Analysis of numerical taxonomy for *Alyssum* (Brassicaceae, sect. Gamosepalum Dudley) in Iran

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ABSTRACT: In this research, Taxonomical relationships of *Alyssum* (Brassicaceae, sect. Gamosepalum Dudley) were studied by use the numerical Taxonomy analysis, for all Iranian species. Accordingly a character table included 32 qualitative and quantitative characters were made for 50 specimens of 10 Iranian species. After standardization of the data, a simplicity matrix was produced. Then a related dendrogeram was drawn by using the Monhatan coefficient and UPGMA method that in which two main clads of Connata and Libera series were distinguished. Finally the taxonomy of section was accepted and Libera series was divided to two Lepidote and Stellate subseries.

Key words: Gamosepalum, Alyssum, Numerical taxonomy, Manhattan, UPGMA.

INTRODUCTION

The genus *Alyssum* L. (Brassicaceae) consists more than 230 species in the world (AL-Shehbaz and Beilstein, 2006). The genus divided to 5 sections included: *Meniocus*, *Odontarrhena*, *Alyssum*, *Psilonema* and *Gamosepalum* (Dudley, 1964a, b, Ball & Dudley, 1996). The section of *Gamosepalum* had been identified as a genus by Hausskkhnet with 4 species (Dudley, 1964a). Later it identified as a section of *Alyssum* L. (Brassicaceae) by Dudley and other species were added to that. Dudley has divided this section to two *Connata* and *Libera* series and is nearly accepted by the botanists (Dudley, 1964 a, b) On the base of present data, The section of *Gamosepalum* has 13 species in the world and 10 of them were thrive in Iran (Koch et al., 2006). Each species carefully was measured in the 32 defined Characters and character table was filled. Then for entering the data on the Excel, quantitative characters were coded and with quantitative characters were put in the new numerical table.

MATERIAL AND METHODS

All Iranian species belong to the sect. *Gamosepalum*, were studied for morphological analysis and numerical taxonomy. For this purpose a character table consists of 32 characters were produced from 50 specimens of 10 presented species in Iran. Each specimen was measured in all characters. The character table was completed then we made coding of qualitative characters. Finally a numerical table was produced. This is the way of coding the characters:

**Indumentum of upper part of plant**
1. lepidota(1), stellata(0), lepidota+ stellate (2)

**Indumentum of lower part of plant**
2. lepidota(1), stellata(0), lepidota+ stellata (2)

**Flowering cauline Leaves**
3. many rayed (0), low rayed (1)
4. upper leaves: oblanceolata or spatulata (0), linear oblanceolata (1), obovata (2), obovata-oblanceolata (3).
RESULTS AND DISCUSSION

Two main clads of Connate and Libera series were distinguished in dendrogeram (Fig. 1). In the related clad of Connate series there were A. lepidoto-stellatum, A. tetrastemon, A. thymops, A. paphlagonicum, and in the other, A. baumgartnerianum, A. sulphureom, A. harputicum, A. niveum, A. corningii and A. hezarmasjedensis were distinguished. In numerical taxonomy of Gamosepalum based on morphological characters, related species of two Connate and Libera series put on separate clads and completely separated from one another. A. lepidoto-stellatum and A. paphlagonicum that have maximum of similarity, put in single subclad and along the sister subclad of A. tetrastemon were separated from A. thymops. In morphological studies A. thympop has minimum of similarity with other species and it was clear in related dendrogeram. Section of Gamosepalum had been defined as a genus by Hausskhnet. Later it was identified as a section of Alyssum L. (Brassicaceae) and other species were added to it. Since A. thymops had been in the genus Ptilotrichom (Brassicaceae), it is not very far away from the mind that would have clear differences with other species of Connata series. The Libera series with 6 species, put in a separated clad. Three subclads were distinguished in which, A. niveum and A. hezarmasjedensis have put in a single clad. Flower segments have maximum of similarity in some characters such as the shape of short stamen wings and petals. They have narrow petal with smooth border and short stamen wing with appendage. A. Corningii and A. sulphureom put in single subclad and have mixed with A. harputicum and A. baumgartnerianum in another subclad. On the base of all results, we could explain that Gamosepalum have two main series including Libera and Connata that Libera series has been divided to two Lepidote and Stellate subseries.

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REFERENCES


