

KARNAL BUNT OF WHEAT

Pathogen: *Neovossia indica*

Taxonomic Position: Subdivision: Basidiomycotina; Class: Teliomycetes; Order: Ustilaginales; Family: Tilletiaceae

Distribution and Importance: The disease is also called ***New Bunt or Partial Bunt***. It was first reported in India from ***Karnal (Haryana) by Mitra (1931)***. The disease has been reported from major wheat growing areas of the country. Now the disease is known to occur in Delhi, Rajasthan, Haryana, Punjab, Himachal Pradesh, Jammu and Kashmir, North Bihar and Uttar Pradesh. **The drier parts of central and peninsular zones are free from Karnal bunt in India and wheat produced in this region remains free from the disease.** At Present, this is also reported from Pakistan, Nepal, Iraq, Afghanistan, Lebanon, Mexico and USA. Both quantity as well as quality of wheat grain/seed is adversely affected by the disease. Yield losses are not much and can go up to **0.5%**. The infected seeds can produce seedlings but these are poor in vigour.

Symptoms: The disease becomes evident when the grains have developed. It is then, found that some grains have been partially, and rarely wholly converted into black powdery mass enclosed by the pericarp. **Not all the ears in a stool and not all the grains in an earhead are infected.** Since the smutted grains are very irregularly distributed in ear, it has been presumed that they are the result of airborne, localized infection. The spore mass remains covered by the pericarp for some time but this epicarp later ruptures exposing the black powder. The presence of ***foul smell due to trimethylamine*** is prominent in this disease also.

Pathogen: The pathogen of Karnal bunt of wheat was first reported as *Tilletia tritici* by Mitra in 1931. The name was later changed to *Neovossia indica* by Mundkur in 1940. The teliospores of *N. indica* are dark brown in colour, spherical to oval, with reticulations on the epispore. The teliospores germinate to form a short stout promycelium at the apex of which a whorl of 60-185 sporidia are formed. Sporidia are long, sickle-shaped, and do not fuse in pairs. The compatible primary sporidia and secondary fuse and develop into dikaryotic mycelium. Infection is caused by dikaryotic sporidia or hyphae.

Disease Cycle: The disease is soil as well as seedborne. Teliospores can survive in soil for 4-5 years. At suitable atmospheric conditions, they germinate forming a large number of needle shaped sporidia and sickle shaped secondary sporidia. Germination of teliospores takes place in middle of February or early March. The airborne sporidia germinate on the glumes and the fungus becomes partially systemic. The sporidia are carried to the inflorescence through the air currents, where they infect the ovaries and developing kernels. High humidity, frequent rains, cloudy weather and low temperature especially at the time of flowering have been observed to promote the infection and disease development.

Disease Management:

1. Follow crop rotation to avoid soilborne inoculum.
2. Always use clean and certified seeds.

3. Avoid excess irrigation and nitrogenous fertilizers
4. For effective and economic management use resistant cultivars like HD-1907, HP-743, UP-270, HD-2222, HD-2235, PBW-34, HD-4672, Raj-1555, WH-896, Raj-3765, PBW-343, Ganga (HD-2643), (NW-1012), NW-1014, Gometi (K-9465), Malviya-468, Atal (K-9644), Prasad (K-8434), Naina (K-9533), etc.
5. Seed treatment with fungicides like Agrosan-GN, thiram, zineb, benlate, carbendazim etc. reduce soilborne inoculum and disease incidence
6. Infection of wheat flowers can be prevented by a spray of either mancozeb (0.2%) or carbendazim (0.1%) at the early heading stage before flowering of the crop.
7. A new chemical propiconazole (Tilt 25 EC) has been found very effective in controlling infection if sprayed at boot leaf stage @ 0.1%. At CYMMYT in Mexico, Greater than 90% control of Karnal bunt is achieved with two applications of propiconazole. Seed treatment is not as effective. Some control is achieved with carboxin and other fungicides

