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Chickpea in Algeria

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SUMMARY - Chickpea production in Algeria did not improve in spite of intensification of agricultural services. Drought has been the major yield retardant as the crop is generally sown in spring. Winter sowing has, however, opened new opportunities for increased chickpea production and if research and transfer of technology is properly directed to extend this technology it would greatly benefit farmers, particularly if the prices are set at an attractive level. There is also scope for expanding the area under cultivation, which would additionally increase total production to bridge the current gap between the demand and supply.

RESUME - "Le pois chiche en Algérie". La production du pois chiche en Algérie n'a pas augmenté, en dépit de l'incitation des services agricoles. La sécheresse a été le principal facteur limitant du rendement, la culture étant semée généralement au printemps. Cependant, le semis d'hiver ouvre de nouvelles perspectives pour l'augmentation de la production de pois chiche. Si la recherche et le développement sont correctement réalisés pour développer cette technique, le pois chiche d'hiver devrait beaucoup apporter aux agriculteurs, particulièrement si le prix est maintenu à un niveau attractif. Cette technique devrait aussi permettre une augmentation des surfaces cultivées en pois chiche et donc en définitive augmenter la production totale et combler le déficit actuel de production.

Introduction

Chickpea (*Cicer arietinum*) is well-known in Algeria, as is the case in all other Mediterranean countries. Indeed, it has been grown for a long time, and its use as human food is fairly frequent in soups (Chorba and Harira), sauces (Couscous), dishes (Tadjines), and sandwiches (Karentika). Chickpea is also mixed with coffee. With increase in population the demand for chickpea has surpassed the national production in recent years which has prompted the public authorities to resort to importation.

Evolution of area and production

The area annually sown to chickpea since 1924 has shown a tendency for slow expansion in spite of large year fluctuations. The area increased from 14,500 ha in

1924 to 26,000 ha in 1953, and from 18,230 ha in 1964 to 26,694 ha in 1974. In 1987, it reached a record high value of 60,450 ha (Fig. 1). The increase in area became more pronounced from 1983, when the implementation of the program for decreasing fallow areas and intensifying food legume production started. The area devoted to food legumes has now exceeded 100,000 ha and of this 40,000 ha are devoted to chickpea.

It is clear from Fig. 1 that the first 4 years of the 1980s had a negative effect on the total area sown to chickpea. This is attributed to the drought in these years.

The average yields during the period 1974 to 1987 have remained low (200 to 400 kg/ha) and unchanged. Therefore the growth curve of the national production (Fig. 1) over this period has followed a trend similar to that of the total cropped area. Since 1983, national production has appreciably improved to reach a level of 25,140t in 1987. This improvement is still insufficient as compared to the total national need estimated at 45,000 t of chickpea/annum.

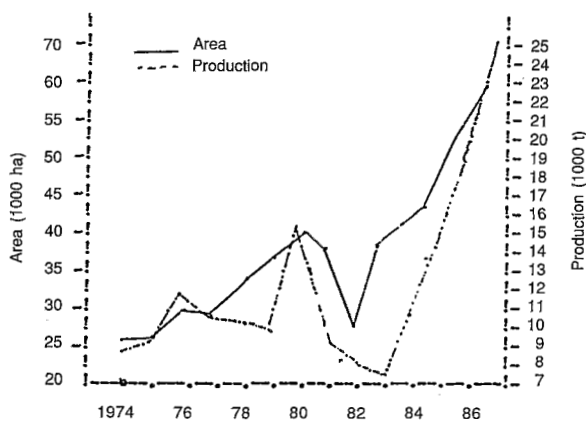


Fig. 1. Area and production of chickpea in Algeria, 1974 to 1987.

Current production practices

Chickpea is planted after wheat or barley in a three course rotation sharing the 3rd course with forage legumes, summer crops (water melon, melon), or fallow. The crop is sown between 15 February and 15 March either using a single row or a paired row planter, or by hand broadcast. About 30% of the farmers in the Sidi Bel Abbes region planted their crop by hand broadcast in 1987.

Row-spacing varies between 52 and 70 cm generally, but the extreme range would be from 35 to 150 cm. Population density ranges from 13 to 41 plants/m² with an average of 27 plants/m². Only triple superphosphate (46%) is applied before or after plowing at a rate of 100 kg/ha.

Major production constraints

Climate

Drought is one of the primary constraints to agricultural production in Algeria. Annual rainfall has been tending to decrease over the last 10 years as compared to the long term average values. This decrease in precipitation varies from 10 to 50% of the average, depending on the year and the region. Besides, 70% of annual rainfall occurs in fall and winter, only 30% is received in spring during storms.

Weeds

Weeds pose the main problem in chickpea production in Algeria. However, less problems are encountered in spring-planted crops because most of the weeds are mechanically controlled during seed-bed preparation in winter. Nevertheless, weed infestation remains high in chickpea fields in spite of mechanical and chemical weed control. The main weed species are spring types, such as *Convolvulus arvensis*, *Cardus* spp., *Polygonum aviculare*, and several members of *Liliaceae*.

Diseases

The main disease affecting chickpea crop during the seasons with spring rains is ascochyta blight caused by *Ascochyta rabiei*. This disease, in our country, is attributed by farmers to late rains which wash out the soluble metabolites including malic acid from the plant organs at the flowering stage. For this reason, farmers prefer to sow their chickpea crop as late as possible. This disease caused complete loss of crop on hundreds of hectares in 1985.

The second main disease, which seems to become more serious because of the drought, is wilt.

