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Faba bean status and prospects in Tunisia

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SUMMARY - Faba bean is a major food legume crop grown in Tunisia. It is used for human consumption in a wide range of traditional dishes, as well as for animal feed. Though the agronomic and economic importance of faba bean is well demonstrated, its cultivation is still limited. The national average yield of faba bean is low and varies tremendously from year to year. This fluctuation is due to many factors such as the lack of improved cultivars, the inadequacy of some cultural practices used by farmers, the high susceptibility of local material to diseases and pests and the sensitivity of the crop to environmental conditions. Faba bean production is also affected by the absence of clear motivating price policy and inadequate marketing system. Recognizing the agronomic and dietary importance of faba bean, research on this crop has been and will be given priority in Tunisia.

RESUME - "La situation et les perspectives de la fève en Tunisie". La fève est le légume sec le plus cultivé en Tunisie. Elle entre dans la préparation d'un grand nombre de plats traditionnels en ce qui concerne la consommation humaine, et elle est également utilisée pour l'alimentation des animaux. Quoique l'importance agronomique et économique de la fève soit bien connue, sa culture est cependant limitée. Le rendement moyen national de la fève est faible, et varie énormément d'une année à l'autre. Cette fluctuation est due à plusieurs facteurs tels que le manque de cultivars améliorés, l'inadéquation de certaines techniques culturales utilisées par les agriculteurs, la grande vulnérabilité des variétés locales face aux maladies et aux insectes ravageurs, et la sensibilité de cette culture aux conditions de l'environnement. La production de fève se voit également affectée par une politique de prix peu encourageants et par un système de commercialisation peu adapté. Conscients de l'importance agronomique et nutritionnelle de la fève en Tunisie, priorité a été et sera accordée à la recherche sur cette espèce.

Introduction

The role of legumes in the farming systems, the human consumption and the animal nutrition is especially important in the Mediterranean region. Having legumes in rotation with other crops is a good management technique which leads to decreased weed infestation in the subsequent crop.

Legume crops are mainly recognized for two characteristics: their faculty to fix atmospheric nitrogen by symbiosis with *Rhizobium* bacteria, and their high protein content. Food legumes are considered the best substitute for meat in many developing countries, especially for the lower income people.

Despite all these beneficial aspects, the area and the production of legumes in Tunisia have not increased in the last years. Statistics on the sown area show tremend-

ous yearly fluctuations with no clear trend (Halila *et al.*, 1989). During the period 1984-87, an average area of 120,000 ha were sown to food legumes in Tunisia (Table 1). They occupy less than 4.5% of the arable land in the North and less than 9% of the area occupied by field crops (Halila, 1986).

Importance of faba bean in Tunisia

Area and yield

Faba bean is a major food legume crop grown in Tunisia (Table 1). The average area allocated to this crop is about 56,000 hectares per year (Fig. 1). Faba bean is grown mainly in the northern part of the country under

Table 1. Sown area of different food legumes in Tunisia (average of 4 years 1984-87).

	Average area (000 ha)	%
Faba bean	57.510	47.8
Chickpea	42.260	35.1
Other food legumes	20.550	17.1
Total food legumes	120.320	100.0

Source: Enquête de base 1984, 1985, 1987, 1988. Ministère de l'Agriculture, Direction de la planification, du développement et des investissements agricoles, Division des statistiques, Tunis, Tunisia.

Table 2. Sown area of food legumes and faba bean in Tunisia (average of 4 years 1984-87).

	Average area of food legumes (000 ha)	Average area of faba beans	
		(000 ha)	%
North	103.090	49.835	86.65
Center	11.520	5.780	10.05
South	5.710	1.895	3.30
Total	120.320	57.510	100.00

Source: Enquête de base 1984, 1985, 1987, 1988. Ministère de l'Agriculture, Direction de la planification, du développement et des investissements agricoles, Division des statistiques, Tunis, Tunisia.

