

A. BORZATTI VON LÖWENSTERN (*), F. GARBARI (*)

CYTOTAXONOMIC CONTRIBUTION TO THE JORDANIAN FLORA 2. *ORNITHOGALUM TRICHOPHYLLUM* BOISS. ET HELDR. (HYACINTHACEAE)**

Abstract - Three populations of *Ornithogalum trichophyllum* Boiss. et Heldr. from the desert of Southern Jordan (Hisma Basin) have been caryologically investigated. The plants show $2n=18$ or $2n=18+1B$. *O. trichophyllum* Boiss. et Heldr. has to be considered new for the Jordanian flora.

Key words - *Ornithogalum*, chromosomes, Jordan.

Riassunto - Contributo alla citotassonomia della flora della Giordania 2. *Ornithogalum trichophyllum* Boiss. et Heldr. (*Hyacinthaceae*). Sono stati analizzati dal punto di vista cariologico tre popolamenti di *O. trichophyllum* Boiss. et Heldr. rinvenuti nel deserto della Giordania meridionale (Bacino di Hisma). Gli individui sono risultati diploidi ($2n=18$), con la sporadica presenza di cromosomi accessori ($2n=18+1B$). La specie, elemento Irano-Turanico (Saharo-Arabico), risulta nuova per la flora della Giordania.

Parole chiave - *Ornithogalum*, cromosomi, Giordania.

Abstract - Three populations of *Ornithogalum trichophyllum* Boiss. et Heldr. from the desert of Southern Jordan (Hisma Basin) have been caryologically investigated. The plants show $2n=18$ or $2n=18+1B$. *O. trichophyllum* Boiss. et Heldr. has to be considered new for the Jordanian flora.

Key words: *Ornithogalum* - chromosomes - Jordan.

INTRODUCTION

Many specimens of *Ornithogalum* L. (subgen. *Ornithogalum* Zahar., according to Zahariadi, 1977) identified as *O. trichophyllum* Boiss. et Heldr. (Fig. 1), with characteristic epigeal germination of seeds, have been found during a scientific expedition in the desert of the Southern Jordan in 1994 (*exsiccata* in PI). This species has never been reported in any of the floristic lists published for Jordan up to now (Al-Eisawi, 1982; Boulos, 1977; Boulos and Al-Eisawi, 1977a, 1977b; Boulos and Lahham, 1977a, 1977b; Boulos *et al.*, 1977; Lahham and El-Oqlah, 1987).

Already designated as a variety or subspecies of *Ornithogalum gussonei* Ten. [= *O. tenuifolium* Guss., Fl. Sic. Prodr., 1: 413 (1827), non F. Delaroché (1811)] (Boissier, 1882; Holmboe, 1914), this entity could be ascribed to the Irano-Turanic or Saharo-Arabic chorotypes (not to the Mediterranean chorotype as *Ornithogalum gussonei* Ten., subgen.

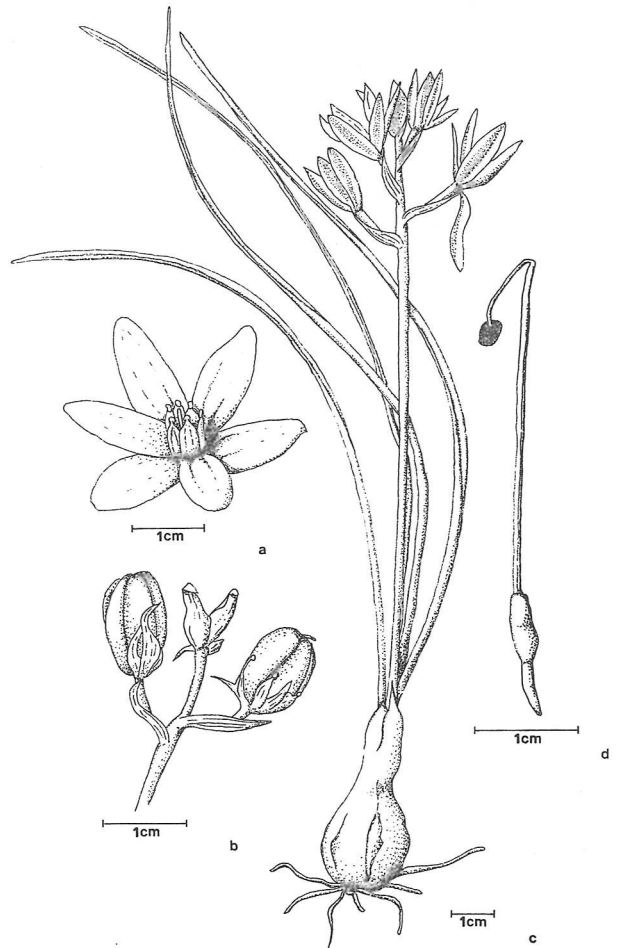


Fig. 1 - *Ornithogalum trichophyllum* Boiss. et Heldr. from J. Atrá (565/94). Flower (a), fruit (b) and plant (c); epigeal germination of seed and plantlet (d).