Insects and other pests

Leafminer *Liriomyza cicerina* is present in all chickpea producing zones. The damage caused by this insect appears to be increasing. However, no studies have been conducted until now to estimate yield loss. Pod borer (*Heliothis armigera*) has been found to have little effect on the spring sown crop so far. But its incidence has to be carefully followed.

Considerable damage is inflicted by birds, particularly pigeons, in most of the production areas as the crop gets established. In certain plots, population is reduced by 50% during germination and early seedling stage, which reduces yield.

Research and perspectives for future development

Research activities on legume crops in Algeria are still at the embryonic stage because in the past those species were not considered as important as today. The willingness of the planners to intensify production of legumes to meet national needs and to improve farming systems has brought about a new drive in research structure to attend to the major production constraints of the crop. The "Institut Technique des grandes Cultures" (ITGC)

with its 8 experimental stations covering all of the main production areas, is promoting the culture of legume crops in general and chickpeas in particular at the farmers level. The program initiated 10 years ago allowed to introduce mechanization, develop an appropriate production technology, and select many new cultivars adapted to winter sowing.

Winter sowing

Yield of traditional spring sown chickpea is largely dependent on the moisture conserved in the soil at the end of winter and on the climatic conditions in spring, which are often not favourable. In this situation, the possibilities to improve production through sowing in winter seem very promising because this allows the plant to better exploit the rains received during winter.

Results from sowing-date trials confirm that early-sowing is advantageous (Fig. 2). The yield advantage with early sowing over the traditional spring sowing ranged from 20 and 100% depending on the season with an overall increase of 70% over the three seasons (1977/78 to 1979/80) at Sidi Bel Abbas. This also indicates that climatic conditions affect average yield and that the interaction between sowing-date and year is significant. However, it was observed that during 1978/79, which was a cold year, the difference between the two early dates (15 Dec. and 15 Jan.) was not significant.

Whereas the early sowing allows a certain yield improvement, its spread would not be without problems. The reluctance of the farmer to advance sowing is dictated by the risk he is taking with respect to ascochyta blight which occurs in general during Feb-Mar and which might develop into epidemics if moisture conditions are favora-

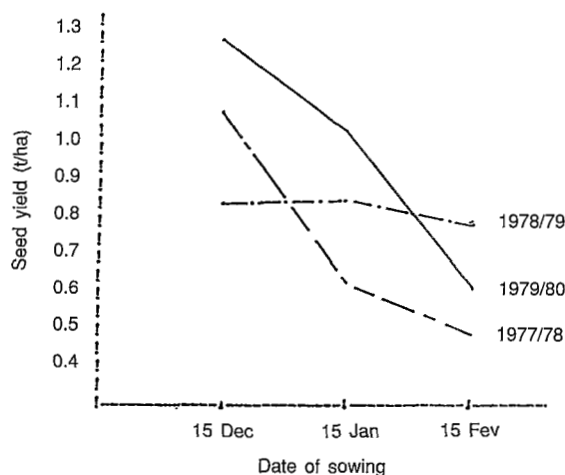


Fig. 2. Effect of date of sowing on the yield of chickpea at Sidi Bel Abbas Research Station, 1977/78 to 1979/80.

ble, particularly because the local varieties are generally highly susceptible to the disease. Even though selection work has permitted the identification of tolerant varieties among the material received from ICARDA, it was shown that given the diversity of *Ascochyta rabiei* strains in Algeria, this disease remains a potential hazard to chickpea crop.

Currently two cultivars, ILC 3279 and ILC 482, have been found suitable for winter sowing in Algerian conditions and seed multiplication is progressing satisfactorily. The first cultivar, though late maturing and having a grain type which is not entirely to the liking of the consumers possesses two important attributes-resistance to ascochyta blight and satisfactory height for machine-harvesting, which are liked by the farmers. The second cultivar which possesses acceptable seed quality is interesting with respect to earliness and productivity, although it shows susceptibility to some strains of *Ascochyta rabiei*.

The other diseases identified on chickpea and isolated in the laboratory (Mr. Bouzenad, INA, El-Harrach) include *Stemphyllium* spp., *Fusarium* spp. and *Ascochyta pinodella*: *Phoma medicaginis* var *pinodella*. Another disease whose symptoms were observed for the first time in 1988 in a large number of fields could not be identified. The symptoms consisted of wilting of one or many of the main branches caused by the blockage of the vessels that lignify. When all the shoots have been infected, the plant can regrow from the basal buds. *Fusarium*, *Rhizoctonia*, and *Sclerotinia sclerotiorum* were initially suspected as the causal agents but none of those pathogens could be isolated from the infected plants.

Early-sowing requires a better control of weeds as weeds offer a serious competition to the winter sown crop. Whatever control method is used, the objective is to keep the plot clean throughout the life cycle of the plant. However, the currently used chemicals and mechanical methods do not seem to totally meet this objective. The chemical method provides a control that is restricted to the first three months of the life cycle of the plant. The mechanical method, using the inter-row cultivation, does not control weeds within the row.

Conclusion

Chickpea production in Algeria did not improve in spite of the intensification of efforts of the agricultural services. Drought, which frequently occurs in spring, seems to be the major retardant of yield of chickpea in Algeria. However, winter-sowing seems to have opened new opportunities for the expansion of cultivation of this species in the medium-term if this technology is promoted at the research and extension level. Winter-sowing ensures a stable yield to farmers and makes them more confident in this crop from the financial view point. Chick-

pea production can be further encouraged through setting attractive prices. Current production costs are at Algerian dinar 600 per ha as against dinar 300 in 1980. With attractive market price and improved productivity

through winter-sowing farmers can be encouraged to expand cultivation of this crop. This could lead to self sufficiency in chickpea in the country.