ABSTRACT

Wheat (*Triticum aestivum* L.) is most widely cultivated grain crop of the world, both in regard to antiquity and its use as a source of human food. In India, wheat is grown over 24 million hectares, which yield nearly 63.02 metric tonnes of grain. In Bihar, it is cultivated in 1.84 million hectares with total production of 2.86 metric tonnes and average productivity of 15.56 quintal per hectare. In plateau region of Bihar, it occupies an area of 50.09 thousand hectares with an average production of 51.08 thousand tonnes which figures in productivity of about 10.20 q/ha. It is an important source of food for human consumption, feed for livestock and wheat starch for industrial purposes.

Wheat is vulnerable to a variety of diseases. Helminthosporiosis of wheat caused by *Helminthosporium sativum* P.K.& B. and *Helminthosporium tritici-repentis* Died is one of the most destructive diseases of wheat. This disease is very common and invariably prevalent in the Chotanagpur plateau region of Bihar.

During survey, wheat crop was found to be severely infected with the Helminthosporiosis causing considerable losses in production of wheat. The disease intensity ranged from 35.0 to 61.5 per cent in different localities of Ranchi.

The two species causing the Helminthosporiosis of wheat, viz., *H. sativum* and *H. tritici-repentis* are quite different to each other in symptom expression and in morphological characters. *H. sativum* produced straw coloured spots with dark brown margin but *H. tritici-repentis* formed light brown coloured spots with yellow halo margin. The former had fusoid conidia (widest in the middle) with heavy wall and rounded ends and brown to olivaceous colouration while the later produced fusiform elliptical conidia, hyaline in colour with snaky head at the basal cell.

The characteristic symptom of the disease was observed almost on leaves. The pathogen was isolated, purified by standard method and satisfied Koch's postulate tests. All seven graminaceous hosts were infected by both the pathogens during host range studies.

The conidia of both the pathogens remained viable in culture throughout the year under laboratory condition but their viability decreased with the increase in the period of storage. The pathogens also survived through plant debris and infected seeds, stored under laboratory condition throughout the year while it lost the viability in the soil after two months. The pathogens remained pathogenic throughout the survival period.

Seeds of wheat variety "Sonalika" showed 15 and 8 per cent seed infection with *H. sativum* and *H. tritici-repentis*, respectively.

Wheat crop sown between 7-21 November in both the years of experimentation, influenced less disease development and better yield. Late sowing increased the disease development in nature.

Application of 100 kg N/ha with recommended doses of P and K, i.e., 50 and 25 kg/ha, respectively, under irrigated condition and 40 kg...
N/ha with recommended dose of P, i.e. 20 kg/ha, under un-irrigated condition helped in the reduction of Helminthosporiosis and increased the grain yield.

The intensity of the disease increased gradually in field as the plant age increased. Maximum disease development was favoured by the temperature 22.2 to 27.3°C, relative humidity 16.1 to 64.0 per cent and absence of rain, at maturity of crop plants. In general, temperature was significantly positively and relative humidity significantly negatively correlated with the disease development in nature.

Leaves extract of *Lawsonia inermis* (Henna/Menhadi) inhibited maximum radial growth of both the pathogens. Five sprays of crude extract (10 per cent) of *Lawsonia inermis*, at an interval of 15 days gave satisfactory control of the disease. Control of the disease by the crude extract of *L. inermis* was a new attempt initiated here, which produced good result and a new finding.

Only three cultivars, namely, H.P. 1761 (Jagdish), HP 1731 (Rajlakshmi) and HUW 206 showed resistant reactions against both the pathogens, under artificial epiphytotic conditions.

Thiram inhibited cent per cent growth of the pathogen followed by Topsin-M *in vitro*. Rest fungicides in order of superiority were Indofil, M-45, Kavach and Bavistin.

Thiram (0.2%) followed by Bavistin (0.2%) was the most effective seed dressing fungicide in minimising the disease intensity and increasing the yield.

Seed treatment with Bavistin @ 2 g per kg seed with integration of three sprays of Topsin-M (0.1%) proved to be the most effective treatment in which the least disease intensity and highest yield were recorded, under field conditions. Indofil M-45 and Kavach ranked second and third in the evaluation.