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GENERAL ARTICLE

A REVIEW OF THE PRESENT STATUS AND FUTURE PROSPECTS OF *VICIA FABA* L. IN CYPRUS

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Introduction

Faba bean (*Vicia faba* L.) is the fourth most important pulse crop in the world after dry beans, dry peas, and chickpeas (Hawtin and Stewart 1979). China produces about two-thirds of the world's total production, while the second largest producer is Ethiopia with about 7%. Other important regions for faba bean production are northern Europe, the Mediterranean Basin, and Latin America (Hawtin and Hebblethwaite 1983).

Faba bean is an important grain legume in much of the northern temperate zone and at higher altitudes in the cool season of some sub-tropical regions. In some Asian, African, and Mediterranean countries the green or ripe seeds provide a substantial part of the protein in human diets. In western Europe the use of fresh or preserved faba bean is confined to restricted areas and to the large-seeded varieties; Smaller-seeded varieties are cultivated on a larger scale for animal feed and, on a limited scale, for racing pigeons. Faba bean is also occasionally used in mixtures with other crops for silage or for green manure, and the crop also functions as a beneficial break from cereals (Bond 1976). However, few countries supply all their animal protein feed from faba beans.

According to Bond (1979) the species *Vicia faba* L. is divided into the subspecies or botanical varieties, *major, equina, minor,* and *paucijuga*. In the UK and where English is spoken in Europe, *V. faba equina* and *minor* are usually referred to as field beans, and *V. faba major* as broad beans. Within this there is the subdivision of field beans into horse beans (*equina*), which may be either winter or spring-sown types, and tick beans (*minor*). Broad beans are often classified as either long-pod or Windsor types.

In Cyprus, broad bean (*V. faba major*) is one of the major pulses (Table 1). The area under cultivation during the last 20 years and the production and value of fresh and dry broad beans are shown in Table 2.

Table 1. Area, production, exports, imports and value of the major pulses in Cyprus during 1982.

Crop	Area (ha)	Production (t)		Value (1000 C£)	Export		Import	
		fresh	dry		Quantity (t)	Value at FOB prices (1000 C£)	Quantity (t)	Value at CIF prices (1000 C£)
Faba bean	1,071*	1,016	1,524	688.0*	916.0	369.2	231.0	89.8
Haricot bean	616*	1,981	559	854.0*	261.5*	107.7*	691.0	269.2
Chickpea	2,268		183	57.6	5.1	2.5	257.0	67.5
Lentil	136		102	36.0	25.0	9.3	382.2	133.7
Cowpeas	402	1,016	203	448.0			327.0	126.1

* fresh + dry.

Table 2. Area, production, and value of faba bean in Cyprus, 1960-1982.

Year	Area (ha)	Fresh			Dry		
		Production (t)	Average price (C£/t)	Value in 1000's C£ at current prices	Production (t)	Average price (C£/t)	Value in 1000's C£ at current prices
1960-64	14,793	3132	39.3	122.6	5388	105.4	562.3
1965-69	10,609	5030	31.5	157.5	8533	80.1	670.6
1970-74	14,726	7163	46.0	230.0	11430	111.2	1248.2
1975	1,339	813	52.5	42.7	1524	122.0	186.0
1976	1,539	1016	64.4	65.4	1778	141.7	252.0
1977	1,339	1168	80.9	94.5	1422	185.1	263.2
1978	1,339	1219	72.9	88.9	2032	196.9	400.0
1979	1,473	1168	104.6	122.2	1829	208.6	381.6
1980	1,606	1016	115.2	117.0	2235	196.9	440.0
1981	1,339	1118	129.9	145.2	1829	189.0	345.6
1982	1,071	1016	145.7	148.0	1524	354.3	540.0

Faba beans are consumed locally as immature green pods or seeds as well as mature dry seeds. Cyprus is self-sufficient in this crop, and exports a large amount of seed every year (Table 3). A small amount of green seeds as well as the imported dry small seeds are preserved by canning, mainly for export. By-products of seed production and a failed green crop are utilized for animal feed.

In 1980 a study of the present status and future prospects of the crop was undertaken by the Agricultural Research Institute, Cyprus. The results of this study and updated information are presented in this paper.

Present status of the crop

Faba bean is traditionally grown in the Orounda-Peristerona area in the Nicosia district where it is one of the main crops, grown in rotation with cereals and vegetables. In these areas the crop is exclusively grown for dry-seed and normally receives spate irrigation. It is also one of the main

Table 3. Exports and imports of dry faba bean, Cyprus, 1960-1982.

