

## Weed Management in Wheat

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With the introduction of high yielding dwarf varieties of wheat, which are highly responsive to irrigation and fertilizer, the crop ecological condition has undergone a significant change leading to intensification of grassy weed problems which are difficult to control by traditional methods. These weeds pose serious problems to wheat production and adversely affect both quality and quantity.

### Major weeds in India

A mixed population of grasses, broad-leaved and sedges grow with wheat under different agro-climatic conditions.

Scientific Name	Common English Name	Common Hindi Name	Family
<i>Chenopodium album</i>	Lambsquarter	Bathua	Chenopodiaceae
<i>Fumaria parviflora</i>	Fumitory	Bansoya	Papaveraceae
<i>Vicia sativa</i>	Vetch	Ankri	Fabaceae
<i>Anagallis arvensis</i>	Pimpernel	Krishnaneel	Primulaceae
<i>Melilotus indica/ M. alba</i>	Yellow/White sweet clover	Pilli senji, benmethi	Fabaceae
<i>Lathyrus aphaca</i>	Yellow vetchling	Matri, Jangli matar	Fabaceae
<i>Rumex denticulata</i>	Prickly dock	-	Polygonaceae
<i>Cichorium intybus</i>	Chicory	Kasni	Asteraceae
<i>Carthamus oxycantha</i>	Wild safflower	Pohli/Peeli kanteli	Asteraceae
<i>Convolvulus arvensis</i>	Field bind weed	Hirankhuri/Hiranchari	Convolvulaceae
<i>Cirsium arvense</i>	Canada thistle, creeping thistle	Kanteli	Asteraceae
<i>Phalaris minor</i>	Small canary grass	Gulli-danda	Poaceae
<i>Avena ludoviciana</i>	Wild oat	Jangli Jayee	Poaceae
<i>Lolium temulentum</i>	Darnel	-	Poaceae
<i>Poa annua</i>	Annual blue grass	-	Poaceae
<i>Cyperus rotundus</i>	Nut grass	Motha	Cyperaceae

Weed problems in wheat differ from region to region due to variation in agro-climatic condition and management practices. In states such as Punjab, Haryana, western Uttar Pradesh and parts of Madhya Pradesh, the problem of *Phalaris minor*, *Avena ludoviciana*, *Chenopodium album* and *Melilotus*



alba are critical. *Phalaris minor* and *Avenaludoviciana* are less intense in states like Rajasthan, Bihar and West Bengal. These states have comparatively more severe problems from *Chenopodium album*, *Anagallis arvensis*, *Melilotus* spp., *Fumariaparviflora*, *Cyperus rotundus* and *Vicia* spp. *Lolium temulentum* and *Oxalis* spp. are more serious in hilly areas of Himachal Pradesh and Uttarakhand.

### Losses caused by weeds

Weeds compete with wheat for nutrients, soil moisture, sunlight and space. Depending upon the nature and intensity of weed flora, 15-30% reduction in grain yield of wheat is common. Besides, weeds remove 30-40 N, 10-20 P O and 20-40 K O kg/ha from the soil and transpire 250-300 tonnes of water per hectare.

### When to control the weeds

The magnitude of losses would depend upon the type of weeds and duration of competition with the crop. It has been observed that the initial 30-45 days is very critical. Therefore, any weed control measure should cover this period for realizing higher grain yield.

### How to control the weeds

Various weed control practices are recommended to minimize the weed competition and improve crop growth and yield. These are:

**Preventive methods:** Use of weed-free crop seeds, well-decomposed farmyard manure (FYM) and compost, clean agricultural implements and irrigation channels before use are some of the measures by which the spread of weeds in wheat fields can be prevented. grassy weeds.

### Mechanical and cultural methods:

Mechanical methods such as hand-hoeing and manual weeding are also useful. Usually, one manual weeding done within 30-45 days after sowing provides good control of weeds. Use of higher seed rate at 125-150 kg/ha, closer row spacing (15cm) and bi-directional sowing induce appreciable smothering effect on the weeds. Tall genotypes of wheat have a greater suppressing effect on growth and

Herbicides	Dose (g/ha)	Time of application	Weeds controlled
2,4-D (Weedmar)	500-800	Post-emergence (30 DAS)	Broadleaved weeds (Bathua, Hiranchari, Motha, Kasni, Krishnaneel, etc.)
Sulfosulfuron (leader)	25	Post-emergence (25-30 DAS)	Both broad-leaved weeds and grasses
Clodinafop-propagyl (Topik)	60	Post emergence (25-30 DAS)	Grasses
Fenoxaprop (Puma Super)	100	Post-emergence (25-30 DAS)	Wild oat and <i>Phalaris minor</i>
Metsulfuron Methyl (Algrip)	40	Post-emergence (25-30 DAS)	Broad-leaved weeds
Pinoxaden (Axial)	60	Post-emergence (25-30 DAS)	<i>Phalaris minor</i> & wild oat.
Isoproturon (Arlon etc.)	750-1000	Post-emergence (25-30 DAS)	Grasses & Some Broad-leaved weeds

development of weeds than dwarf genotypes. Rice-wheat rotation suppresses the establishment and growth of *Avena ludoviciana* in wheat and encourages *Phalaris minor*. Maize-wheat rotation results in a gradual build-up of *Avena ludoviciana*. Depending upon situation and feasibility adoption of rice-mustard, rice-chickpea or maize-wheat may help in reducing the problem of *Phalaris minor* and other

### **Herbicidal control of weeds**

Mechanical and cultural methods sometimes do not work due to the fact that there is a morphological similarity of some major weeds viz., *Phalaris minor* and *Avena ludoviciana* with wheat crop. Under such situations use of herbicides has been found more effective and economical. Required quantity of herbicides should be mixed in 500-600 litres water and sprayed in one hectare area. A number of herbicides have been tested and recommended for effective weed control in wheat.



Use of a single herbicide continuously for several years at a specific location may not give efficient control of varied types of weed species. Minor and unknown weed species may become major ones, if the existing herbicides are not able to kill them properly. For cost effective broad-spectrum weed control, herbicides like Sulfosulfuron 0.025 kg/ha or Mixture of clodinafop + Metsulfuron (4g) can be used for broad spectrum weed control in wheat. Mixture of isoproturon 1.0 + 2,4-D @ 0.5 kg/ha and Clodinafop 0.06 fb 2,4-D 0.50 kg/ha have also been recommended.

Combining cultural methods, pre- or post-emergence application of herbicides and hand weeding has been found to be effective and economical. Emphasis has to be laid on judicious combination of cultural and chemical methods for season-long weed control. Adoption of closer row spacing (15 cm) or cross sowing in combination with 0.50-0.75 kg/ha isoproturon applied at 3 weeks after sowing has been found quite effective in controlling weeds and increasing the grain yield of wheat.