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Research Article

POLLEN MORPHOLOGY INVESTIGATIONS OF ECONOMICALLY IMPORTANT *Koelreuteria paniculata* L. (Sapindaceae) TAXON GROWING IN ESKİŞEHİR

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ABSTRACT. Pollen morphology of *Koelreuteria paniculata* L. (Sapindaceae) taxon, which is used for landscaping in Eskişehir province, were investigated by means of light and scanning electron microscopy microphotographs. The investigated *Koelreuteria paniculata* pollen grains are tricolporatae type and sphaeroidal shaped. Exine was seen to be tectatae-striatae-perforatae ornamentation. As a result of microscopic examinations, the distinctions between taxa were revealed statistically. Comparisons were performed between studied taxa will make contribution to the taxonomy for classification of *Koelreuteria paniculata* taxon.

Keywords: *Koelreuteria paniculata, pollen morphology, Eskişehir, Turkey*

INTRODUCTION

Palinology has clear contributions in the phylogenetic relationships of plants. Plant systematists have taken into account their palynological features as well as their morphological, anatomical and ecological features in determining and classifying plants. Owing to to the morphological features of pollen grains, classification of many plant families has been made more accurate today and the origins of these families have been better understood.

The classification of pollen grains is made according to their shape, structure, and exine ornamentation. In this respect, ornamentation of the exine membrane, which forms the outer part of the pollen grains, are particularly important taxonomic character.

In recent years, palynological studies conducted with electron microscopy have made the precise distinction of plant species in taxonomic terms and phylogenetic relationships have been revealed. By using electron microscopy, the structure of the exine and intine layers of the pollen grains was examined in detail, and thus it was possible to distinguish at the level of variety, race, or even population. Investigating the differences in the sizes of pollen grains and surface ornamentation are used as a very useful method in terms of distinguishing different varieties and types. In this study conducted in Eskişehir parks and gardens, the pollen grains of two Koelreuteria paniculata taxon were determined and their morphological characteristics were determined. In this study, it is aimed to shed light on plant systematics.

MATERIALS AND METHODS

The materials of the study is *Koelreuteria paniculata* (Sapindaceae) taxon, used for herbal design in the parks in Eskişehir city center. Pollen samples of the plants were obtained from the flowers in the trees located on the parks and gardens. Pollen samples of the investigated taxa were taken from dried plants found in the Herbarium (OUFE) of Osmangazi University Faculty of Science. The examination of current pollen grains under light microscope was done by Wodehouse (1935) method, and examination of fossil pollen by Erdtman (1969) method. Morphological examinations of the pollen grains were done under Nikon binocular microscope, oil immersion objective (x100). 50 times measurements were made for all parameters to determine the average values. Standard deviation and variations have been calculated. Each range in the ocular micrometer is 0.98 µm. Microphotographs were taken with a Nikon 80i type microscope and a KAMERAM Digital camera in the Department of Biology, Faculty of Science, Eskişehir Osmangazi University. The magnification of the photos is x1000. For Scanning electron microscopy (SEM) examinations, unacetholyzed pollen grains were placed on the fixing plate and covered with gold and examined under Jeol 5600 LV Scanning electron microscope (SEM) [11; 12]. Various basic palynological books and various studies have been used for the diagnosis of pollen [4-12].

RESULTS

Sapindaceae is a family of deciduous in winter, up to 15 meters in height, elegant, with large hairy leaves. The inflorescences are pyramidal. The fruit is a swollen papery sac. Leaf hairy, leaflets 7-15 toothed or lobed. The flower diameter is about 1 cm; petal 4; stamens are hairy. The fruit is egg-shaped with a pointed tip, 4-5 cm. It blooms in summer-autumn. It grows in sunny places and in temperate climates. It grows in all kinds of soils but prefers sandy, dry soils. They are produced by seeds and cuttings. It is grown singly or in groups on the streets, streets and roadsides. Its homeland is Japan and China.

Species: *Koelreuteria paniculata* L.
Pollen Type: Tricolporatae
Pollen Shape: Suboblata P/E= 1,88 µm (W); 1,20 µm (E)
Exine: Average thickness 1,24 µm (W); 0,96 µm (E)
Aperture: Colpus broad and long, well-defined, pointed ends. Pores are prominent.
Structure: Tectatae
Sculpture: Striatae-perforatae

Table 1. Morfometric Data of *Koelreuteria paniculata* L.

