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## COMPARATIVE PALYNOLOGICAL STUDY FOR THE SPECIES OF THE GENERA *ANASTATICA*, *ANCHONIUM*, *AUBREITA*, *BARBAREA* AND *CORONOPUS* IN IRAQ

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### ABSTRACT

Pollen morphology of 7 species belonging to 5 genera of the tribes Euclideae, Hesperideae, Mathioleae, Arabideae and Lepidieae from Brassicaceae family were investigated using light and scanning electron microscope. The study showed that the pollen grains are a stenopalynous have tricolporate to tetracolporate in *Anchonium elichrysifolium*. The ornamentation is reticulate and the shape is spheroidal in equatorial view and oblate to spheroidal in polar view. The study reported also little differences in quantitative characters between all species studied.

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### INTRODUCTION

Brassicaceae is a cosmopolitan family occurring mainly in north temperate regions of the world. In Iraq it is represented by approximately 80 genera and 2000 species (Hedge and Lamond, 1980 and Townsend., 1980). A number of investigators dealt with pollen grains of Brassicaceae like Erdtman (1963), Sharma and Nair (1973), Abdel Khalik *et al.*, (2002), Perveen *et al.*, (2004), Arora and Modi (2011) and Keshavazi *et al.*, (2012) and Kaya *et al.*, (2017) recorded that the predominant pollen type is tricolpate, little is tetracolpate, rare is aperturate. The ornamentation type is reticulate, microreticulate or coarsely reticulate (Rollins and Banerjee, 1979; Lahham and El-Eisawi, 1987; Abdel Khalik *et al.*, 2002). The aim of the present paper is to describe the pollen morphological traits and use obtained data in distinguish of species studied.

### MATERIALS AND METHODS

Pollen samples used for this study was based on the herbarium materials obtained from National Herbarium of Iraq (BAG).

The observations for light microscope were prepared by the method of Al-Mayah (1989) as follows: Closing flowers were moistening by tap water for 2-5 minutes. Then opened by fine needles in a drop of glycerin and Saffranin stain (1:1). Slides were prepared for 10-20 grains and photographed by digital microscope camera. For scanning electron microscopy observations pollen grains mounted on slides with a double sticky tape. Prepared stubs were sputter-coated with gold in 2 minutes Sputter coating Then the slides were examined with Scanning electron microscope

### RESULTS AND DISCUSSION

***Anastatica hierochuntica*:** The mean of equatorial and polar diameter is 53.25  $\mu\text{m}$  X 39.0  $\mu\text{m}$ . 3-colporate with reticulate ornamentation. Mean of exine thickness is 3.2  $\mu\text{m}$ . Porus diameter ranges from (3.75-12.5)  $\mu\text{m}$  (Table 1). Shape of pollen grains in equatorial view is spheroidal and oblate – spheroidal in polar view (fig.1).

***Anchonium elichrysifolium*:** The mean of equatorial and polar diameter is 45.0  $\mu\text{m}$  X 37.5  $\mu\text{m}$ . 4-colporate with

