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# Morphological study within some Algerian populations of *Trifolium bocconeii* Savi

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**Abstract.** In the framework of the evaluation and valorization of plant genetic resources of fodder and pastoral interest in Algeria, three Algerian populations of the species *Trifolium bocconeii* Savi have been the subject of a morphological study of fruiting heads, pods and seeds. Ten characters were considered. The data of the natural habitat of the populations (rainfall, altitude, longitude, latitude) were also taken into consideration during the statistical treatments. The analysis of variance highlighted interesting results. A relationship seems to exist between the number of pods per fruiting heads and the latitude of the environment of origin of the populations. As a very rare clover in Algeria, *Trifolium bocconeii* should be conserved and valorized, particularly in the marginal areas of the country.

**Keywords.** Fruiting heads – Latitude – Pods – Seeds.

## **Etude morphologique chez quelques populations algériennes de l'espèce *Trifolium bocconeii* Savi**

**Résumé.** Dans le cadre de l'évaluation et de la valorisation des ressources phytogénétiques d'intérêt fourrager et pastoral en Algérie, trois populations algériennes de l'espèce *Trifolium bocconeii* Savi, ont fait l'objet d'une étude morphologique des infrutescences, gousses et graines. Dix caractères ont été considérés. Les données du milieu d'origine des populations (pluviométrie, altitude, longitude, latitude) ont également été prises en considération lors des traitements statistiques. L'analyse de variance a mis en relief des résultats intéressants. Une relation semble exister entre le nombre de gousses par infrutescence et la latitude du milieu d'origine des populations. Signalée comme très rare en Algérie, *Trifolium bocconeii* est une espèce à conserver et à valoriser, particulièrement dans les régions marginales du pays.

**Mots-clés.** Gousses – Graines – Infrutescences – Latitude.

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## **I – Introduction**

The genus *Trifolium* L. contains about 290 species distributed throughout the temperate and subtropical regions but mainly in the temperate regions of the north (Clapham *et al.*, 1962). Algeria is represented by 37 species (Quezel and Santa, 1962). In the framework of the evaluation and valorization of plant genetic resources of fodder and pastoral interest, a morphological study of fruiting heads, pods and seeds was conducted on some spontaneous populations of *Trifolium bocconeii* Savi. A previous study concerning the distribution of 27 clovers in Algeria indicate that this species is very rare (Abdelguerfi *et al.*, 2006). The present contribution follows the numerous autoecological, morphological, phenological and caryological studies conducted on several spontaneous populations belonging to many species of the genus *Trifolium* L. (Issolah, 1997, 2006; Issolah and Abdelguerfi, 1999a,b, 2000, 2003; Abdelguerfi *et al.*, 2006).

## **II – Materials and methods**

Following prospect missions conducted in Algeria by INA and ITGC in 1985, 1986 and 1990, several species of the genus *Trifolium* L. were collected. Among these species, three Algerian

populations belonging to *Trifolium bocconeii* Savi have been the subject of a morphological study. For each population, 30 fruiting heads were chosen randomly. Ten (10) characteristics were considered: size of fruiting heads: length (LF), width (WDF); number of pods per fruiting head (PF); number of seeds per pod (SP); number of seeds per fruiting head (SF); seed size: length (LS), width (WS); weight of 30 fruiting heads (WF); the weight of a thousand seeds (WTS) and the ratio weight of seeds/weight of fruiting heads (RW). The data of the natural habitat of populations: altitude, rainfall (Gausson and Bagnouls, 1947), longitude and latitude were also subjected to statistical treatments (analysis of variance, matrix of correlations).

### III – Results and discussion

The morphological study carried out on *Trifolium bocconeii* revealed a low intraspecific variability for the studied characteristics, except the "width of fruiting heads", "weight of fruiting heads" and "weight of a thousand seeds" which present an average variability (Table 1). Concerning the size of fruiting heads, Clapham *et al.* (1962) report 10 mm or 1 cm in length. Our study has revealed, for "the length of fruiting heads" a margin ranging from 1.69 to 1.88 cm with an average of 1.80 cm. For the "width of fruiting heads", it ranged from 0.61 to 0.76 cm with an average of 0.67 cm. Results reflect the existence of variation within this species.

**Table 1. Variation of fruiting heads, pods and seeds within *Trifolium bocconeii***

Characteristics	Min	Max	Mean	Standard deviation	Coefficient of variation
LF (cm)	1.69	1.88	1.80	0.10	5.4
WDF (cm)	0.61	0.76	0.67	0.08	11.8
PF	84.03	94.40	89.50	5.21	5.8
SP	–	–	1	–	–
SF	77.13	84.30	81.78	4.03	4.9
LS (mm)	1.00	1.14	1.07	0.07	6.5
WS (mm)	0.53	0.55	0.54	0.01	1.9
WF (g)	2.08	2.71	2.33	0.33	14.3
WTS (g)	0.30	0.37	0.33	0.04	11.7
RW	0.337	0.342	0.34	0.003	0.7

<sup>†</sup>Min: mean of a population; Max: mean of a population; Mean: mean of the species.

