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Kuschakewiczia versus *Solenanthus*—Palynological Data and the Generic Position of *Kuschakewiczia turkestanica* Regel and Smirnov (Boraginaceae)

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ABSTRACT

The genus *Kuschakewiczia*, Regel and Smirnov [1], was described including only one species, *K. turkestanica*. Later it was joint with the genus *Solenanthus*, although there are characters (corolla having narrow long lobes, filaments inserted on the corolla margin, low gynobasis, small scar on nutlets after disconnecting without any strip of tissue, reduced number of nutlets in the ripe fruit, etc.) which distinguish the two genera sufficiently. Palynological data, although not significantly different, support its separate positions on the discrete generic level.

Keywords: Central Asia; *Kuschakewiczia*; *Solenanthus*

1. Introduction

The genus *Kuschakewiczia* was described by Regel and Smirnov [1] including only one species, *K. turkestanica*, from the neighborhoods of Tashkent in Tajikistan. Differential characters of the new genus should be the position of the stamen insertion (stamina fauce inserta), the structure of the nutlet surface (facie antice areola concava saepe marginata) and the number of nutlets in imamture flowers (maturae semper solitariae). Later Lipsky [2] considered these characters to be insufficient and classified this species into the genus *Solenanthus* under the name *S. kuschakewiczii*. He did not find differences between both genera except for the position of the stamens. The name of the species was brought in accordance with nomenclatural rules by Kuznetzow [3] and three years later illegimately also by Macbride [4]. Meling [5] found five characters distinguishing the genus *Kuschakewiczia* from the genus *Solenanthus*: 1) corolla having narrow long lobes, 2) filaments inserted on the corolla margin, 3) low gynobasis, 4) small scar on nutlets after perfect disconnecting (no rest of tissue strip), 5) inconspicuous thickness of the cells in the endocarp walls. Further the reduced number of nutlets in ripe fruits, the structure of the fruit surface and other characters are to be added. Palynological data had not yet been used to solve the problem of the generic level of the genus *Kuschakewiczia*. Similarly as in other cases in Boraginaceae they can be useful. Already Avetisyan [6] started to use palynological data for this purpose and later also many others, such as Clarke *et al*. [7], Sahay [8], Díaz & Valdés [9], Popova *et al*. [10], Khatamzas [11], Liu *et al*. [12], and lately Bigazzi *et al*. [13]. For differentiation of newly created genera they were used by Barbier et Mathez [14] and Sutorý [15].

2. Materials and Methods

Pollen material of four specimens collected in south Tajikistan and preserved at the V. L. Komarov Botanical Institute of the Russian Academy of Sciences in St. Petersburg was used (Michelson A. I., No. 1245, 4.5.1913, Liičevskij I.A. No. 46, 30.4.1938, Varivceva E. A., Nepli G. N., No. 269, 4.5. 1948, Filatov E. M., Saprunova R. M., No. 30, 27.3.1964). Pollen grains were measured on the photographs of pollen grains. SEM microphotographs were produced using the Tescan Mira 3 LMU electron microscope.

3. Results and Discussion

Only three previously published sources can be partly utilized for the problem under discussion. These are consistent in the shape and structure of the pollen grains but different in their dimensions. Avetisyan [6] mentions measurements of 10.5 × 9.8 μm, Barbier et Mathez [14] 9 ×

8.2 µm, and Bigazzi *et al*. [13] 6.4 × 7.4 µm in size. The discrepancies are probably due to different methods they used. My preliminary measurements (15 pollen grains) carried out on material from the four different samples come close to the results of Bigazzi *et al*. [13], namely with an average of 6.9 × 7.6 µm (the amplitude being 6.2 - 7.2 × 7.1 - 8.0 µm). In any case, all sources agree that the pollen grains are small, on the lower end of the range of other species in *Solenanthus* (7.5 × 6.3 µm to 11.0 × 9.9 µm). They have a very low ratio (1.2) of polar axis: equatorial diameter, thus they are almost spherical in shape, which is not different from most other species of *Solenanthus*. The ratio in my measurements was 1.1. The pollen grains are tricolporate, *i.e.* having three compound apertures (colpori) altering with three simple apertures (pseudoapertures, colpi) and in the equatorial region they are connected with a distinct belt (ectocingulus). Bigazzi *et al*. [13] call this type of pollen the "Cynoglossum officinale type" and they describe the pollen in *Solenanthus* as "essentially uniform" and the apertures in *Solenanthus* with the following words: "The ectoapertures [composed apertures, colpori] are rhombic in outline with lalongate [= transversely elongate] endoapertures (1.2 × 3.2 µm), situated at about the equator, the colporate apertures are equal to or shorter than the fusiform simple colpi [pseudocolpi]". Liu *et al*. [12] give a similar description: "colpi… slightly shorter than pseudocolpi, rhomboid, with narrow endocingulus". Avetisyan [6] gives the length of colpi and colpori as being identical. This is in accordance with published pictures by Díez et Valdés [9], Bigazzi *et al*. [13], and Liu *et al*. [12] (**Figure 1(A)**). In the genus *Kuschakewiczia* the type of pollen grains is identical but the shape and character of apertures are reciprocal. The compound apertures (ectoapertures, colpori) are generally narrower (sometimes longer or equally long as to colpi), the simple colpi is almost rhombic, endoapertures are narrower and longer, about 1 × 4 (-5) µm (**Figure 1(B)**).

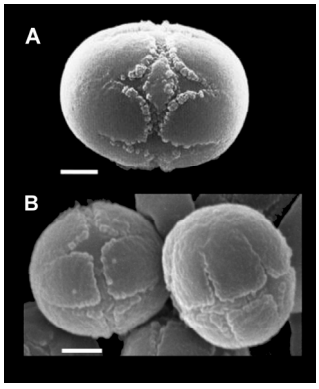

Figure 1. Pollen grains of *Solenanthus biebersteinii* (A) (Bigazzi *et al*. [13]) and *Kuschakewiczia turkestanica* (B) (Scale bars 2 µm).

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