Hypogaeum Zahar.) but its distribution still is to be defined exactly.

It has been reported from Egypt (Boissier, 1882; Täckholm and Drar, 1973; Täckholm, 1974), Palestine and Israel (Feinbrun, 1941; 1986), Cyprus (Meikle, 1985) and more recently from Northern Sinai (Lucchese, 1992) and Negev Highlands (Danin, 1992).

(*) Dipartimento di Scienze Botaniche, Via Luca Ghini 5, 56126 Pisa.

(**) First contribution by Garbari & Crisman (1988). Financial support of C.N.R., Italy is greatly acknowledged.

DISTRIBUTION IN JORDAN

As previously stated out, this species is new for the flora of Jordan. It has been found in the desert of Southern Jordan, Hisma Basin, in three districts and in isolated localities far a few miles one from the other.

The collecting localities are the following (Fig. 2):

- Jebel el Gill, North of the Hisma Basin, not far from the road leading from Aqaba to Ma'An;
- Wadi Thalaja, one of the valleys going southwards from the highlands of Ras en Naqb;
- Jebel Atra, a little North of the big mud flat of the district of Disi.

The specimens generally appear to be isolated one from the other, in small circumscribed populations; nevertheless in the Jebel el Gill site, it is not rare to find many specimens living close up one with the other.

The plants seem to prefer sandy, rather compact soils and a very warm and dry climate.

We have also noticed a different anthesis phase among the collecting spots which is likely to be a consequence of local variations in temperature.

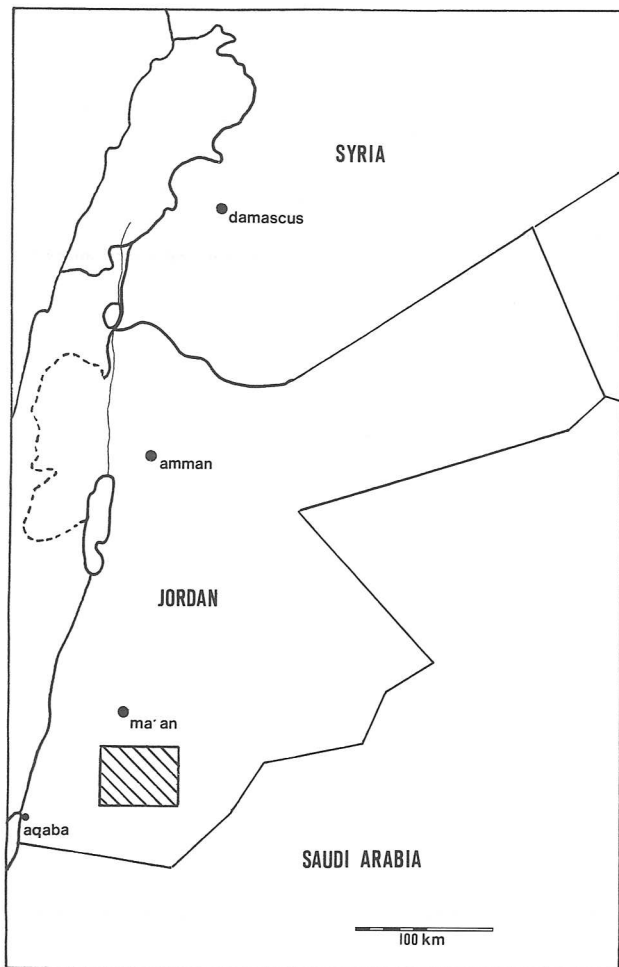


Fig. 2 - The collecting area in the desert of Southern Jordan (shaded area).

CARYOLOGICAL ANALYSIS

As already done for some Jordan species (Garbari and Crisman, 1988), root tips of the studied material, cultivated in clay pots in the Botanical Garden of Pisa (565/94 Jebel Atra; 536/94, 537/94, 539/94, 540/94, 541/94 Jebel el Gill; 555/94, Wadi Thalaja), have been put in a 0.3% colchicine solution, fixed in Carnoy (absolute ethanol: acetic acid 3:1) and finally stained with the Feulgen Reagent. Root tips were then squashed in acetic orceine. The following idiograms were constructed from metaphase chromosomes according with Levan *et al.*'s (1964) formula:

Jebel Atra: $2m+2(1sm+1m)+2sm+2st+2sm+2sm+2sm^2+2m+2M+1B$

Jebel el Gill: $2m+2m+2m+2st+2sm+2sm+2sm^2+2m+2M$

Wadi Thalaja: $2sm+2m+2sm+2st+2sm+2m+2sm^2+2sm+2m$

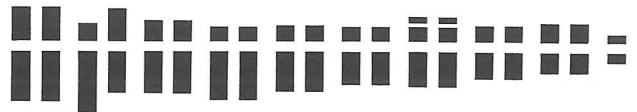


Fig. 3 - *Ornithogalum trichophyllum* Boiss. et Heldr., $2n=18+1B$. Somatic metaphase and idiogram of the karyotype from J. Atra. Note heterozygosity on the 2nd pair of chromosomes.