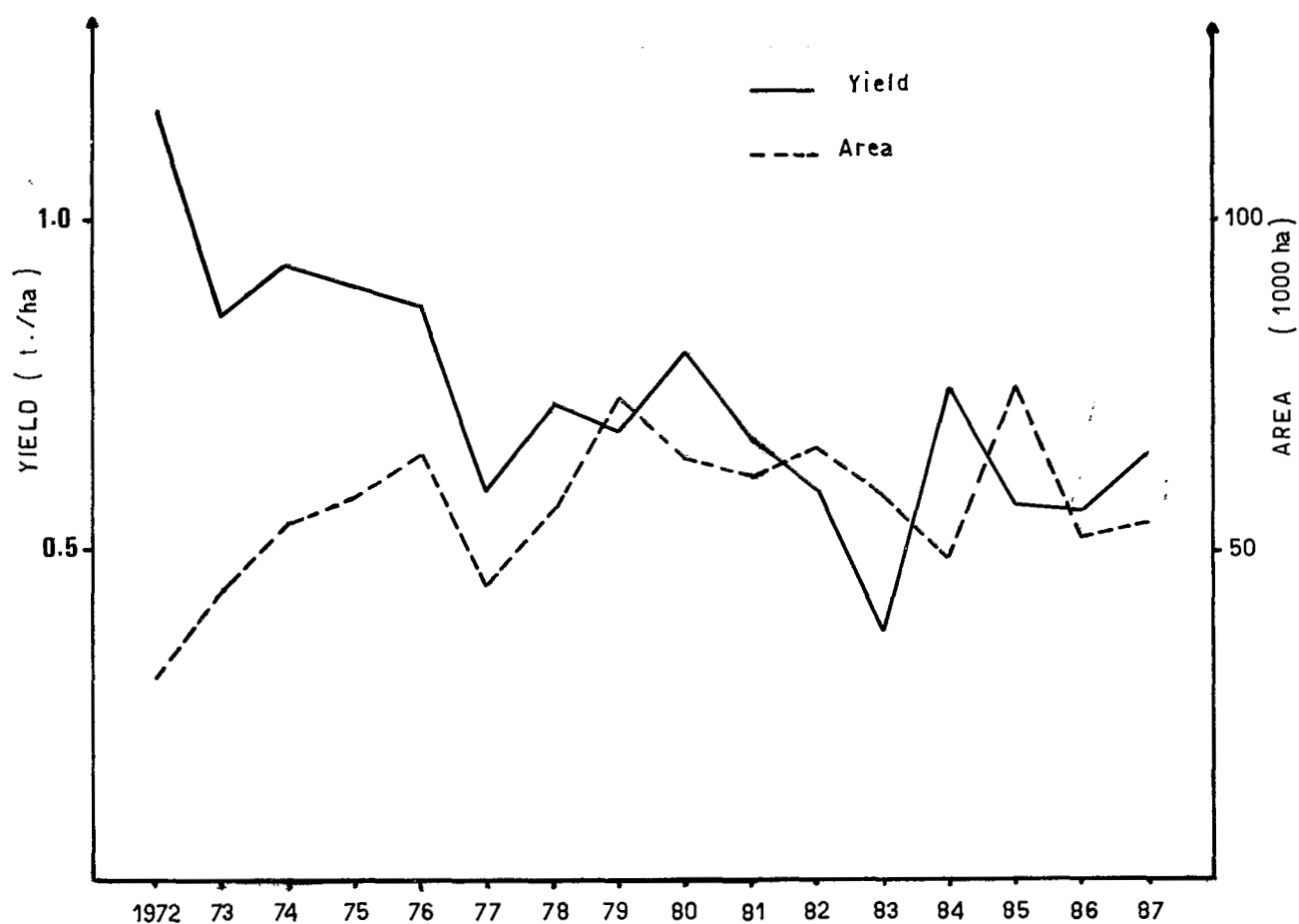


Fig. 1. Evolution of area and yield of faba bean from 1972 to 1987. (Source: Annuaire des statistiques agricoles, 1983, 1988. Ministère de l'Agriculture, Direction générale de la planification, du développement et des investissements agricoles, Division des statistiques, Tunis, Tunisia).

rained conditions (over 400 mm rainfall). A minor growing area is located in the Center and the South of the country under irrigated conditions (Table 2).

The area occupied by faba bean fluctuates from one year to another (Fig. 1). The season's growing conditions and economic factors, especially product prices, determine the area to be planted of each crop (Halila *et al.*, 1989).

The national average yield of faba bean is low (730 kg/ha), characterised by wide fluctuations (Fig. 1). The instability of the yield is mainly due to the lack of suitable genetic material with stable yield and reasonable resistance to the prevalent diseases and pests. Agronomic practices used by some farmers are also responsible for the low yield of faba beans.

Faba bean use

In many parts of Tunisia, faba bean is very common in the diet of the population. Some portion of the faba bean crop is consumed as green pods and seeds, but the most frequent use is as dry seeds, which is also the case for chickpea and lentil. Small seeded types of faba bean are used mainly as animal feed.

Faba bean crops are used in rotations with wheat and barley, which represent the major cereal crops in Tunisia.

