

Strategies for Management of Foliar Diseases of Chickpea

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Abstract

Ascochyta blight (AB), botrytis gray mold (BGM), alternaria blight (ALB), rust, and stemphylium blight (SB) are important foliar diseases of chickpea. Foliar diseases occur in areas that have the highest potential for chickpea production due to a long growing season and lack of drought stress. Thus good growing conditions for chickpea and occurrence of foliar diseases are linked and, unless the linkage is broken, there is very little chance of increasing chickpea production in the northern latitudes

Among the foliar diseases, serious attempts have only been made to develop control measures for AB. High and stable genetic resistance, especially in the podding stage, is lacking in the available germplasm. Integration of host-plant resistance with foliar fungicidal sprays is effective and feasible, but needs wider testing and evaluation

Limited screening for BGM resistance and observations on disease epidemics indicate that it may be difficult to obtain a sufficient level of genetic resistance for exploitation in the management of the disease. There appears to be some scope for manipulation of plant geometry (including intercropping) and crop maturity for the management of the disease. It is essential to integrate the control measures for AB, BGM, and other foliar diseases, as the incidence of these diseases can overlap in certain areas.

The epidemiology of the diseases is not fully understood and this information is essential for developing effective management practices. Germplasm enhancement for resistance and studies on genetics of resistance and pathogenic variability also should receive better attention

Résumé

Stratégies de gestion des maladies foliaires du pois chiche : La flétrissure ascochytiqne, la pourriture grise due à botrytis, la flétrissure causée par alternaria, la rouille et la pourriture due à stemphylium sont d'importantes maladies foliaires du pois chiche. Les maladies foliaires se produisent dans des régions qui ont le meilleur potentiel de production de pois chiche, en raison d'une saison de culture longue et de l'absence de stress hydrique. Il existe donc un lien entre de bonnes conditions de culture du pois chiche et l'apparition de maladies foliaires. Par conséquent, il ne semble guère possible d'accroître la production de pois chiche dans les latitudes nord à moins de briser ce lien.

Parmi les maladies foliaires, seule la flétrissure ascochytiqne a fait l'objet d'efforts sérieux de mise au point de moyens de lutte. Il n'existe pas de sources de résistance élevée et stable, particulièrement au stade de formation des gousses, dans le matériel génétique disponible

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ICRISAT Conference Paper no. CP 560.

Citation: ICRISAT (International Crops Research Institute for the Semi Arid Tropics). 1990. Chickpea in the Nineties: proceedings of the Second International Workshop on Chickpea Improvement, 4-8 Dec 1989, ICRISAT Center, India. Patancheru, AP 502 324, India. ICRISAT.

actuellement. L'intégration de la résistance de la plante-hôte avec la pulvérisation de fongicides sur les feuilles est efficace et faisable mais exige davantage d'essais et d'évaluations.

Un criblage restreint pour la résistance à la pourriture grise due à *botrytis* et des observations sur les épidémies de la maladie indiquent qu'il pourrait être difficile d'obtenir un niveau suffisant de résistance génétique pour servir à la lutte contre la maladie. Il semble possible de manipuler la géométrie des plantes (y compris la culture associée) et la maturité de la culture pour maîtriser la maladie. Il est essentiel d'intégrer des moyens de lutte contre la flétrissure ascochytiqque, la pourriture grise due à *botrytis*, et d'autres maladies foliaires, car l'incidence de ces dernières peut se chevaucher dans certaines régions.

L'épidémiologie des maladies n'est pas encore complètement comprise et cette information est essentielle pour mettre au point des pratiques de gestion efficaces. L'amélioration du matériel génétique pour la résistance ainsi que les études sur la génétique de la résistance et la variabilité pathogénique devraient également recevoir davantage d'attention.

Chickpeas suffer from some serious foliar diseases. In the order of importance worldwide, these are ascochyta blight (*Ascochyta rabiei* [Pass.] Labr.), botrytis gray mold (*Botrytis cinerea* Pers. ex Fr.), stemphylium blight (*Stemphylium sarciniforme* [Cav.] Wilts.), alternaria blight (*Alternaria alternata* [Fr.] Kiessler), and rust (*Uromyces ciceris-arietini* [Grog.] Jaz & Beyer). The incidence of these diseases is mainly confined to the chickpea-growing regions between latitudes 25° and 45°, where the weather is cooler and wetter than in growing regions at lower latitudes. As the higher latitude areas have the greater production potential, management of foliar diseases is important for increasing chickpea production.

Research on chickpea diseases has recently been reviewed by Nene and Reddy (1987). Here, we attempt to summarize progress made during the past 10 years, identify the gaps in knowledge as well as research constraints, and to suggest research strategies for the future.

Ascochyta Blight

Ascochyta blight (AB) is most serious between the latitudes 30° and 45°, where relatively low temperatures (15°-25°C) prevail during the crop season and favor its development. Appearance of the blight however is not regular. The disease develops whenever the winter-sown chickpeas in northwest India and Pakistan and spring-sown chickpeas in the Mediterranean region receive rains during the crop season. There is no AB problem if there are no rains but then drought reduces the yield. A good season for the chickpea crop is also favorable for AB and low yields result (Fig. 1). This relationship will have to be considered when we develop effective disease management strategies.

The average yield of spring-sown chickpeas in the Mediterranean region is low (about 0.75 t ha⁻¹) mainly due to drought and heat stress. Advancing the sowing date into autumn results in 50-100% yield increase provided AB is controlled (Hawth and Singh 1984). Hence control of AB is essential for increasing chickpea production in the countries in the Mediterranean region but also in the major chickpea-producing regions in India and Pakistan.

Botrytis Gray Mold

Botrytis gray mold (BGM) causes concealed damage in chickpea, and its importance has only recently been realized. Without visible symptoms on foliage, the disease can cause flower drop resulting in poor pod setting, and extension of the crop duration. Some pod setting may occur late in the season when the day temperatures exceed 30°C and conditions are unfavorable for the disease. But the yields in such situations

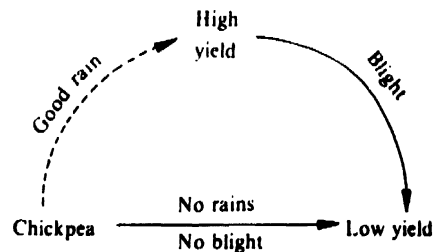


Figure 1. Relationship between chickpea yields and ascochyta blight (*Ascochyta rabiei*).

