

C.P. = 504

With compliments and
warmer regards to
Dr. Y. L. Nene.

UB

27/8/92

Disease Resistance Breeding in Chickpea

*Proceedings of the Consultative Meeting on Breeding for Disease
Resistance in Kabuli Chickpea, 6-8 March 1989, Aleppo, Syria*

Editors

K.B. Singh

Principal Chickpea Breeder (ICRISAT)

M.C. Saxena

Leader, Food Legume Improvement Program (ICARDA)

Sponsors

**International Crops Research Institute for the Semi-arid Tropics
International Center for Agricultural Research in the Dry Areas**



International Center for Agricultural Research in the Dry Areas

ICARDA

P.O. Box 5466, Aleppo, Syria

1992

Important Disease Problems of Kabuli Chickpea'

Y.L. Nene and V.K. Sheila

ICRISAT, Patancheru P.O., Andhra Pradesh, 502 324, India

Abstract

Both types of chickpeas, kabuli and desi, are affected by the same range of pathogens. Diseases that are more important in the kabuli chickpea-growing regions are: ascochyta blight (*Ascochyta rabiei*), botrytis gray mould (*Botrytis cinerea*), fusarium and verticillium wilts (*Fusarium oxysporum* and *Verticillium albo-atrum*), collar and root rots (*Sclerotium rolfsii*, *Rhizoctonia bataticola*, *Fusarium solani*, *Rhizoctonia solani* and *Pythium ultimum*), stunt (bean leaf roll virus) and nematodes. While foliar diseases such as ascochyta blight and botrytis gray mould have been responsible for devastating crops in different countries in certain years, soil-borne diseases such as fusarium wilt and collar and root rots have caused less spectacular but consistent damage. This paper gives a brief account of the important diseases of kabuli chickpea with special reference to economic importance, biology and epidemiology, and control. The present status on the availability of sources of genetic resistance to various diseases is discussed.

Introduction

Chickpea (*Cicer arietinum* L.) is the world's third most important grain legume after dry bean (*Phaseolus vulgaris* L.) and pea (*Pisum sativum* L.). Chickpeas are of two types, kabuli and desi. Since this paper deals mainly with the kabuli type, it is pertinent to mention a few characteristics of kabuli types that may have relevance to their susceptibility or resistance to different diseases. Compared with the desi type, plants of the kabuli type in general have fewer anthocyanins. Kabuli seeds have less seed coat mass, higher nitrogen and sugar content, less fiber in whole seed, less cellulose, more protein and sugar in cotyledons, and fewer polyphenols than desi seeds. Some of these characteristics probably make kabuli seeds more susceptible to seed and seedling rot fungi. We are not aware of any disease that affects only the kabuli genotypes and not the desi, although there may be differences in their relative susceptibilities.

Diseases are a major production constraint. More than 70 pathogens have been reported so far on chickpea from different parts of the world (Nene *et al.* 1984). Nene and Reddy (1987) have given a detailed review of the internationally important chickpea

diseases. In this paper we discuss a few of the important diseases of chickpea that are prevalent in the geographical regions where kabuli chickpea is grown widely. Also, to limit the length of the paper, we have cited only selected references. For more details, the readers are referred to the review by Nene and Reddy (1987).

Ascochyta Blight

Ascochyta blight caused by *Ascochyta rabiei* (Pass.) Labr. is one of the most important diseases of chickpea. The disease has been reported from 31 countries: Afghanistan, Algeria, Australia, Bangladesh, Bulgaria, Canada, Cyprus, Egypt, Ethiopia, France, Greece, Hungary, India, Iran, Iraq, Italy, Jordan, Lebanon, Mexico, Morocco, Pakistan, Portugal, Romania, Sudan, Syria, Tunisia, Tanzania, Turkey, USA and USSR (Abdel Monem 1983; Nene *et al.* 1984). Severe outbreaks of the disease in many chickpea-growing countries have contributed to heavy crop losses (Table 1). The damage in Pakistan resulted in a severe shortage of pulses and necessitated their import to the extent of US \$ 6.43 million in 1982/83 (B.A. Malik, pers. comm.). In the Mediterranean region, changing the time of sowing of chickpea from spring to winter increased ascochyta blight severity during 1976/77 (Hawtin and Singh 1984). Productivity of winter-sown chickpea was greatly increased when ascochyta blight was controlled.

Table 1. Reports of losses caused by ascochyta blight in different chickpea-growing countries†.

Country	Year	Extent of loss
Bulgaria	1936	20-50%
Greece	1957/58	10-20%
Morocco	1971	US \$ 10 million
Pakistan	1920/30	50%
	1936	20-50%
	1978/79	17%
	1979/80	48%
	1980/81	Up to 15%
	1981/82	42%
Spain	Post-war period	20-100%
Syria	1974‡	0.5-1.0 t/ha
	1981	5-30%
	1982	30%
Tunisia	1981	40%
USA	1987§	US \$ 1 million
USSR	1956¶	100%

† Based mainly on Nene and Reddy (1987).

‡ Hanounik (1980).

§ Kaiser and Muehlbauer (1988).

¶ Nemlienko and Lukashevich (1957).