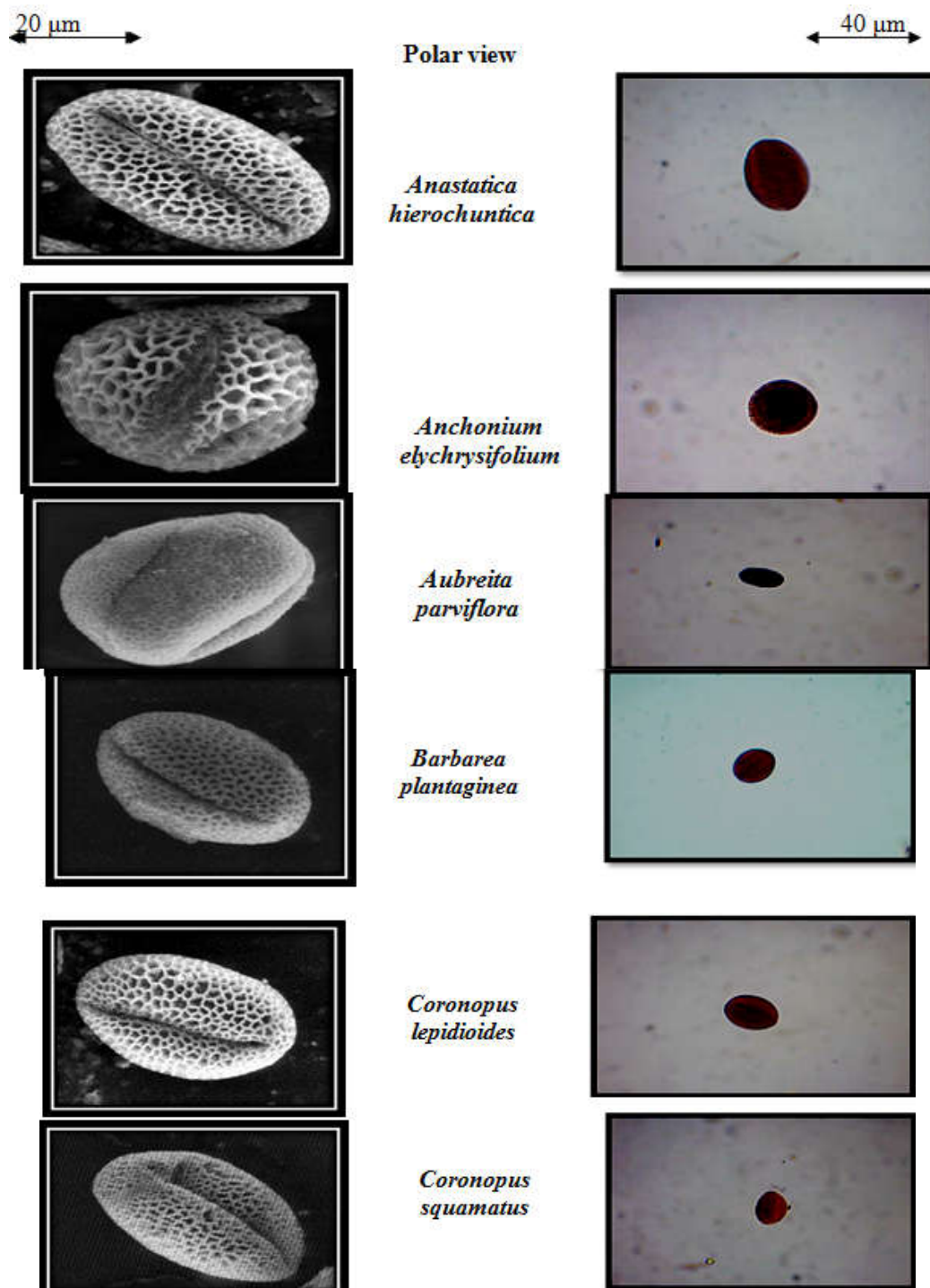


Fig. 1. Variations in the shapes and dimensions of pollen grains in the species under study

reticulate ornamentation. Mean of exine thickness is 3.2  $\mu\text{m}$ . Porus diameter ranges from (3.0-9.5)  $\mu\text{m}$  (Table 1). Shape of pollen grains in equatorial view is spheroidal and oblate – spheroidal in polar view (Fig.1).

