

# Effective Strategies for Management of Yellowing of Wheat Crop

**Rajinder Singh Bal, Harpal Singh Randhawa and Johar Singh**

District Extension Specialist (PP), Principal Entomologist and Principal Plant Breeder

PAU Regional Station, Gurdaspur

\*Corresponding Author: [harpals\\_randhawa@pau.edu](mailto:harpals_randhawa@pau.edu)

Wheat (*Triticum aestivum*) is one of the important staple crops of India which is cultivated in the *Rabi* season. It contributes to a significant share in total wheat production of over 107 million tons (Anonymous 2023). Major wheat growing states in India include Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, Rajasthan, Gujarat and Bihar. However, crop production is constrained by various biotic and abiotic stresses, which leads to less productivity in terms of grain yield and flour quality. Among them yellowing of crop is a major problem in all the wheat-growing areas. It is caused by many factors like bad weather, un-recommended varieties, heavy irrigation, poor-quality of irrigation water, nutrient deficiency, yellow rust or insect-pests etc. Therefore, many farmers start spraying of fungicides at an early stage, which increases cost of production. The following are major reasons responsible for yellowing of wheat (Anonymous 2023a).

## **Irrigations and quality of irrigation water**

The heavy soils have lower water infiltration rate and it does not percolate below root zone after heavy irrigation or rain. This results in oxygen deficiency in the root zone and roots are not able to work properly resulting in yellowing of crop. All the plants show yellowing of leaves from tips towards base. For preventive measure, the field should be laser levelled before sowing the crop. Heavy irrigations should be avoided and weather conditions may be taken into consideration while giving irrigation. So fields should be divided into 8 and 16 parts per acre in heavy and light soils respectively. The provision for drainage of excess water is also necessary. In some areas, the ground water is poor in quality and not suitable for irrigation. The application of such water may result in yellowing of the crop. Therefore, farmers are advised to make testing of irrigation water from authorised laboratories. If water is in poor quality, then apply the recommended dose gypsum before irrigation of the crop. Impure and pure water can be

used alternatively or by mixing with each other (Anonymous 2023a).

## **Weather**

Sometimes, the crop is adversely affected by poor weather conditions. If there is a sudden decrease in temperatures, then crop may be turned yellow. Frost is another reason for the yellowing of wheat. The effect of bad weather will be visible in the whole region. The crop usually recovers from the effect of poor weather in due course of time but farmers should apply need based timely irrigation (Anonymous 2023b).

## **Nutrient deficiency**

**Nitrogen deficiency:** The lower leaves become yellow and start drying from the leaf tips inward. The primary causes of nitrogen deficiency are insufficient fertilizer doses, leaching due to heavy rains and the presence of heavy amounts of crop residue, which immobilize nitrogen. Apply the recommended dose or soil test basis nitrogenous fertilizers. In salt affected soils, apply 25 % extra nitrogenous fertilizers.

**Zinc deficiency:** The leaves become yellow or chlorotic in the middle. The plants remain stunted and crop gives bushy appearance. In zinc deficient fields, apply 25 kg of zinc sulphate (21%) per acre. The zinc deficiency can also be corrected by foliar spray of 0.5% zinc sulphate. Prepare the solution for spray by dissolving 1 kg zinc sulphate and half kg unslaked lime in 200 litres of water per acre. Two or three sprays at 15 days interval may be given depending upon the severity of deficiency.

**Manganese deficiency:** It generally appears in light soils under rice-wheat rotation. On the middle leaves interveinal chlorosis appears with light greyish yellow to pinkish brown specks of variable size confined largely to 2/3 lower portion of the leaf. Later, the specks join with each other forming a streak or band in between the veins. However, the veins remain green. Whole of the plant may die in acute deficiency conditions. In manganese deficient soils, give one spray of 0.5% manganese sulphate solution (1 kg

manganese sulphate in 200 litres of water) 2-3 days before first irrigation. Give three more sprays at weekly intervals on sunny days. Do not grow durum varieties in sandy soils, as these varieties are prone to manganese deficiency.

**Sulphur deficiency:** It generally starts from the young leaves with fading of the normal green colour. The topmost leaves become light yellow except the tip, while the lower leaves retain green colour for a longer time. It mostly occurs more in sandy/light soils and very severe when rains continue for a long time in the early growth period. In sulphur deficient soils, where phosphorus has been applied through DAP instead of single superphosphate, apply 100 kg of gypsum or 18 kg bentonite-sulphur (90%) per acre before sowing the crop. Gypsum can also be applied in standing crop if deficiency of sulphur is observed.