A previous phenological study conducted on several spontaneous clovers in Algeria has shown at the end of the cycle of the plants, that the total drying characterized, at first, the populations of *T. tomentosum* and *T. glomeratum* whereas it occurs very late in *T. bocconeii* and *T. arvense*. Regarding the speed of spring growth, the highest values respectively characterized *T. bocconeii* (2.07 cm/J), *T. resupinatum* (1.66 cm/J) and *T. spumosum* (1.65 cm/J), whereas the lowest were recorded in *T. striatum* (1.17 cm/J) and *T. fragiferum* (1.03 cm/J) (Issolah, 2006; Issolah and Abdelguerfi, 1999b, 2000, 2003).

A biometrical study conducted in seven (7) species of clovers signalized the importance of biometrical characteristics (width of fruiting heads, weight of thousand seeds, weight of fruiting heads, number of pods per fruiting heads and the number of seeds per fruiting heads) comparing to the characteristics of flowering and particularly to those related to the vegetative development (Issolah, 1997).

Regarding the correlations, this study highlighted the positive relationship that exists between the number of pods per fruiting heads and the latitude of the environment of origin of the populations (Table 2). The high number of pods characterized ecotypes coming from the north of Algeria. Other relationships have also been reported between phenological characteristics,

biometrical characteristics, chromosome numbers on the one hand and on the other hand, the ecological factors of the environment of origin within the populations of several spontaneous clovers in Algeria (Issolah and Abdelguerfi, 1999a).

**Table 2. Relations between the morphological characters and the factors of the natural habitat of *Trifolium bocconei***

Ecological factors	Characteristics <sup>†</sup>									
	LF	WDF	PF	SF	LS	WS	WF	WTS	RW	
Altitude	0.253	-0.619	-0.951	-0.995	-0.888	0.128	-0.613	-0.212	0.829	
Rainfall	0.005	0.801	0.839	0.986	0.740	0.132	0.796	0.457	-0.657	
Longitude	-0.405	-0.973	-0.552	-0.838	-0.409	-0.518	-0.972	-0.774	0.301	
Latitude	-0.477	0.413	0.997*	0.944	0.972	-0.361	0.407	-0.028	-0.939	

<sup>†</sup>Characteristics: see Materials and methods.

\*, \*\*, \*\*\* Significant at the 5%, 1% and 0.1% levels of probability.

## IV – Conclusions

This study permitted to highlight the morphological abilities of *Trifolium bocconei* and the role of this forage legume in the development of marginal regions of the country. Considered as a very rare clover in Algeria, the introduction of this species in the short, medium and long term in the marginal regions of the country would help to ensure its preservation and conservation in the case of genetic erosion of populations in their natural habitat.

## References

- Abdelguerfi A., Abdelguerfi-Laouar M., M'hammedi Bouzina M., Guitonneau G.G., Huguet T., Abbas K., Mebarkia A., Aouani M.E. and Madani T., 2006. Distribution et ecologie de quelques Fabaceae spontanées d'intérêt pastoral et / ou fourrager en Algérie. In: *International Workshop "Diversité des Fabacées Fourragères et de leurs Symbiotes: Applications Biotechnologiques, Agronomiques et Environnementales"*, Alger (Algeria), 19-22 February 2006, p. 27-36.
- Clapham A.R., Tutin T.G. and Warburg E.F., 1962. *Flora of the British Isles*, p. 338-346.
- Gausson M. and Bagnouls F., 1947. *Cartes des Précipitations (6 feuilles). Moyennes Annuelles Ramenées à la Période de 1913-1947*. Gouvernement Général d'Algérie.
- Issolah R., 1997. Comportement, biométrie et caryologie de populations spontanées de treize espèces du genre *Trifolium* L. en Algérie. MSc Thesis: INA, p. 125.
- Issolah R., 2006. Synthèse de travaux réalisés sur des populations algériennes de plusieurs espèces du genre *Trifolium* L. In: *International Workshop "Diversité des Fabacées Fourragères et de leurs Symbiotes : Applications Biotechnologiques, Agronomiques et Environnementales"*, Alger (Algeria), 19-22 February 2006, p. 81-83.
- Issolah R. and Abdelguerfi A., 1999a. Chromosome numbers within some spontaneous populations of *Trifolium* species in Algeria. In: *Caryologia*, 52, 3-4, p. 151-154.
- Issolah R. and Abdelguerfi A., 1999b. Variability within 31 spontaneous populations of *Trifolium scabrum* L., nature of relations with factors of the site of origin. In: IX Meeting of the FAO-CIHEAM Sub-Network on Mediterranean Pastures and Fodder Crops, Badajoz (Spain), 26-29 November 1997. *Options Méditerranéennes, Series Cahiers*, 39, p. 123-127.
- Issolah R. and Abdelguerfi A., 2000. Study of the variability in 28 spontaneous populations of *Trifolium tomentosum* L.: Relations with factors of the environment of origin. In: *Proceedings of the 10<sup>th</sup> Meeting of the Mediterranean Subnetwork of the FAO-CIHEAM Inter-Regional on Pastures and Fodder Crops*, Sassari (Italy). *Options Méditerranéennes, Series Cahiers*, 45, p. 29-32.
- Issolah R. and Abdelguerfi A., 2003. Morphological Variability within four Algerian populations of the species *Trifolium spumosum* L. In: 25<sup>th</sup> EUCARPIA Fodder Crops and Amenity Grasses Section Meeting, 1-4 September 2003. *Czech J. Genet. Plant Breed.*, 39 (special issue), p. 205-208.
- Quezel P. and Santa L., 1962. *Nouvelle Flore de l'Algérie et des Régions Désertiques Méridionales*. CNRS, p. 505-514.