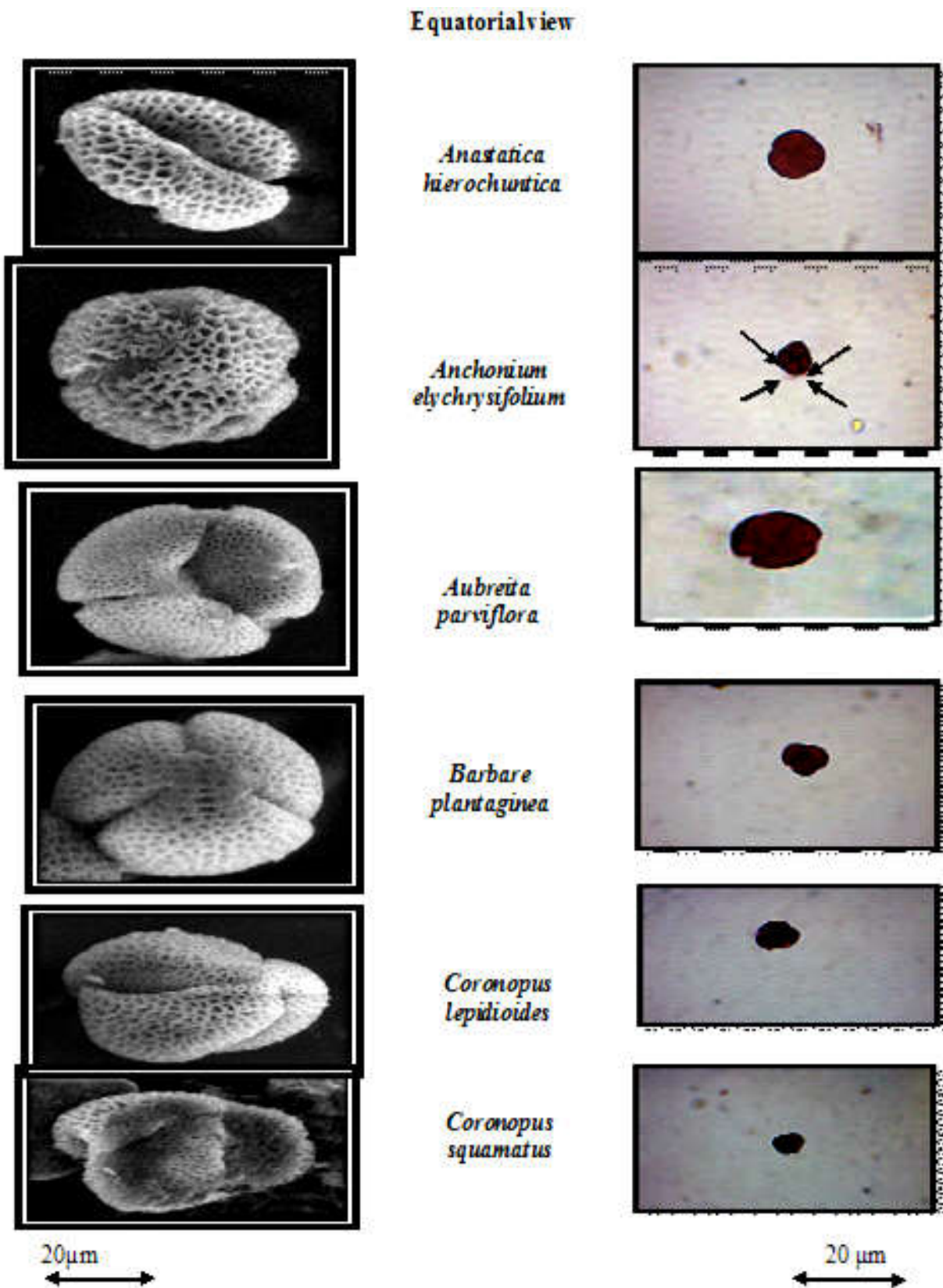
***Aubreita parviflora*:** The mean of equatorial and polar diameter is 46.5  $\mu\text{m}$  X 47.0  $\mu\text{m}$ . 3-colporate with reticulate ornamentation. Mean of exine thickness is 2.3  $\mu\text{m}$ . Porus diameter ranges from (5.5 -10.5)  $\mu\text{m}$  (Table 1). Shape of pollen grains in equatorial view is spheroidal and oblate – spheroidal in polar view (fig.1).

***Barbarea plantaginea*:** The mean of equatorial and polar diameter is 48.5  $\mu\text{m}$  X 44.75  $\mu\text{m}$ . 3-colporate with reticulate ornamentation. Mean of exine thickness is 3.5  $\mu\text{m}$ .

