. The pollen morphology, an artificial key and colour photographs of each species are presented.

Keywords : Pollen morphology, *Thunbergia*

Introduction

The family Acanthaceae belonging to the order Scrophurlariales is one of the large family of flowering plants. Members of this family is widely distributed in tropical to subtropical and temperate regions, gowing especially in damp or marshy places. The most plants are herbs, shrubs, often twining and rarely trees.

The identification of family Acanthaceae depend on the tumid at the node, opposite and decussate leaves, characters of bracts (size and form), zygomorphic flowers, corolla (Shape), numbers of stamens, equal or unequal level of the anther lobe, the anthers with or without spurred and bilocular capsule with seeds are situated upon hook-like projections called retinacular. Many species have extremely showy flowers and a number are cultivated for their beauty.

Pollen are male gamete which produced in the anther of flower to carry out the gametophytic generation of flowering plants. Pollen is one the best resistant of plant material to various kinds of treatment. It situated unchanged their structure and sculpture for millions of year although they are deposited in the soil.

Pollen grains can be divided into groups on the basic of aperture type, number, position and sculpturing pattern of exine. There are two types of aperture, namely circular pores (Pori) and elongate furrows (colpi).

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Pollen grains which possess pores called porate and those with furrows are colpate. Colporate pollen grains which both pores and furrows (a circular pore in the center of a furrow).

The pollen grains are described by the shape of their outline in polar and equatorial view, which pollen may be spheroidal, elliptic, triangular and quadrangular. The wall of pollen grain is composed of two layers, an inner soft layer, intine and an outer hard layer, exine.

The present study focus on type, shape, size, sculpture of pollen of 6 species of genus *Thunbergia*. Thus, this research is carried out to the information of pollen morphology that will be useful in plant identification.

Materials and Methods

1. Collection of Plant Material

These plants were collected from some areas of Upper Myanmar. All the collected specimens were photographed while the flowering times and then identified by using the literature; Backer (1965), Dassanayake (1998), Hooker (1885) and Small (1933).

2. Collection of Pollen Samples

The fresh pollen were stored in small glass vials with 1 cc of glacial acetic acid and labelled the specimens.

3. Acetolysis of Materials

All these pollen samples were acetolysed by acetolysis method (Erdtman, 1952). The glass vial with pollen specimens were crushed with a glass rod and 1cc acetic acid was added to it. Then, the mixture was heated in a water-bath for 15-30 minutes. The mixture was allowed to cool and was diluted with distilled water and transferred into a centrifuge tube and then centrifuged for 15-30 minutes. After centrifuged, the distilled water was decanted and glycerine jelly with suffranin was added to the samples.

4. Preparation of Slide

The sample bottle was warmed in a water bath and stirred with a glass rod. A drop of melted glycerine jelly was placed on a glass slide and then covered with a glass cover slip. The glass slide was mounted with pollen sample was examined by using light microscope with 40 X and imaged by Canon A 710. The micrometer was used to measure the size of pollen grain and recorded. Twenty pollen grain per sample were measured. The terminology used in the identification of pollen are referred to Erdtman (1952), Erdtman (1969), Moore & Webb (1978), Hoen (1999) and Paldat (2005).

Results

Six species of genus *Thunbergia* belonging to the family Acanthaceae had been identified and studied the morphological characteristic of pollens.

An Artificial key to the Pollen Morphology

1. Intercolpi space more than 26 μ wide ----- *Thunbergia grandiflora*
1. Intercolpi space less than 20 μ wide ----- 2
 2. Pollen grain less than 65 μ in diameter ----- 3
 2. Pollen grain more than 75 μ in diameter ----- 4
3. Intercolpi space less than 9 μ wide ----- *T. alata*
3. Intercolpi space more than 11 μ wide ----- *T. fratrans*
 4. Exine more than 6 μ thick ----- *T. laurifolia*
 4. Exine less than 4 μ thick ----- 5
5. Sexine as thick as nexine ----- *T. wightiana*
5. Sexine thicker than nexine ----- *T. affinis*

Pollen Morphology of Study Species

1. *Thunbergia affinis* S. Moore (Fig. 1. A,B)

Spiraperturate, spheroidal, 68-73 μ in diameter; the colpi spirally arranged over the pollen grain, about 2.7 μ wide; intercolpi space about

17 μ wide; exine about 2.5 μ thick, sexine thicker than nexine; sculpturing obscurely reticulate.

Location : Mandalay Division, Chan-aye-thar-zan Township

2. *Thunbergia alata* Boj. (Fig. 2. A,B)

Spirapeturate, spheroidal, 50-60 μ in diameter; the colpi spirally arranged over the pollen grain, about 4 μ wide; intercolpi space about 9 μ wide; exine about 2.5 μ thick, sexine thicker than nexine; sculpturing obscurely reticulate.

Location : Northern Shan State, Hsipaw Township

3. *Thunbergia fragrans* Roxb. (Fig. 3. A,B)

Spirapeturae, spheroidal, 58-60 μ in diameter; the colpi spirally arranged over the pollen grain, about 2.5 μ wide; intercolpi space about 12 μ wide; exine about 3 μ thick, sexine thicker than nexine; sculpturing obscurely reticulate.

