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9. ABSTRACT

This report proposes the use of a rating system for field surveys, based on the extent of stem browning as a measure of disease severity. To test the method, soybean fields were surveyed for the incidence and severity of brown stem rot in the east central region of Illinois in September of 1968 and 1969. On the basis of a three-point rating system, plants rated in the third class yielded significantly less than plants in the first and second classes. This is the first case where a rating system has been used to reflect yield of soybeans infected with C. gregatum. The system is simple, can be used at a timely period in the growth cycle, and is effective over a variety of conditions. In view of evidence that this disease is spreading over vast acreages of the soybean crop, this method of surveying damage might be useful for workers in several states where an analysis of severity is needed.

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# A Rating System for Determining Soybean Yield Reduction by Cephalosporium gregatum

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ABSTRACT

A three-class system for field surveys of brown stem rot of soybeans is proposed. On the basis of the rating system, plants rated in the third class yielded significantly less than plants in the first and second classes. Phytopathology 60:1024.

*Additional key words*: Brown stem rot of soybean.

Brown stem rot of soybean caused by *Cephalosporium gregatum* Allington & Chamberlain was first reported in Illinois in 1944 and was found the following year in Indiana and Iowa (1). Since 1945, brown stem rot has been reported from several areas where soybeans are grown in North America (2, 3, 5, 6, 7, 8, 9). Most reports on the occurrence of this disease give results of a visual survey based on the presence or absence of discoloration (browning) in the pith region of stems (3, 4).

This report proposes the use of a rating system for field surveys based on the extent of stem browning as a measure of disease severity. To test efficacy of the method, soybean fields were surveyed for the incidence and severity of brown stem rot in the east central region of Illinois in September 1968 and 1969. Twenty fields in five counties were sampled in 1968, and 57 fields in 12 counties were sampled in 1969. Either 20 or 25 plants were selected at random from each field for evaluation, and the variety in each field was determined and placed in either an early or a midseason maturity group. Stems of mature plants were split longitudinally, and the extent of browning of stem tissue was recorded on the basis of a 4-class rating system: Class 1, no stem browning; Class 2, stem browning up to the first node; Class 3, stem browning 6 inches above the first node; and Class 4, stem browning over 6 inches above the first node.

Brown stem rot was found in all soybean fields sampled except a single field in 1969. The relationship between rating class and yield was evaluated by harvesting pods separately from the upper and lower half of each plant in each rating. The average per cent of infected plants per field in 1968 for the early maturity group was 43; for the midseason maturity group, 47. This compared to 48% and 57% in 1969, respectively. On the basis of the rating system, the average per cent of diseased plants in the 4th class was greater in the midseason group (19 and 27) than in the early group (4 and 15) in both years.

The survey showed that, regardless of maturity group, 100% of the fields in 1968 and 97% of the fields in 1969 had plants with symptoms of brown stem rot. With the use of a 4-point severity rating, it was found that, for both 1968 and 1969, the early maturity group contained a lower per cent of plants in the 4th rating class than did the midseason maturity group. Yields from plants rated as Class 4 (Mean, 25 g seed/plant) were significantly below those of Class 1 (Mean, 36 g seed/plant). There were no significant differences among classes 1, 2, and 3. Therefore, we propose the elimination of the 2nd category of the 4-class system, since a 3 rating category will suffice.

The high incidence of brown stem rot in central Illinois soybean fields in 1968 and 1969 is comparable with that of earlier surveys (1). Weber et al. (10) reported that soybean varieties corresponding to early, midseason, and late maturity grown at two locations on infested soil in Ames, Iowa, averaged 11% lower in yield than soybeans grown on noninfested soil. The largest yield reduction (20%) from infection by *C. gregatum* occurred in later-maturing varieties.

This is the first case where a rating system has been used to reflect yield of soybeans infected with *C. gregatum*. It is simple, can be used at a timely period in the growth cycle, and is effective over a variety of conditions. In view of evidence that this disease is spreading over vast acreages of the soybean crop (2, 3, 6, 9, 10), this method of surveying damage might be useful for workers in the several states where an analysis of severity is needed.

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