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Morpho-anatomical taxonomic delimitation of *Astragalus bruguieri* and *A. baba-alliar* subsp. *nudicarpus*

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INTRODUCTION & AIM

Astragalus (Fabaceae) is one of the largest genera, with many closely related species.

Within sect. *Poterion*, *A. bruguieri* & *A. baba-alliar* subsp. *nudicarpus* are morphologically similar; the latter has sometimes been treated as a variety of the former.

This study aims to delimit these taxa & identify reliable morpho-anatomical traits.

Fig. 1. Growth habit of *Astragalus* taxa

METHOD

Sampling: 45 populations from western & southwestern Iran.

Identification: Floras & herbarium specimens.

Morphometry: ≥10 mature individuals per site, 3 replicates per organ.

Anatomy: Stem and leaflet cross-sections; double-staining (methylene blue + carmine alum); epidermis stained with fuchsin.

Analysis: PCoA & Mantel test (NTSYS software).

RESULT & DISCUSSION

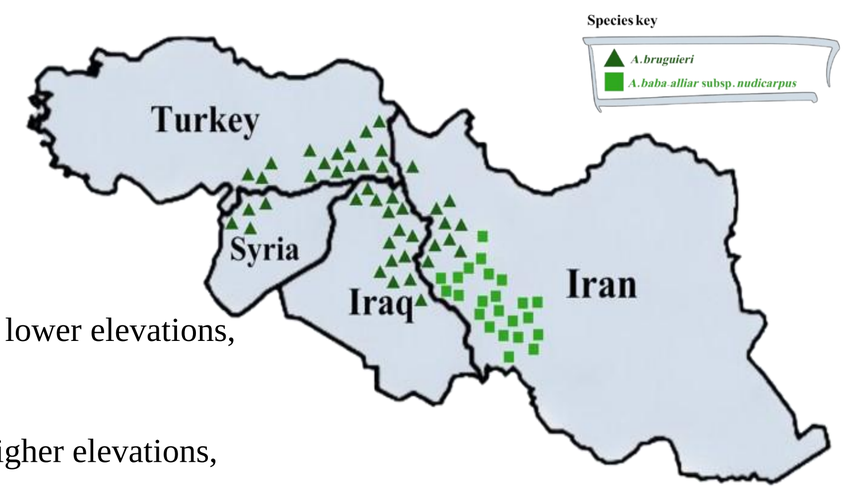

Fig. 2. Geographical distribution of *A. bruguieri* and *A. baba-alliar* subsp. *nudicarpus in the* Middle East

Distribution:

A. bruguieri: Middle East, lower elevations, calcareous soils.

Subsp. *nudicarpus*: Iran, higher elevations, lighter soils (Fig. 2).

Morphology:

Differences in plant size, stipule length, and indumentum of leaflets & ovaries.

Anatomy:

Variation in vascular bundle size, leaflet venation, epidermal cell number & stomatal densities (Table 1, Fig. 3).

Table 1. Comparative morpho-anatomical measurements of *A. bruguieri* and *A. baba-alliar* subsp. *nudicarpus*

Trait	*A.bruguieri*	*A.baba-alliar* subsp. *nudicarpus*
Height(cm)	40-50	80-150
Stipule(mm)	5-6	1-2
Leaflet	Glabrous	Pubescent
Ovary	Pubescent	Glabrous
Vascular bundles diameter(um)	50-60	80<
Number of lateral veins	4-5	2
Number of Epidermal cells	80-100	130-250
Stomatal density(mm^2)	20>	20<