#### **Insect-pests**

**Termite:** The termite attacks the crop at seedling stage mostly in sandy soils. Affected plants turn yellow and dry up completely. Such plants can be easily uprooted. For prevention, the seed should be treated with recommended insecticides like 1g Cruiser 70 WS (thiamethoxam) or 2 ml Neonix 20 FS (imidacloprid + hexaconazole) or 4 ml Dursban/Ruban/Durmet 20 EC (chlorpyrifos) per kg seed. If severe damage is observed after germination, then broadcast 7 kg Mortel 0.3 G (fipronil) or Dursban 20 EC (chlorpyrifos) @1.2 litre per acre by mixing with 20 kg moist soil per acre before first irrigation.

**Pink stem borer:** At seedling stage, the larvae enter the stem by making holes. The crop looks yellow and finally the central shoot is killed (dead hearts). If incidence of this pest is high in previous rice crop, then do not sow wheat in such fields during month of October. Apply irrigation to crop during daytime so that predacious birds eat maximum number of larvae. In case of severe infestation broadcast 7 kg Mortel/Regent 0.3 G (fipronil) or 1.0 litre Dursban 20 EC (chlorpyrifos) after mixing with 20 kg moist soil before irrigation or spray 50 ml Coragen 18.5 SC (chlorantraniliprole) using 80-100 litre water per acre.

**Yellow rust:** It is a fungal disease which produces powdery yellow pustules in lines on the leaves. By touching the infested leaves, yellow powder sticks to

hands. The disease first appears in patches on few plants in the hilly areas. The cool and damp weather conditions i, e temperature of about 10-15°C, high humidity and intermittent rainfall or dew favours disease development. The disease spreads through wind currents that causes airborne spores to travel long distances and infect healthy plants, The lack of crop rotation: Growing the same type of wheat varieties for many years can increase disease severity.

#### **Preventive measure**

Select varieties that are region specific and resistant to yellow rust and other diseases

- Avoid early sowing of crop in sub-mountainous regions and susceptible varieties should not be sown there.
- The self-grown wheat plants and alternate host plants should be removed as early.
- Good agronomic practices, such as proper planting density, appropriate irrigation and timely weed control, can help prevent yellow rust incidence
- Follow mixed cropping and crop rotation with suitable crops such as legumes, mustard, and barley to break the disease cycle by reducing the amount of inoculums in the soil
- Avoid excessive application of nitrogenous fertilizers
- Farmers should regularly monitor their crop, whenever the disease symptoms appear then spray the crop with 200g Caviet 25 WG or 120g Nativo 75 WG or 200ml Ampect Xtra 25.5 SC or 200 ml Opera 18.3 SE or 200 ml Custodia 320 SC or 200 ml Tilt 25 EC in 200 litres water per acre. At early stage, give only spot application of fungicides. Any of these fungicidal (alternately) spray may be repeated if required again.

**Nematodes:** Sometimes yellowing of the crop may be occurred due to attack of nematodes. However, this type of yellowing occurs in patches. The root system of such plants is reduced in size and becomes bunched. The leaves of the affected plants become yellow and small knots are formed on the roots. The plants remain stunted and give a bushy appearance. Either effected

plants do not produce ears or they produce small ears with poorly filled grains. In nematode infested fields, make deep ploughing during hot months. Follow crop rotation with non-cereal crops. Apply 13 kg Furadan 3G per acre before sowing the crop in the fields' nematodes infested.

### References

Anonymous (2023). India: Production volume of wheat during rabi season 2022. <https://www.statista.com> Agriculture > Farming

Anonymous (2023a). Package of practices for Rabi crops. Punjab Agricultural University, Ludhiana: 01-23.

Anonymous (2023b) Effective strategies for managing yellow rust disease in wheat crops. <https://kisanvedika.bighaat.com> > Crop

Mengesha G G (2020). Management of yellow rust (*Puccinia striiformis* f.sp. *tritici*) and stem rust (*Puccinia graminis* f.sp. *tritici*) of bread wheat through host resistance and fungicide application in Southern Ethiopia. *Cogent Food & Agriculture* 6: 1739493

Umer B F, Khan Z H, Ahad I, Maqbool S, Munazah M, Rafieq I, Rehman A S and N Sultan (2019). A review on insect pest complex of wheat (*Triticum aestivum* L.) *Journal of Entomology and Zoology Studies* 7(1): 1292-1298.

\* \* \* \* \*