

Wheat Production Technology in the Rainfed Areas of Punjab

Preparation of Land: At the onset of monsoon perform a deep ploughing to conserve moisture in the soil. At the time of sowing, two ploughings with plankings is done for fine preparation of land.

Time of sowing: Best time for sowing in Barani areas is from 25th October to 20th November.

Sowing Method: Sowing should be done using Rabi Drill keeping row to row distance 9 inches maintaining depth of 1.5 to 2 inches.

Seed Rate: 50Kg/acre seed rate is recommended for Barani areas. However, for high tillering varieties like Chakwal-50, the seed rate rate should be reduced upto 5 kg.

Recommended Varieties: Ihsan-2016, Fatehjang-2016, Dharabi-11, Chakwal-50 and BARS-09

Seed Treatment: Seed treatment is necessary for prevention of seed borne diseases. Proper fungicide at the rate of 2g per kg is applied.

Fertilizers: Fertilizers are recommended according to rainfall given as under and the whole fertilizers should be applied at the time of sowing.

Area	Urea	DAP	Potash
Low Rainfall (upto 350mm)	¾ bag	1 bag	1 bag
Medium Rainfall (upto 350mm-500mm)	1 bag	1 bag	1 bag
High Rainfall (More than 500mm)	1.5 bag	1.5 bag	1 bag

Weed Eradication: Weeds compete with the main crop for nutrition, space and water. It may cause losses from 15 to 45 %. For eradication of weeds chemical and non-chemical methods (Hoeing, Bar-harrow, Daab Method) are applied in Barani areas.

Wheat Diseases and their Control: The main diseases of wheat are Leaf rust, Yellow Rust and Loose smut in Barani areas. Detail is given as under:

Leaf Rust:

- **Symptoms:** Pustules are circular or slightly elliptical, smaller than those of stem rust, do not usually coalesce, and contain masses of orange to orange-brown urediospores. Infection sites are found primarion the upper surfaces of leaves and leaf sheaths, and occasionally on the neck and awns.
- **Development:** Primary infections are usually light and develop from wind-borne urediospores that may have travelled long distances. The disease can develop rapidly when free moisture is available and temperatures are near 20°C. Successive generations of urediospores can be produced every 10-14 days if conditions are favorable. As plants

mature, or when environmental conditions are not favorable, masses or black teliospores may become evident.

- **Hosts/Distribution:** Leaf rust can affect wheat, triticale, and many other related grasses. The disease is found wherever temperate cereals are grown. The alternate hosts are *Thalictrum*, *Isopyrum*, *Anemonella*, and *Anchusa* spp.
- **Importance:** Severe early infections can cause significant yield losses, mainly by reducing the number of kernels per spike, test weights, and kernel quality.

Stripe Rust (Yellow Rust) *Puccinia striiformis* Westend f. sp. tritici

- **Symptoms:** The pustules of stripe rust, which contain yellow to orange-yellow urediospores, usually form narrow stripes on the leaves. Pustules also can be found on leaf sheaths, necks, and glumes.
- **Development:** Primary infections are caused by wind-borne urediospores that may have travelled long distances. The disease may develop rapidly when free moisture (rain or dew) occurs and temperatures range between 10-20°C. At temperatures above 25°C, the production of urediospores is reduced or ceases and black teliospores are often produced.
- **Host/Distribution:** Stripe rust can attack wheat, barley, triticale, and many other related grasses. The disease is found in all highland and/or temperate areas where cereals are grown. No alternate host was known until it was found on common barberry and several other *Berberis* spp. in 2010 in the USA. The alternate host *Berberis vulgaris* (European barberry) was historically an important source of inoculum in North America and Europe, but is now rare since the implementation of barberry eradication laws. However, some regions where barberry is common, particularly in East Europe and West Asia, may facilitate continued cyclic rust infection and evolution of new combinations of virulence.
- **Importance:** Severe infections can cause yield losses, mainly by reducing the number of kernels per spike, test weights, and kernel quality.

Loose Smut (*Ustilago tritici* (Pers.) Rostr.)

- **Symptoms:** The entire inflorescence, except the rachis, is replaced by masses of smut spores. These black teliospores are often blown away by the wind, leaving only the bare rachis and remnants of other floral structures.
- **Development:** Wind-blown teliospores that land on the flowers of wheat plants can germinate and infect the developing embryo of the kernel. The mycelium of the loose smut fungus remains dormant in the embryonic tissues of the kernel until the kernel begins to germinate. The mycelium then develops along with the growing point of the plant, and at flowering time replaces the floral parts of the spike with masses of black spores. Infection and disease development are favored by cool, humid conditions, which prolong the flowering period of the host plant.
- **Hosts/Distribution:** The disease can occur wherever wheat is grown.

- **Importance:** Yield losses depend on the number of spikes affected by the disease; incidence is usually less than one percent and rarely exceeds 30 percent of the spikes in any given location

Control: To prevent from rust diseases resistant varieties is the best solution. For prevention from loose smut, seed treatment with suitable fungicide is the best remedy.

MAJOR VARIETIES ALONGWITH THEIR SALIENT FEATURES

IHSAN-2016

S. No.	Characters	Description
1	Seedling growth habit	Semi erect
2	Plant height (cm)	102 – 106
3	Plant colour	Green
5	Flag leaf length (cm)	34-40
6	Wax	Present
7	Days taken to heading	132
8	Days taken to maturity	170-175
9	Spike length (cm)	11.5 – 16.0
10	No. of spikelets / spike	21
11	Grains / spike	64
12	1000 grain weight (g)	38.0
13	Grain yield potential (kg/ha)	5500
14	Leaf rust	Tolerant
15	Stripe rust	Tolerant
16	Stem rust (Local race & Ug-99)	Tolerant

Fatehjang -2016

S. No.	Characters	Description
1	Seedling growth habit	Semi erect
2	Plant height (cm)	105-110
3	Plant color	Green
4	Flag leaf orientation	Erect
5	Flag leaf length (cm)	25-29
6	Wax	Present
7	Days taken to heading	125
8	Days taken to maturity	166-171
9	Spike length (cm)	11-14
10	No. of spikelets / spike	17-20
11	Grains / spike	52-58
12	1000 grain weight (g)	48-50
13	Grain yield potential (kg/ha)	5155
14	Leaf rust	Tolerant
15	Stripe rust	Tolerant
16	Stem rust (Local race)	Tolerant

Dharabi-2011

S. No.	Characters	Description
1	Growth habit	Semi erect
2	Plant height (cm)	95 – 104
3	Plant colour	Bluish Green
4	Flag leaf orientation	Semi erect
5	Flag leaf length (cm)	22-29
6	Wax	Present
7	Days taken to heading	135
8	Days taken to maturity	177
9	Spike length (cm)	12 – 18
10	No. of spikelets / spike	21
11	Grains / spike	62
12	1000 grain weight	42.5
13	Grain yield potential (kg/ha)	5500
14	Leaf rust	Tolerant
15	Stripe rust	Tolerant
16	Stem rust	Tolerant at Kunri

**10 YEARS AREA, PRODUCTION and YIELD STATISTICS of RAINFED AREAS OF
PUNJAB**

Year	Area (000 ha)	Production (000 t)	Yield (Kg/ha)
2006-07	709.8	1245.5	1755
2007-08	659.8	794.7	1205
2008-09	692	1013.9	1465
2009-10	549.2	431.3	785
2010-11	689.7	915.6	1328
2011-12	695.1	699	1006
2012-13	661.9	843	1273
2013-14	679.7	865	1273
2014-15	702.8	1030	1465
2015-16	708.5	1029	1452