Constraints to faba bean production

Diseases and pests

Diseases and pests have been reported as recurrent problems in Tunisia (Anonymous, 1984). This was highlighted during the 1981/82 season, where the majority of faba bean crop was devastated by chocolate spot incited by *Botrytis fabae*. A disease survey conducted in spring 1987, covering the major growing areas of faba bean in Tunisia showed that chocolate spot, followed by alternaria leaf spot (*Alternaria tenuis*) and ascochyta blight (*Ascochyta fabae*) were the prevalent diseases on faba bean. Nematode (*Ditylenchus dipsaci*), rust (*Uromyces fabae*), virus diseases and root rot (*Rhizoctonia* spp.) were also present. Chocolate spot was identified in almost all the areas covered by the survey including the semi-arid and arid areas of the central and southern parts of the country where the climatic conditions are normally not conducive for disease development. The disease was reported in 81% of the total number of fields inspected; however, the aggressive stage of infection was not detected (Kamel *et al.*, 1989).

Aphids and others insects such as *Sitona* spp. and stem borer (*Lixus algirus*) cause some damage to faba bean. The presence of *Orobanche* spp. in some faba bean

growing areas is considered as a limiting factor to the expansion of the crop.

Agronomic practices

Culture is mechanized for small seeded faba bean types in some regions of the country, but in many areas, sowing, weed control and harvesting are still carried out by hand. The lack of use of improved technologies related to cultural practices and mechanization were a severe limitation to the cultivation and production of faba bean. With the cost of labour rapidly becoming an inhibiting factor to legume production, the evolution of such technologies and their application to the real situation are becoming a matter of urgency.

To overcome these problems, many experiments have been conducted to investigate mainly the effect of the date of sowing and the seed rate and spacing on faba bean yield. Results of these studies have shown that seed yield was significantly reduced by delaying planting from early November to late January, and generally showed a linear increase by raising the plant population from 5 to 12 plants/m² for faba bean large seeded cultivars. Trials conducted at INRAT experimental station of Bèjà showed no significant seed yield response to nitrogen and phosphate application, and no difference was observed between applying phosphate as di-ammonium phosphate or as triple super-phosphate (Anonymous, 1986; ICARDA, 1986).

The seed yield of faba bean can be severely reduced by weed infestation. The average reduction due to weed infestation was around 80%. Hand weeding at two 45 day intervals after emergence gave a reasonable weed control. No herbicide or combination of herbicides could be considered effective in controlling the weed population. The best result was obtained by the combination of Igran (terbutryne) and Kerb (propryzamideplus pronamide) in pre-emergence application (Anonymous, 1986; ICARDA, 1986).

Social and economic constraints

Most of the farmers in Tunisia have a low training level which constitutes a handicap to a better assimilation of new technical practices. The absence of a clear motivating price policy and inadequate marketing system affect also faba bean production.

Faba bean improvement research program

The faba bean improvement program was initiated in 1981 with a cooperative research program on food leg-

umes between the national program and the International Center for Agricultural Research in the Dry Areas (ICARDA). The program was carried out within the Institut National de la Recherche Agronomique de Tunisie (INRAT).

Breeding program

Since 1981-82 season, ICARDA provided our breeding program with hundreds of entries and segregating populations. Most of this material was relatively unadapted for our local conditions, probably because of the relatively narrow adaptation of genetic material bred under Tel Hadya conditions. To overcome this problem, our program started to put much greater emphasis on testing and selecting segregating populations and early generation breeding lines under local environmental conditions. Based on these remarks, selfing and selection were undertaken within a number of local populations to assess existing variation.

Furthermore, segregating materials coming mainly from crosses ordered by our program and made at ICARDA, Aleppo, using Tunisian adapted parents and disease resistant material identified at ICARDA are planted under controlled pollination conditions. Selections were performed within this material.

Selection for *Orobanche* resistance was initiated and developed by the use of a highly *Orobanche* infested field at Béjà. So far, none of the lines tested had shown any degree of resistance even in crosses which were targeted for the incorporation of resistance to this pest into local material. It is planned to continue using this plot for field *Orobanche* screening.

Conclusion: prospects of faba bean in Tunisia

Faba bean is considered as an important source of dietary protein for human and animal nutrition. It also

contributes to farmers's income and improves the soil fertility through biological nitrogen fixation.

The need of plant protein is increasing mainly for livestock. Faba bean is considered as a best substitute for other source of imported plant protein used by livestock producers. However, the area allocated to small seeded types of faba bean remains low and more emphasis should be laid for encouraging farmers to incorporate this crop in the rotation systems. To satisfy the increasing demand of faba bean seeds, a regional strategy aiming for the improvement of certain agronomic practices and genetic material could be developed.

For this purpose, we suggest: to exchange genetic material and expertise, to perform joint trials, to use off-season growing facilities and to develop common strategies for faba bean improvement in North Africa and South Europe.

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