

MORPHOLOGICAL VARIABILITY OF *PALIMBIA REDIVIVA* s.l., AND STATUS OF *P. TURGAICA* (APIACEAE)

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To distinguish *Palimbium redivivum* and *P. turgaicum* species, several authors (Lipsky in Woronov, 1931; Korovin, 1963; Pimenov, 1983; Ryabinina, Khyazev, 2009; Pimenov, Ostroumova, 2012; Pimenov, 2020) used the following traits: general appearance of inflorescence, number of rays in the terminal umbel, angle between the stem and branches of the first order, branching order, number of internodes on the stem from the rosette to the first branch, and the width of the leaf segments. Other authors considered *P. turgaicum* a synonym of *P. redivivum* (Schischkin, 1950; Vinogradova, 2004; Yelenevskii et al., 2008).

Type specimens of the both species (Table 1) and materials from LE, MHA, and MW herbaria were studied (totally 934 specimens). Inflorescence appearance is associated with the order of branching; plants can branch only to the first order (morphotype A), or to the second (morphotype B), or to the third (morphotype C), and occasionally there are individuals without branches or with branches of the fourth order (Fig. 1). It was shown that all the proposed diagnostic characters have a unimodal distribution and are not suitable for the species distinguishing (Fig. 3).

At the same time, some geographical differentiation was noted. Morphotypes A and B predominate in the northern part of the range, while morphotypes B and C predominate in the western part, and all three forms are widely represented in Kazakhstan.

The most significant correlations (Table 2) were noted between indicators of the total vigour of plants (total stem length, stem length below the first branch and in inflorescence, length of branches, number of internodes), and between the traits of synflorescence (branching order, number of internodes and length of the main stem in the inflorescence area, length of branches).

For the branching order and the number of rays of the terminal umbel, a negative correlation of -0.4759 is shown. The tendency to reduction of the terminal umbel is also known in other Apiaceae (Reuther, Classen-Bockhoff, 2010; Kusnetzova, Timonin, 2017).

The number of stem internodes from the rosette to the first branch is correlated not only with the length of this section, but also with the branching order, the number of umbel rays (negatively), and with the angle of origin of the lateral branches. The relationship of these traits has already been noticed by the compilers of keys for plant identification (Woronov, 1931; Korovin, 1963; Pimenov, 1983; Ryabinina, Knyazev, 2009), but in fact the correlation is not very high. It is interesting that the branching order is practically not correlated (0.092148) with the length of the stem below the first branch, but has a correlation of 0.49303 with the number of internodes in this section.

When analyzing the principal components (Fig. 4, Tables 3, 4), the first component explains 46.98% of the variance, the second – 20.77%, in the amount of 67.7% (Table 3); thus, the projection of points onto the plane of the first and second components rather accurately reflects the position of dots in multidimensional space. The dots on the diagram form a continuous cloud; the studied individuals were not divided into isolated groups, although the areas of type specimens in multidimensional space do not overlap. The areas of dots of the Volgograd Region and the Crimean-Taman ones largely coincide, despite the disjunction. The areas of the western region (Crimea, Taman and Volgograd Region) do not overlap with plants from the northern part of the range. The dots for the plants from Kazakhstan and the Orenburg Region show the greatest scatter and overlap with all other regions (Fig. 4).

Thus, *Palimbium turgaicum* cannot be reliably distinguished morphologically from *P. redivivum*. The former was described as an extreme morphological variant from the northern part of the range, but it is connected by continuous transitions with the rest of the individuals, and should be considered a synonym of *P. redivivum*.

Keywords: Apiaceae, morphology, taxonomy, variability

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