The caryograms in two of the stands are very similar, as may be seen from figs. 3, 4 and 5, but in the population of Jebel Atra one accessory chromosome and structural heterozygosity on the second pair have been found, whereas in the population of W. Thalaja a little increase of caryotypical asymmetry compared to the other ones has been observed.

We believe our results consistently agree with those produced by Kushnir *et al.* (1977) for the neighbouring Israel.

Finally, *Ornithogalum trichophyllum* Boiss. et Heldr. has a diploid chromosome complement with $n=9$ as basic number, with the sporadic presence of a B-chromosome.



Fig. 4 - *Ornithogalum trichophyllum* Boiss. et Heldr., $2n=18$. Somatic metaphase and idiogram of the karyotype from J. el Gill.

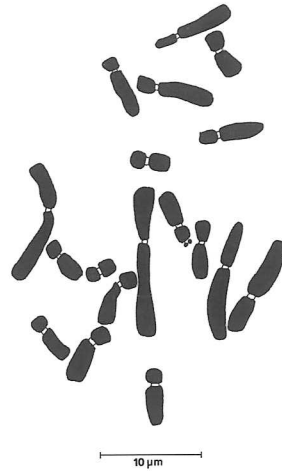


Fig. 5 - *Ornithogalum trichophyllum* Boiss. et Heldr., $2n=18$. Somatic metaphase and idiogram of the karyotype from W. Thalaja.

REFERENCES

- AL-EISAWI D.M. (1982). List of Jordan vascular plants. *Mitt. Bot. München*, **18**: 79-182.
- BOISSIER P.E. (1882). *Flora Orientalis*. Genevae et Basileae.
- BOULOS L. (1977). Studies on the flora of Jordan 5. On the flora of El Jafr Bair desert. *Candollea*, **32**: 99-109.
- BOULOS L., AL-EISAWI D.M. (1977a). Studies on the flora of Jordan 6. On the flora of Ras en Naqb. *Candollea*, **32** (1): 111-118.
- BOULOS L., AL-EISAWI D.M. (1977b). Studies on the flora of Jordan 8. New and noteworthy plants. *Candollea*, **32** (2): 269-276.
- BOULOS L., LAHHAM J. (1977a). Studies on the flora of Jordan 3. On the flora of the vicinity of Aqaba gulf. *Candollea*, **32** (1): 73-79.
- BOULOS L., LAHHAM J. (1977b). Studies on the flora of Jordan 4. On the desert flora North-East of Aqaba. *Candollea*, **32** (1): 81-97.
- BOULOS L., LAHHAM J., JALLAD W. (1977). Studies on the flora of Jordan 7. On the desert flora of the area of H-4 and H-5, pumping station NE Jordan. *Candollea*, **32** (2): 225-268.
- DANIN A. (1992). Check-list of the vascular plants collected during Iter Mediterraneum II. *Bocconeia*, **3**: 43-216.
- FEINBRUN N. (1941). The genus *Ornithogalum* in Palestine and neighbouring countries. *Palestine J. Bot.*, Jerusalem ser., **2** (2/3): 132-150.
- FEINBRUN N. (1986). *Flora Palaestina*. Israel Acad. Sciences Human. Jerusalem.
- GARBARI F., CRISMAN E. (1988). Cytotaxonomical contribution to the Jordanian flora 1. *Webbia*, **42** (1): 21-41.
- HOLMBOE J. (1914). Studies on the vegetation of Cyprus based upon researches during the Spring and Summer 1905. Bergen.
- KUSHNIR U., GALIL J., FELDMAN M. (1977). Cytology and distribution of *Ornithogalum* in Israel I. Section *Heliocharmos* Bak. *Israel J. Bot.*, **26**: 63-82.
- LAHHAM J., EL-OQLAH A.A. (1987). Floristic analysis of Ajlun Mountains (Jordan). *Mitt. Bot. München*, **23**: 345-353.
- LEVAN A., FREDGA K., SANDBERG A.A. (1964). Nomenclature for centromeric position on chromosomes. *Hereditas*, **52**: 201-220.
- LUCCHESI F. (1992). New records for the flora of Gebel Maghrara (Northern Sinai). *Ann. Bot. (Roma)*, **50**: 153-160.
- MEIKLE R.D. (1985). *Flora of Cyprus*, **2**: 1631-1632. Kew.
- TÄCKHOLM V. (1974). *Students' flora of Egypt*, Ed. 2, 637. Beirut.
- TÄCKHOLM V., DRAR M. (1973). *Flora of Egypt*, **3**: 166-167. Cairo.
- ZAHARIADI C. (1977). Notes on the intrageneric classification of the genus *Ornithogalum* L. (Liliaceae). *Bot. Zurn.*, **62** (11): 1624-1639.

(ms. pres. il 24 novembre 1995; ult. bozze il 29 maggio 1996)