Year	Exports			Imports		
	Quantity (t)	Price (C£/t)	Value at FOB prices (1000 C£)	Quantity (t)	Price (C£/t)	Value at CIF prices (1000 C£)
1960-64	1890	89.2	162.8	775	69.9	52.5
1965-69	5435	79.5	462.1	2305	49.1	94.5
1970-74	4166	133.4	510.8	298	182.9	44.9
1975	411	233.7	96.1	49	235.8	11.6
1976	645	239.7	154.6	59	252.2	15.0
1977	536	247.3	132.6	122	215.7	26.3
1978	1644	266.1	437.5	91	135.2	12.3
1979	1313	283.8	372.7	80	174.2	14.0
1980	1242	279.7	347.4	60	266.7	16.0
1981	1109	288.4	319.8	86	334.9	28.8
1982	916	403.1	369.2	231	388.7	89.8
	Exports			Imports		
Country	Lebanon, Iraq, Syria, Jordan, and others			USA, Greece, Morocco, UK, Holland and others.		

crops in some villages of Paphos area, where it is grown mainly under dryland conditions, but is given 1-2 irrigations at critical stages, when water is available. On a smaller scale, it is grown in the Limassol district in rotation with other crops. In the Larnaca area it is grown on a very small scale and exclusively for green pods and seeds, while in the Famagusta area it is usually grown within other crops for family use only.

Almost all the faba bean area is under the local variety, while an introduced variety is grown on a very small scale. The local variety has an indeterminate growth habit with three ovules per pod. Plants are relatively short, with pods produced on the lower nodes. Flowers are white with black spots, relatively few in each node. The variety is a *major* type with large seeds, but the size and shape of seeds is uneven. The introduced variety has long pods with up to six seeds per pod, with smaller seeds than the local variety.

The crop is usually sown in December to February and matures during May-June, depending on the year and the locality. In the Larnaca area it is sown in late September-early October in order to supply the early market with green pods. The crop is hand-sown, either broadcast or sown in rows 30-90 cm apart. A mouldboard plow or a ridger plow is used to cover the seed. Seed rates range from 149 to 209 kg/ha. Fertilizers (phosphorus, nitrogen, and potassium) or manure are used.

Traditionally, harvesting is by hand. Plants are pulled up and are allowed to dry off. When they have completely dried off, seeds are threshed from the plant debris on a threshing floor, by means of a special piece of wood or a tractor rolling over them, and then winnowed (Photiades and Alexandrou 1979). However, a specially modified combine harvester has been used successfully to harvest faba beans in the western part of the country. One harvesting method which is used with some modifications in the Polis area, and which is recommended to the farmers by Xenophontos (1983), is to cut the crop before it is completely dry with a cutter bar and to use a threshing machine to separate the seed from the straw after drying. However, the local variety constrains mechanization; pods are carried low on the plant, making cutting difficult, and the large seeds are difficult to thresh by machine. In addition, the stoniness of the fields in many cases prevents the use of a cutter bar.

Weeds are an important problem in faba bean crops. Until recently, weed control involved hand-hoeing once or twice. Recently, chemical herbicides have been applied pre-emergence or post-emergence with satisfactory results.

A serious problem is presented by broomrape (*Orobanche* spp.). The crop in infested fields may be totally destroyed. *Orobanche* spp. can produce up to a million seeds per plant, which reinfest the land before the end of the cropping season. A susceptible crop cannot be grown for many years following orobanche infestation because the parasite's seeds survive dormant in the soil (Basler 1979). In the Mediterranean region two species, *O. ramosa* and *O. crenata*, prevail and cause considerable losses in tomato, potato, tobacco, sunflower, faba bean, and other crops (Saghir and Dastgheir 1979). Nattrass (1936) reported that in Cyprus faba beans suffered most severely from *Orobanche crenata* and suggested hand pulling of orobanche spikes before the flowers set seed. This is very laborious, however, and since orobanche has not been controlled infestation is increasing. In recent research work in Egypt the herbicides Lancer (glyphosate) and Kerb (propyzamide) showed good control of orobanche (Zahran *et al.* 1980; Zahran 1982).

Observations by the ARI nematologist (Philis, personal communication) have shown that faba beans are seriously attacked by a seed and soil-borne nematode, the stem eelworm, *Ditylenchus dipsaci*. It usually attacks the base of the plant but may extend to the pod bearing region. The giant race of this species was found to be a serious pest of faba bean in the Mediterranean region (Hooper 1980). The occurrence, distribution, and infestation intensity of *D. dipsaci* in Cyprus has recently been reported by Augustin (1983) in a study which also included Syria and Egypt. This nematode can withstand desiccation and can be dispersed in dried plant debris and especially in seed.

Sitona weevil is a serious pest of faba bean in Cyprus. In the case of heavy infestation, the plants may be completely defoliated. The weevil attacks many leguminous plants, including peas, beans, alfalfa, and clover (Kawar 1979).