Wodehouse Method			Erdtman Method		
	M	S	M	S	
P	25,28	± 2,88	22,13	± 3,38	µm
E	31,16	± 2,14	19,06	± 3,14	µm
clg	25,86	± 2,08	18,36	± 2,20	µm
clt	9,25	± 1,22	5, 32	± 1,18	µm
plg	8,78	± 1,66	8,12	± 2,12	µm
plt	6,48	± 1,56	6,35	± 1,54	µm
L	31,28	± 1,24	21, 98	± 1,42	µm
t	8,04	± 0,78	5,96	± 0,80	µm
i	0,82	± 0,08	-	-	µm
Ex	1,24	± 0,12	0,96	± 0,10	µm

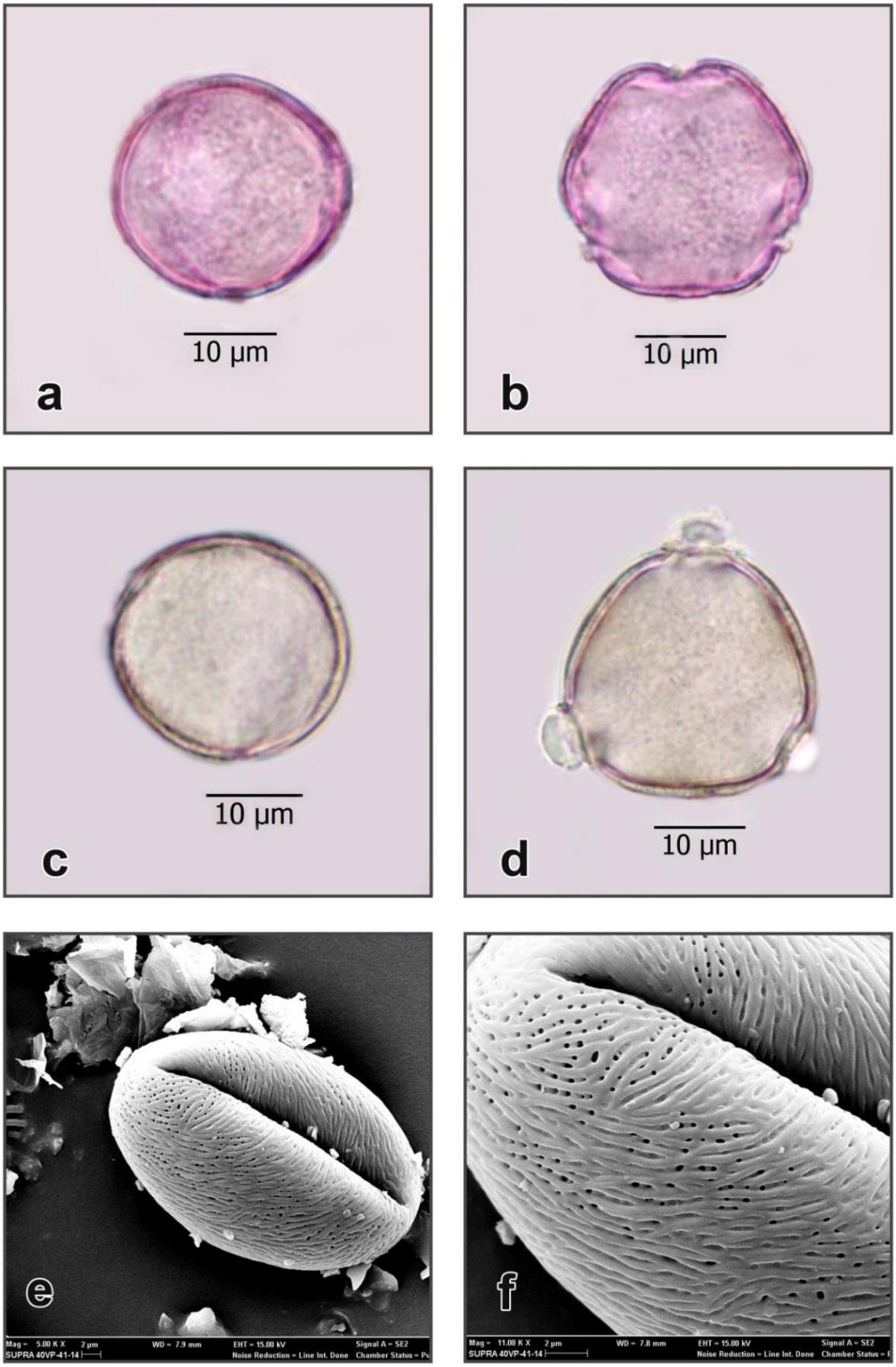

Figure 1. LM (A-D: Equatorial (W), A1-D1: Polar (W), A2-D2: Equatorial (E), A3-D3: Polar (E)) and SEM (A4-D4: Equatorial view, A5-D5: Exine ornamentation) microphotographs of investigated taxa.

DISCUSSION

In this study, pollen morphology of economically important *Koelreuteria paniculata* L. taxon grown in parks and gardens in Eskişehir was studied at the level of light microscopy and scanning electron microscopy.

Our study will set an example for other provinces and will help to create a pollen atlas of all parks and gardens throughout Turkey. As a result of our study, when we compared the palynological findings of the previously examined species with the findings of this study, in our pollen measurements. Differences in size and shape, and occasionally similarities, were found. Changes were seen not only in terms of measurement, but also in terms of ornamentation. The most obvious reasons for these changes and similarities are the fact that the studies are carried out by different people, the differences in climate and temperature, and the predominance of cultivated plants. As a result of the study, the pollen morphology of *Koelreuteria paniculata* L. taxon found in parks and gardens was revealed. In this context, the study supports plant systematics by determining the diversity and richness of species in parks and gardens in and around Eskişehir.

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