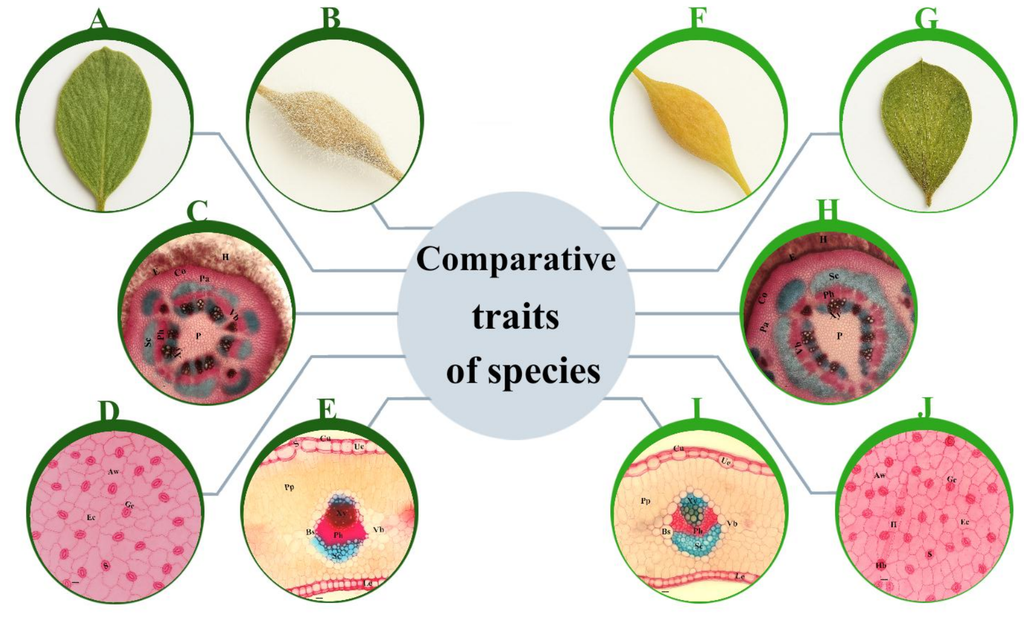

Fig. 3. Morphological and anatomical comparison of *A. bruguieri* (A_E) & *A. baba-alliar* subsp. *nudicarpus* (F_J): A,G_ leaflet indumentum; B,F_ ovary indumentum; C,H_ stem cross-section; D,J_ epidermis; E,I_ leaflet cross-section. Scale bar = 10 um

H= Hair; E= Epidermis; Co= Collenchyma; Pa= Parenchyma; Vb= Vascular bundle; Sc= Sclerenchyma; Ph= Phloem; Xy= Xylem; P= Pith; Cu= Cuticle; Ue= Upper epidermis; Le= Lower epidermis; Pp= Palisade parenchyma; Bs= Bundle sheath; Hb= Hair base; Aw= Anticlinal wall; Ec= Epidermal cell; Gc= Guard cell; S= Stoma.

PCoA:

Clear separtion of *A. bruguieri* & *A. baba-alliar* subsp. *nudicarpus* (Fig. 4).

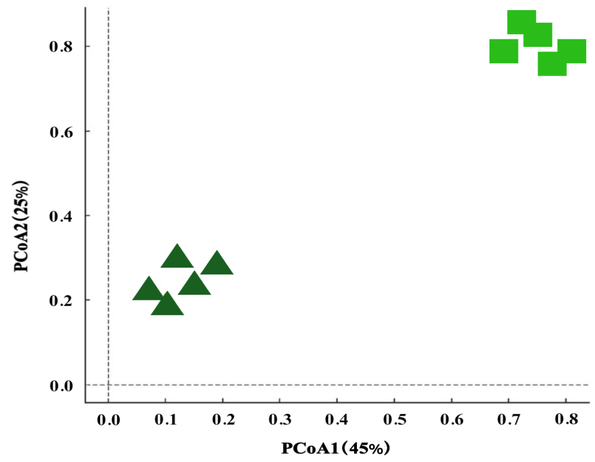

Fig. 4. PCoA plot illustrating morpho-anatomical grouping of the two taxa

CONCLUSION

Morpho-anatomical traits provide consistent diagnostic differences.

The taxonomic position of *nudicarpus* requires further investigation.

FUTURE WORK / REFERENCES

Molecular phylogenetic analysis (chloroplast and nuclear markers).

Broader sampling within Iran and neighboring regions to assess intraspecific variation.

Almizori, S. O. H. (2017). Taxonomic and anatomical traits of some *Astragalus* species in duhok province, Northern Iraq [Master's thesis, Kahramanmaraş Sütçü İmam University]. Kahramanmaraş.

Khal, L. H. M. (2024). Systematic Study in some Taxa of the genus *Astragalus* L. (Fabaceae) in districts of Kurdistan-Iraq [Doctoral dissertation, University of Sulaimani]. Sulaimani.

Tietz, S. (1988). Revision von *Astragalus* L. sect. *Campylanthus* Bunge, sect. *Microphysa* Bunge und sect. *Poterion* Bunge. Mitteilungen der Botanischen Staatssammlung München, 27, 135-380.