Other pests of broad beans in Cyprus are aphids (*Aphis rumicis* L.) and seed beetles (*Bruchus rufimanus* and *Bruchus dentipes*). Common diseases are chocolate spot (*Botrytis fabae*), *Cercospora fabae, Ascochyta* sp., *Uromyces fabae, Fusarium* spp. and possibly others. *Botrytis fabae* can be very important, becoming epidemic in hot and humid spring weather during flowering and fruit maturation, causing large yield losses. Farmers plow-in crops which are severely infected (Djerbi *et al.* 1979). Advice to farmers on control of pests and diseases and crop production is given in leaflets of the Department of Agriculture, Cyprus (Soteriadou and Orphanides 1976; Xenophontos 1983).

coefficients of nitrogen, organic matter, and gross energy were also similar for all diets with both species (Animal Production Section, 1983).

Weed and orobanche control: A trial of pre-emergence herbicides was conducted in 1981, in cooperation with ICARDA. All treatments were very effective against weeds, and did not affect the emergence of the crop (Plant Protection Section 1982). In 1982 chemical weed-control trials as well as orobanche control trials, were established by the Plant Protection Section (1983) in Orounda and Peristerona areas. Results were very promising. The trials were repeated in 1983.

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SHORT COMMUNICATIONS

General

ECONOMIC ANALYSIS OF FARMER–MANAGED TRIALS ON FABA BEANS IN SUDAN 1982/83

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Faba bean (*Vicia faba*) is becoming increasingly important in Sudanese diets. Its consumption is no longer confined to urban areas, as in the past, but has spread to almost all parts of the country. This is associated with a three-fold increase in the area under the crop between the 1960s and the 1970s and a yield increase of about 25% (Salkini *et al.* 1983a). All of the domestic production is consumed in Sudan, and additional quantities of faba beans have been imported in 1981 and 1983.

In spite of the increased production levels there has been a trend of rising prices for faba beans. For example, in the Zeidab area, farmgate prices reached LS 581/t in 1982/83 (Faki 1983), compared with LS 362/t in 1979/80 (Salkini *et al.* 1983b). Retail prices of more than LS 1600/t in major consuming centers in 1982/83 indicate high marketing margins, with estimated price elasticity of demand of only 0.2 (El Mubarak Ali *et al.* 1984). This indicates opportunities for profit from faba beans for both farmers and marketing agencies.

In Sudan, 98% of the crop is grown in the Northern and Nile provinces of the Northern Region. Despite overall increases in yields, the potential for further increases are enormous (El Sarrag 1981; Salkini and Nygaard 1983). Since 1960, considerable research has been conducted on problems which limit yield and on improving quality (Salih 1980). Since the 1978/79 season, increased research efforts have been supported by the ICARDA/IFAD Nile Valley Project, which has focused on yield improvement via a multidisciplinary approach. Testing of research findings in farmers' fields (on-farm research) has been the major activity of the project.

This paper presents the agroeconomic results of the farmer-managed trials on faba beans in Sudan in 1982/83. These trials were conducted at several sites in each of three large irrigation schemes: Aliab, Zeidab, and Seleim. The trials were mostly managed by the farmers, with supervision and monitoring by scientists and technicians. The effects of early sowing (from the last week of October to the first week of November), more frequent irrigation (every 10 days), and pest control when insect infestations were noted, were compared with farmers' practices in these areas of late sowing, fewer irrigations (every 15-20 days), and no pest control. At Seleim, handweeding was also included in the trial. All other operations were done according to the farmers' normal practices. The area of each farmer-managed plot was about 0.5 ha. Seed yields, costs, and benefits estimated from the trial plots were compared with those of the rest of the farmers' fields by partial budget analysis (Table 1).

Farmgate prices prevaling at harvest time in each region, used in the budgets, were LS 519, LS 581, and LS 667 in Aliab, Zeidab, and Seleim, respectively. Irrigation water is the most expensive of the variable costs. The water rate on government schemes in 1982/83 was LS 85.7/ha/season, corresponding to LS 14.29/ha/irrigation, assuming 6 irrigations per season as general practice in these areas; this was the figure used in calculating the budgets.

Results

The practices tested significantly increased seed yields by 515, 1119, and 564 kg/ha in Aliab, Zeidab, and Seleim, respectively, over the farmers' practices. Allowing for the increased costs, the test package was profitable at all sites in Zeidab and Seleim, and at five out of seven sites in Aliab (Table 1). Average marginal rates of return were 188% in Aliab, 307% in Zeidab, and 217% in Seleim, reflecting favorably on the test package. There was, however, considerable variation in profitability between farms, especially in the Aliab and Zeidab schemes.

While these figures are realistic for both Aliab and Zeidab, the situation is different for Seleim, where irrigation is done with small, privately-owned pumps. The prevailing practice is that the pump owner receives half of the crop as payment. Assuming this as the irrigation cost, profitability of the test package for farmers in Seleim is lower than that of their normal practices in three cases out of four (Table 2).