Location : Mandalay Division, Pyinoolwin Township

4. *Thunbergia grandiflora* (Roxb. ex Rottl.) Roxb. (Fig. 4. A,B)

Spirapeturae, spheroidal, 88-100 μ in diameter; the colpi spirally arranged over the pollen grain, about 3.5 μ wide; intercolpi space about 27 μ wide; exine about 7 μ thick, sexine thicker than nexine; sculpturing obscurely reticulate.

Location : Northern Shan State, Hsipaw Township

5. *Thunbergia laurifolia* Lindl. (Fig. 5. A,B)

Spirapeturae, spheroidal, 80-90 μ in diameter; the colpi spirally arranged over the pollen grain, about 3.5 μ wide; intercolpi space about 19 μ wide; exine about 6 μ thick, sexine thicker than nexine; sculpturing obscurely reticulate.

Location : Mandalay Division, Pyinoolwin Township; Kachin State, Banmaw Township

6. *Thunbergia wightiana* T.Anders. (Fig. 6. A,B)

Spirapeturae, spheroidal, 73-80 μ in diameter; the colpi spirally arranged over the pollen grain, about 3 μ wide; intercolpi space about 19.5 μ wide; exine about 3.5 μ thick, sexine thicker than nexine; sculpturing obscurely reticulate.

