

## RESPONSE OF WHEAT VARIETIES TO THE SEED GALL NEMATODE, *ANGUINA TRITICI*

R. Parveen, A.A. Khan, M. Imran and A.A. Ansari

Plant Pathology and Nematology Laboratories,  
Department of Botany, Aligarh Muslim University, Aligarh-202002, India

**Summary.** Seven varieties of wheat were tested against the seed gall nematode, *Anguina tritici*. Two varieties, HD-2009 and WH-0542, were resistant; the remaining varieties HUW-234, PBW-343, RR-21, UP-2338, HD-2285, were susceptible to the nematode.

About 80 species of nematodes are found associated with wheat in India (Midha and Swarup, 1974). Among these two nematodes are of major importance at present, the cereal cyst nematode (*Heterodera avenae*) causing Molya disease and the seed gall nematode (*Anguina tritici*) causing Ear cockle and Tundu disease. In India, the annual loss caused by *A. tritici* ranges from 1 to 9% representing a financial loss of about 70 million rupees (Kaushal, 1998).

In a search for resistance to the nematode, seven varieties of wheat were screened.

### MATERIALS AND METHODS

Seventy clay pots of 20 cm diameter were filled with 1 kg soil mixed with compost:manure (3:1). They were then autoclaved in order to make the soil free from any kind of pathogen. Certified seeds of seven varieties of wheat, *Triticum aestivum* L. (Table I) were pre-soaked in water for six hours separately and then five seeds of

each variety were sown in each pot with ten replicates for each variety. Ten days after sowing five pots of each variety were inoculated with about 10,000 freshly hatched second stage juveniles of *A. tritici* Steinbuch near the base of stem. The juveniles were obtained by soaking the wheat galls in double distilled water for 24 hours and the inoculum was prepared by gently crushing the water soaked cockled seeds. Five non-inoculated pots of each variety served as control. After inoculation the pots were sprinkled with water at three day intervals for 15 days, after which water was directly poured into the pots. During the growing period of three and a half months, the plants were regularly inspected for visible symptoms of nematode damage. At maturity, five plants were uprooted and the length of root and shoot, dry weight of plant, the number of tillers, leaves, grains/plant and weight of grains/plant were recorded. The number of juveniles per cockle was also recorded. Mean value of each group of five plants were treated as a replicate. Data were analysed statistically.

**Table I.** Response of wheat varieties to the seed gall nematode *Anguina tritici*.

| Variety   | Treatment  | Length (cm) |       | Dry weight of plant (g) | Number/plant |        |       | Weight of grain/plant | Galls/plant | Juveniles/gall |
|-----------|------------|-------------|-------|-------------------------|--------------|--------|-------|-----------------------|-------------|----------------|
|           |            | Root        | Shoot |                         | Leaf         | Tiller | Grain |                       |             |                |
| HUW-234   | Control    | 13.0        | 53.0  | 2.46                    | 6            | 1.72   | 24    | 1.592                 | -           | -              |
|           | Inoculated | 10.9        | 45.7  | 1.20                    | 5            | 1.30   | 15    | 0.783                 | 15          | 10,000         |
| HD-2009   | Control    | 13.0        | 73.3  | 3.56                    | 5            | 1.42   | 25    | 1.560                 | -           | -              |
|           | Inoculated | 12.5        | 59.4  | 3.37                    | 5            | 1.38   | 23    | 1.550                 | -           | -              |
| PBW-343   | Control    | 13.2        | 69.8  | 5.90                    | 8            | 1.82   | 16    | 0.950                 | -           | -              |
|           | Inoculated | 11.3        | 61.0  | 3.35                    | 6            | 1.72   | 13    | 0.850                 | 13          | 5,000          |
| RR-21     | Control    | 12.2        | 73.4  | 5.66                    | 6            | 1.64   | 32    | 1.875                 | -           | -              |
|           | Inoculated | 10.8        | 52.6  | 4.10                    | 5            | 1.05   | 16    | 1.050                 | 16          | 12,000         |
| UP-2338   | Control    | 13.0        | 58.0  | 3.40                    | 6            | 1.52   | 21    | 1.250                 | -           | -              |
|           | Inoculated | 11.0        | 45.7  | 2.60                    | 5            | 1.40   | 15    | 0.675                 | 15          | 7,000          |
| WH-542    | Control    | 13.8        | 57.9  | 3.90                    | 8            | 1.32   | 14    | 0.810                 | -           | -              |
|           | Inoculated | 12.2        | 57.9  | 3.10                    | 8            | 1.21   | 12    | 0.800                 | -           | -              |
| HD-2285   | Control    | 13.2        | 62.6  | 4.07                    | 6            | 1.34   | 40    | 1.995                 | -           | -              |
|           | Inoculated | 12.0        | 61.6  | 3.03                    | 5            | 1.22   | 30    | 1.400                 | 14          | 6,000          |
| LSD at 5% |            | 1.25        | 2.80  | 0.37                    | 0.46         | 0.33   | 2.50  | 0.025                 |             |                |

## RESULTS AND DISCUSSION

Data presented in Table I show that length of shoot and root, total dry weight of plant, number of leaves, tillers and grain per plant and weight of grains per plant of varieties HUW-234, PBW-343, RR-21, UP-2338 and HD-2285 were significantly reduced in inoculated sets as compared to the control. The highest number of seed galls occurred on the variety RR-21 followed by HUW-234, UP-2338, HD-2285 and PBW-343. The largest number of juveniles per gall was also recorded in RR-21 followed by HUW-234, UP-2238, HD-2285 and PBW-343. All of these varieties are considered to be susceptible to *A. tritici*. Affected plants showed basal swellings, wrinkling, crinkling and twisting of leaves. Infected ear heads were thinner and deformed with broken and distorted awns. Some head contained only galls, while others contained galls and kernels. Each infected floret contained about one gall. The galls were green at the beginning and later become comparatively brown and

black at maturity.

The varieties HD-2009 and WH-542 were found resistant to *A. tritici* as their growth and yield parameters were statistically similar. Moreover, grains were free from infection. However, these two varieties also showed twisting and crinkling of the leaves which was attributed to ectoparasitic feeding of the nematodes. Of the seven varieties screened in this experiment HD-2009 and WH-542 may be grown in the field to minimize the effect of *A. tritici*.

## LITERATURE CITED

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