EARCOCKLE - A NEW DISEASE OF LESSER CANARY GRASS (PHALARIS MINOR)

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Summary. In a pot experiment Anguina tritici reproduced on lesser canary grass (Phalaris minor Retz.) although at a lower rate than on wheat. Diseased plants showed no symptoms in the vegetative phase but diseased earheads were smaller and thinner than healthy ones.

Earcockle caused by the seed gall nematode, Anguina tritici (Steinbucb) Filipjev, is still one of the most important diseases of wheat in developing countries like India. On lesser canary grass (Phalaris minor Retz., commonly known as ‘kanki’ - a weed of Gramineae family commonly found in wheat fields) this disease has not been recorded so far. However, Dahiya and Bhatti (1980) and Paruthi and Gupta (1987) observed yellow ear rot or ‘tundu’, caused by the association of this nematode with a bacterium, Clavibacter tritici, on this weed in the field. During the cropping season 1986-87, we observed a few galls in the earheads of lesser canary grass growing in wheat fields artificially infested with A. tritici. The symptomatology of the disease on P. minor was then studied under greenhouse conditions during 1987-88 and 1989-90 cropping seasons.

Materials and methods

One seed of 'kanki' was sown in each of 25 cm earthen pots containing 4 kg steam sterilized sandy soil. Each pot was inoculated with two wheat seed galls containing 20-25,000 second stage juveniles of A. tritici/gall. Similar inoculations were made to wheat, Triticum aestivum L. cv. Sonalika (main host of this nematode) to compare the disease development in both crops. Uninoculated wheat and 'kanki' plants were grown as controls. The plants of both the crops showing typical symptoms of disease (basal swelling of the stem, crinkling, curling and twisting of the leaves) in the vegetative phase were tagged for periodic observations of the development of symptoms. All the treatments had ten replications. Five galls from both crops were ruptured during March and May 1988 and the gall contents were examined.

Results and discussion

Three plants of 'kanki' showed basal swelling of the stem but no other symptoms; very mild crinkling was observed on two leaves of a single plant. All of the wheat plants exhibited typical symptoms of nematode infestation.

Five out of 104 ears of 'kanki' exhibited earcockle disease, whereas in wheat 27 out of 56 ears developed earcockle. In both crops, infected ears emerged from the leaf sheath at the same time as the healthy ones. In 'kanki' plants cockled ears were thinner and bore comparatively fewer spikelets than the healthy ones (Fig. 1). The florets bearing galls appeared open due to the reduction or absence of glumes (Fig. 2).

The green (immature) cockles of P. minor were roughly rounded, anteriorly bilobed and bore no hairs on their surface. They could easily be differentiated from the

Fig. 1 - Healthy (A) and cockled (B) earheads of Phalaris minor parasitised by Anguina tritici.
healthy developing seeds which are cone-shaped, dorso-ventrally compressed and hairy (Fig. 3). The galls of ‘kanki’ turned from brown to black on maturity with wrinkled and rough surface compared with the light brown, smooth and glistening surfaced seeds of healthy plants. Immature galls of ‘kanki’ contained only pre-adult stages of nematodes whereas in wheat galls adults as well as eggs and a few second stage juveniles were observed. Absence of adults in ‘kanki’ galls during March, 1988 indicated a delayed development of *A. tritici* on *P. minor*. The contents of (mature) ‘kanki’ galls ranged from 750-1800 second-stage juveniles (mean 917 juveniles/gall) whereas they ranged from 18,000-30,000 in wheat galls. However, two galls of ‘kanki’ contained only disintegrated nematode bodies which may be due to parasitisation of floret by a single nematode or few nematodes of the same sex.

The larger numbers of nematodes in mature black ‘kanki’ galls (917) than in immature green galls (12.5 only) clearly indicates that the nematode reproduced on this weed. The fewer nematodes and lower disease incidence in ‘kanki’ as compared to wheat may be due to smaller size of ‘kanki’ seed and lower host susceptibility of this plant.

**Literature cited**


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