

Greenhouse Evaluation of Sugarcane Cultivars for Resistance to Eyespot in Kenya

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ABSTRACT

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Eyespot of sugarcane, incited by *Helminthosporium sacchari*, is increasing in importance in Kenya. Seven commercial and five promising unreleased sugarcane cultivars were tested for resistance to the disease by spraying 3-mo-old plants with a mycelial and spore suspension under high humidity. One commercial and one unreleased cultivar were resistant to the disease. The other cultivars were rated intermediate or susceptible.

Eyespot, caused by *Helminthosporium sacchari* Butl. Subram and Jain, has not been a major disease of sugarcane in Kenya. In 1972, Bungey (2) reported that the incidence appeared to be increasing and that popular cultivars such as Co 421 were susceptible. In 1977, an epiphytotic of eyespot on Co 421 occurred at Nandi Hills, Kenya, where sugarcane growing is being encouraged even though the altitude is higher and the climate cooler than in other commercial sugarcane-growing areas. In addition, a severe attack of eyespot on the unreleased cultivar EAK 71-476 was observed at Kibos, an area long considered free from the disease.

Climate, particularly temperature and moisture, influences the development and spread of eyespot (3). Kibos and Nandi Hills are in western Kenya, near Lake Victoria, but have different weather conditions. Nandi Hills is about 2,000 m

above sea level and has more rainfall and lower temperatures than Kibos, about 1,300 m above sea level.

These recent severe attacks are evidence that eyespot can no longer be regarded as minor in Kenya. In several fields in Nandi Hills, the disease reduced yields by an estimated 10–30%. In Mexico, Osada and Flores (6) reported that eyespot on the second ratoon crop of Co 419 reduced yields by 33%. This article reports a study to utilize a rapid greenhouse test for resistance to eyespot and to determine the reactions of seven popular commercial cultivars and five promising unreleased cultivars.

MATERIALS AND METHODS

Leaves with eyespot lesions were collected from sugarcane fields at Nandi Hills, and 1-cm² leaf pieces were surface-sterilized in 0.1% mercuric chloride solution for 3 min and rinsed with sterile water. The pieces were placed in petri dishes on Whatman No. 2 filter paper moistened with sterile water and incubated at room temperature. After sporulation, spores were transferred from the petri dishes to slants of potato-

dextrose agar (PDA) on sterile media.

Single-bud cuttings of seven commercial and five locally produced unreleased cultivars of sugarcane were planted in 40 × 30 cm metal trays. Three cultivars were planted in each tray, with each cultivar represented by three buds in a row. A randomized design was used, with three replicates. The commercial cultivars, with their date of arrival in East Africa or East African Introduction (EAI) number, were B41227 (30/1/50), Co 421 (EAI 6274), Co 440 (EAI 267), Co 746 (EAI 224), N50/211 (EAI 27), NCo 376 (EAI 92), and Q47 (EAI 61); the unreleased cultivars were EAK 69-40 (Co 464 MP [2]), EAK 69-41 (Co 464 MP [3]), EAK 70-09 (Co 290 MP), EAK 70-150 (Co 1001 MP), and EAK 71-476 (Co 52-68 × Co 775); these were produced by the former East African Sugarcane Breeding Station in Tanzania and selected in Kenya.

Inoculum was prepared by flooding 14-day-old cultures on PDA slants with sterile water, scraping the surface to dislodge the mycelia and spores, and crushing the mycelia into small pieces in sterile water. A hand atomizer was used to spray 3-mo-old plants with the suspension of spores and pieces of mycelia. After incubation for 48 hr at high humidity, the plants were transferred to greenhouse benches.

Disease reactions were rated 21 days after inoculation, using a broad numerical scale of 0 (immune), 2 (resistant), 5 (intermediate), and 8 (susceptible) (4). Each cultivar was scored for foliar symptoms, with 0 = no visible symptoms,

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2 = small dark-brown spots, 5 = medium-sized lesions forming short streaks, and 8 = large lesions forming long, coalescing streaks. Martin (5) has described eyespot symptoms and their development.

RESULTS AND DISCUSSION

No cultivar was rated immune. Q47 and EAK 70-09 were rated resistant, and EAK 69-40, EAK 69-41, Co 421, and EAK 71-476 were rated susceptible. The remaining six cultivars—NCo 376, Co 746, Co 440, N50/211, B41227, and EAK 70-150—were rated intermediate.

These results agree with those of a field experiment (1) indicating that Q47 is the cultivar most resistant to eyespot in Kenya, under field conditions. In that

experiment, Co 440, N50/211, and B41227 were classified as moderately resistant and Co 421 as highly susceptible. The reactions observed in the greenhouse agree with those reported in the field (1) except for Co 746, which was only slightly more susceptible in the greenhouse test.

Of the unreleased cultivars, only EAK 70-09 was rated resistant. EAK 69-40 and EAK 69-41, rated susceptible, are being considered for release; eyespot could limit their commercial cultivation in cooler areas.

A possible explanation of the severe infection by eyespot at Kibos is that the abundant rainfall and low temperatures during recent years favored development of the disease.

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