Porus diameter ranges from (2.0 -4.0)  $\mu\text{m}$  (Table 1). Shape of pollen grains in equatorial view is spheroidal and oblate – spheroidal in polar view (fig.1).

***Coronopus lepidioides*:** The mean of equatorial and polar diameter is 47.0  $\mu\text{m}$  X 45.73  $\mu\text{m}$ . 3-colporate with reticulate ornamentation. Mean of exine thickness is 1.15  $\mu\text{m}$ . Porus diameter ranges from (3.5 -5.5)  $\mu\text{m}$  (Table 1). Shape of pollen grains in equatorial view is spheroidal and oblate – spheroidal in polar view (fig.1).

***Coronopus squamatus*:** The mean of equatorial and polar diameter is 59.31  $\mu\text{m}$  X 55.25  $\mu\text{m}$ . 3-colporate with reticulate ornamentation. Mean of exine thickness is 2.4  $\mu\text{m}$ . Porus diameter ranges from (5.0 -10.0)  $\mu\text{m}$  (Table 1).



**Fig(2): Variations in the shapes and dimensions of pollen graine in the species under study**

Shape of pollen grains in equatorial view is spheroidal and oblate –spheroidal in polar view (fig. 1).

**DISCUSSION**

Erdtman (1952) demonstrated that the pollen grains of Brassicaceae is stenopalynous and our results agreed with him. Arora and Modi (2011) recorded reticulate ornamentation in different species of Brassicaceae and this congruent with our

study. The number of aperture is a useful character in distinguish between species which were divided on this basis into two groups, the first one included *Anastatica hierochuntica*, *Aubreita pariviflora*, *Barbarea plantaginea*, *Coronopus lepidioides* and *Coronopus squamatus* which have 3-colporate pollen grains, the second group consist of *Anchoonium elychrysiifolium* only which has 4-colporate pollen grains, this result disagree with Lahham and Al-Eisawi who reported inaperturate pollen grains in *Anastatica hierochuntica*

Table 1. Quantitative characteristics of pollen grain in the species under study measured by micrometer ( $\mu\text{m}$ )

Species	Diameter of Polar axis	Diameter of Equatorial axis	P/E	Exine thickness	Diameter of perus
<i>Anastatica hierochuntica</i>	(28.0-52.0) 39.0	(40.0-62.5) 53.25	0.73	(2.0-3.5) 3.25	(3.75-12.5) 8.12
<i>Anchonium elychnisifolium</i>	(27.6-51.0) 37.5	(32.5-60.0) 45.0	0.83	(2.1-2.5) 3.2	(3.0-9.5) 6.5
<i>Aubreita parviflora</i>	(37.0-55.5) 47.0	(32.5-60.5) 46.5	1.01	(1.5-2.5) 2.25	(5.5-10.5) 8.5
<i>Barbarea plantaginea</i>	(20.0-50.5) 44.75	(40.5-52.0) 48.5	0.92	(3.0-4.5) 3.5	(2.0-4.0) 3.0
<i>Coronopus lepidioides</i>	(29.5-42.0) 45.73	(30.0-60.0) 47.0	0.97	(2.5-2.25) 3.15	(3.5-5.5) 5.5
<i>Coronopus squamatus</i>	(40.0-60.0) 55.25	(35.5-42.5) 59.31	0.93	(1.5-4.0) 2.58	(5.0-10.0) 7.25

and Abdel Khalik *et al.*, (2002) who reported 3-colpate in the same species but agreed with Zhen (1989) who recorded tricolporate or tetracolporate pollen grain in different species of Brassicaceae. The study revealed minor differences in equatorial and polar diameters, *Barbarea plantaginea* and *Coronopus lepidioides* in general have the highest pollen size compares with *Anchonium elychnisifolium* which has the smallest pollen size (table 1). Rollins and Banerjee (1979) reported spheroidal shape of pollen grains of Brassicaceae and our results congruent with this character.

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