Location : Mandalay Division, Pyinoolwin Township

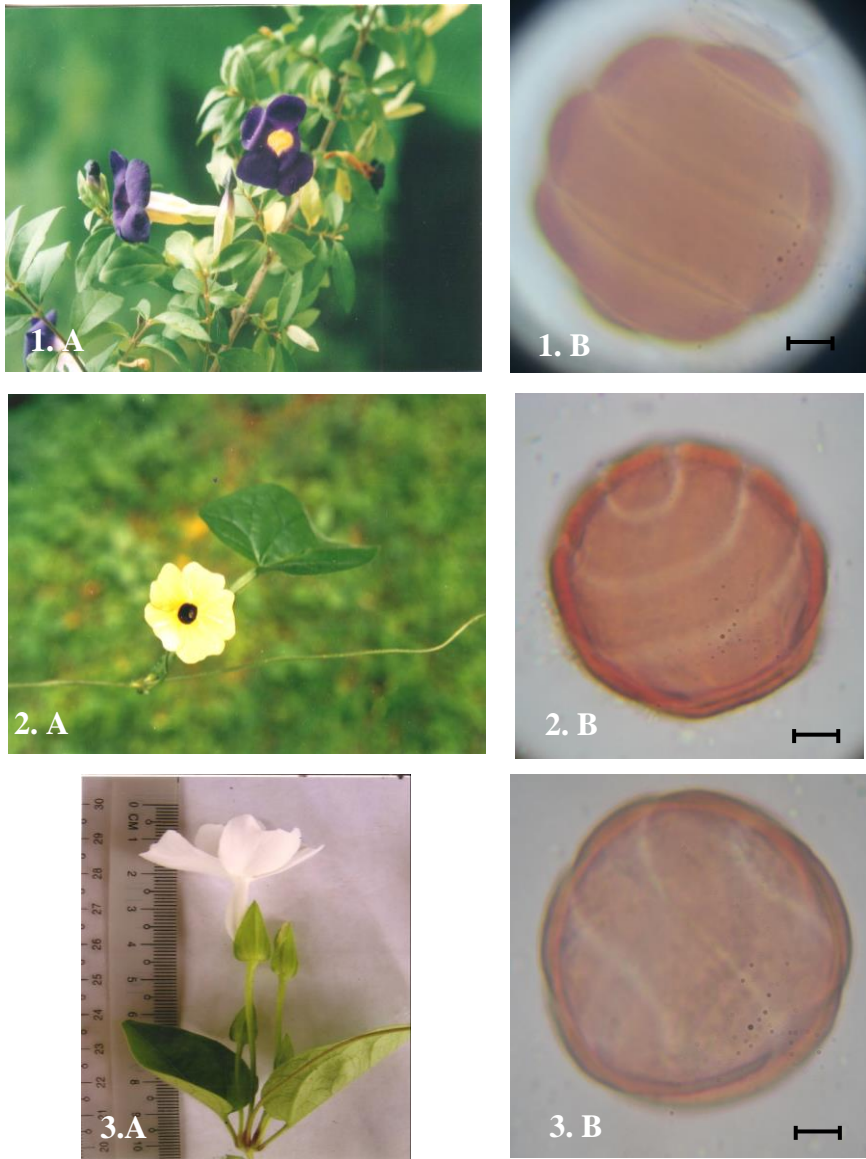


Figure 1. A. Inflorescences, B. Surface view of *Thunbergia affinis*

Figure 2. A. Inflorescences, B. Surface view of *T.alata*

Figure 3. A. Inflorescences, B. Surface view of *T. fragrans*

Scale bar = 10 μ

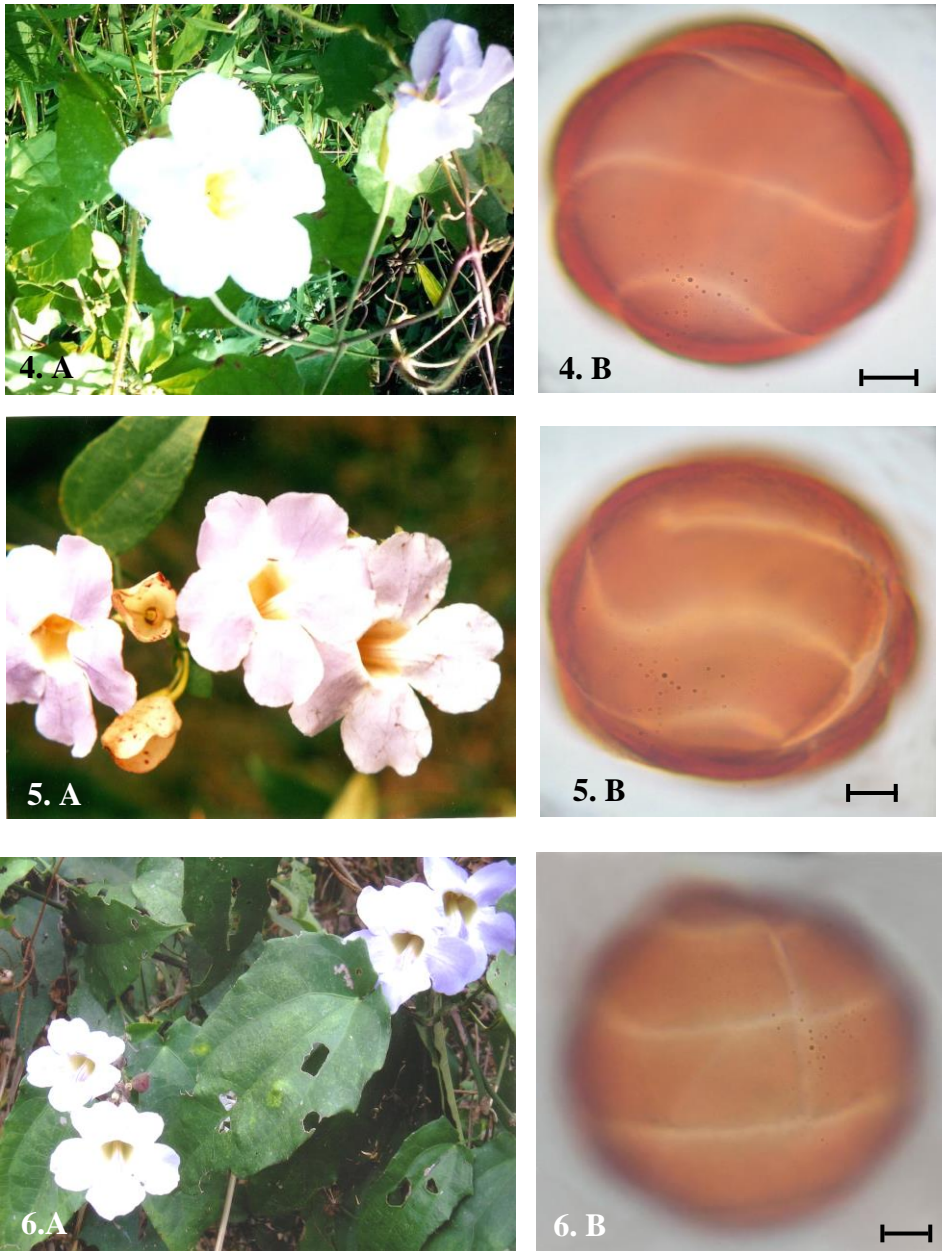


Figure 4. A. Inflorescences, B. Surface view of *Thunbergia grandiflora*

Figure 5. A. Inflorescences, B. Surface view of *T. laurifolia*

Figure 6. A. Inflorescences, B. Surface view of *T. wightiana*

Scale bar = 10 μ

Discussion and Conclusion

In the present paper, six *Thunbergia* species of pollen morphology from family Acanthaceae has been studied. The pollen grain morphology was described by aperture type, number, position, grains size, shape and sculpturing.

The genus *Thunbergia* possess syncolpate (spiaperturate) in which the colpi are spirally arranged over the pollen grain. In *Thunbergia*, the faintly reticulate exine sculpture are observed. The spheroidal shape of pollen grains are found in all species of *Thunbergia* and the grains size are range from 50-100 μ in diameter.

The smallest intercolpi space is found in *T. alata* and the largest ones are *T. grandiflora*. Except the *T. wightiana* and the rest species of *Thunbergia* are sexine thicker than nexine.

From this results, the use of pollen morphology of *Thunbergia* give as a source of an information on the systematic studies.

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