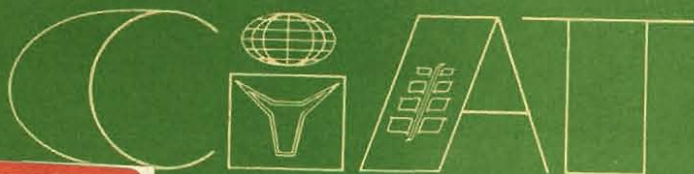


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CIAT's Bean Disease Management Dilemma-Evolvement of a Progressive rather than a Responsive Strategy

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SUMMARY

Dry beans (Phaseolus vulgaris L.) are susceptible to more than 250 different plant pathogens endemic to tropical regions of the world. The prevalence and severity of each pathogen or complex of pathogens is influenced by various factors such as temperature and moisture regimes, inoculum availability, cultural systems, and degree of varietal susceptibility. Disease management measures exist which can reduce production losses caused by bean diseases; and consist of planting pathogen-free seed, crop rotation, cultural practice modifications, biological control agents, chemicals, improved plant architecture to favor disease avoidance, and breeding for disease resistance.

The CIAT Bean Program has been actively involved since 1973 in the process of improving dry bean productivity in Latin America. Its efforts have concentrated on breeding improved germplasm possessing resistance or

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tolerance to several important production constraints, including diseases of widespread prevalence. Significant advances have already been made, and high-yielding materials with resistance to one or more prevalent diseases are currently being tested and grown by collaborators in many national programs throughout Latin America.

However, the performance of various materials is being adversely affected by other diseases that are prevalent only in specific bean production regions. Many of these regionally prevalent diseases are capable of causing severe yield losses to dry beans (Figure 1), and individual or complexes of pathogens may pose serious threats to current as well as future bean production in those regions. Likewise, pathogenically variable organisms, such as those causing rust, anthracnose, and angular leaf spot, may threaten the stability of various resistance sources currently being utilized by national programs and CIAT.

During its formative years, the Bean Program has pursued a responsive disease management strategy, whereby disease priorities and breeding projects were selected in response to those pathogens which CIAT and national program scientists considered to be most widespread and limiting to Latin American bean production in general. As other pathogens gained notoriety and increased in prevalence, the Bean Program has responded by including them within higher priority breeding projects. This responsive disease management strategy is therefore characterized by its emphasis upon past and current threats to the crop in major bean production regions of Latin America. This strategy does not cope with the many regionally prevalent diseases, nor adequately consider potential threats that may arise from modifications of current varieties and agricultural practices.

Therefore, the Bean Pathology Program has been striving to develop and implement a progressive disease management strategy within the CIAT Bean Program's germplasm development system. This strategy is designed to focus research efforts upon the integration of specific disease management packages within the germplasm development of commercial bean types required by collaborators for specific bean production regions throughout

Latin America. These specific management packages place special emphasis upon breeding for resistance to pathogens with widespread or regional prevalence, and must be supplemented by other disease management measures to further stabilize these resistances or as replacements if disease resistance is not feasible or available. This progressive disease management strategy must be absorbed within the CIAT Bean Program Philosophy now to assure that the current disease spectrum crop losses steadily decline, and that the potential disease spectrum crop losses do not steadily increase (Figure 2) in Latin America.

YIELD LOSS POTENTIAL OF VARIOUS

DRY BEAN DISEASES

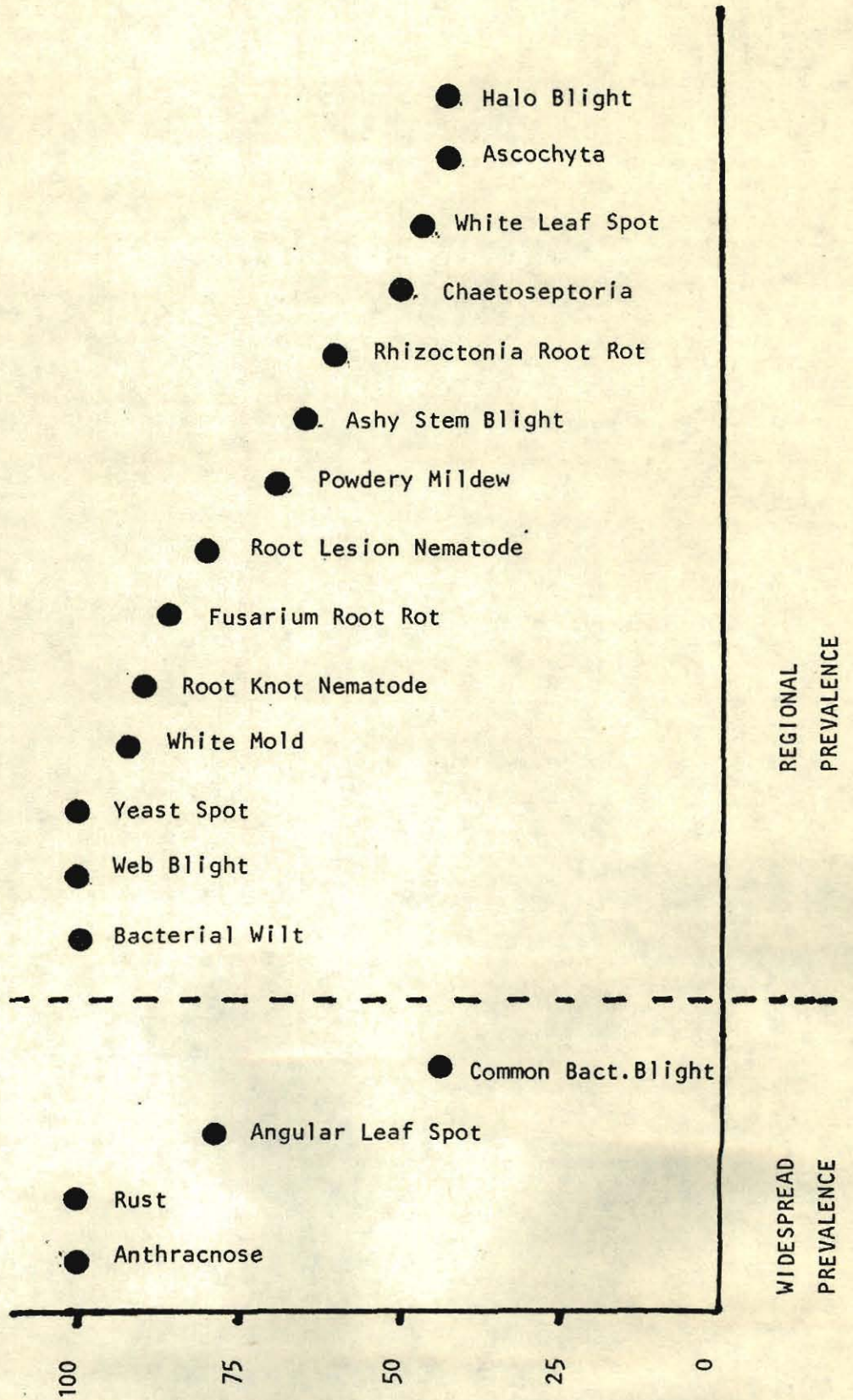


Figure 1.

(%) YIELD LOSS

Figure 2.

DRY BEAN DISEASE MANGEMENT FORECAST

