
The Production of Barley (*Hordeum Vulgare* Linn) in Sindh-Pakistan

By Mrs. Farzana, May 2005

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Fax: 92-21-5830826 and 92-221-860410
Publisher: Digitalverlag GmbH, Germany
www.ChemLin.com

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Edition ChemLin

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Abstract

In the year 1994-95 the area under Barley production in Pakistan was 165,000 hectares, while in that Sindh was 24,900 hectares. The Barley production in Pakistan was 164,000 tonnes, while in Sindh its production was 12,200 tonnes. In the year 1994-95 the yield per hectare in Sindh was 489 kgs, while its yield per hectare in kgs in Pakistan was 993 kgs.

Varieties

The varieties or cultivars are grown in Pakistan are Karan-4, Karan-19, Karan-201 and Karan 521 (huskless), Karan-280, Karan-15, Jyoti and K-125 (Hulled). Cytoplasmic male-sterility is not found so far so the production of hybrid variety is not so advanced.

Cultivated barley comprise chiefly two species, *Hordeum vulgare* L., six-rowed, and *Hordeum distichon* L., two-rowed barley. The former species are grown more extensively than the latter. Cultivated barley have seven pairs of chromosomes. Two-rowed barley tend to tiller more strongly than the six-rowed type. In barley tillering continue after earing if nitrate and moisture supply are adequate.

The commercial varieties of barley may divided into three types according to their reaction to day-length and temperature. These are winter barley (low temperature requirements), spring barley and intermediate winter barley.

Barley is used extensively in the study of linkage relations, including resistance to certain diseases, as mentioned by Robertson, Wiebe and Shands (1955) cultivated barley is divided into three classes based on the character of growth; winter, intermediate and spring.

Introduction

- Seeds rates used is 30-35lb/acre.
- It need cool winter.
- Barley has the ability to grow under a wide range of agro-climatic conditions.
- Barley is more productive under adverse conditions.
- It mature earlier than wheat.

Soil

- Soil moisture stress during the period between pollination and grain maturation causes a reduction in average kernel weight.
- It can tolerate alkalinity.
- It needs well drained and moderately rich loam soil.
- Well drained soil, medium loam of fair fertility, even texture is most suitable for its cultivation.

Planting

- Plant rows are spaced nine inches a part.
- Seeds are sown either by broad casting, or by single tube drill operated in shallow furrows behind a plough.
- Depth of sowing is 6-8 cm.
- Alkaline land prepared, planked and left un-disturb for about a week before sowing, so that the salt moves from lower soil layers to the upper soil zone and root zone becomes relatively free from salts.
- Its sowing time is from middle of October to the middle of November.
- Barley begin to germinate at 2°C but optimum temperature for germination are 15-20°C, while at 16-17°C the vegetative growth start.
- Hybrids tend to germinate faster and to head earlier than the parent varieties. However drought stress before maturity appears to be more serious in the hybrids than in the parent varieties.
- Certain varieties have purple stem, due to presence of anthocyanin pigment.
- Barley is grown pure or mixed with other Rabi crop such as wheat, gram, peas and lentil. Some time rape and mustard, and linseed also grown mixed with barley.
- It needs slightly loose seed-bed.

Fertilisers

- Super-phosphate, help to neutralise deteriorious effects.
- Ammonium sulphate is used as a source of nitrogen by increase of nitrogen fertiliser the protein content of the grain will increase and reduce its malting value. Increase protein content for feed barley is beneficial.
- 12 kgs of N+8 kgs of P₂O₅ + 8 kgs K₂O are needed per acre.
- Phosphate produces a higher percentage of plump kernels and high malt extract.
- It needs 2-3 kgs of nitrogen per acre at time of sowing and germination.

Rotation

- It can give rotation with crops like bajra, maize, paddy, jowar, cotton, ground nut.
- Barley can be crop rotated with bajra.
- Barley is grown either by itself or mixed with wheat, gram, peas, lentils, mustard and linseed.
- It is frequently grown with an alternate of wheat. Barley is harvested from 15th March to 1st April in Sindh and is followed by crop of sorghum and cotton.

Irrigation

- Minimum water requirements of winter barley are around 400-500mm in crop growing period lasts about 5 months
- It needs 4-5 irrigations. The heavy or frequent irrigations increases the average weight and kernel size. .
- Water stress effects grains maturation in three ways:
 - * Reduction in the rate of grain growth.
 - * Early cessation of growth bring early grain maturity.
 - * Loss due to respiration after assimilation.
- If moisture stress occurs in early stages of grain development, resulting in thin and shrivelled grain.
- Barley is more salt tolerant cereals and very susceptible to water logging.

Weed control

- Hand-weeding and hoeing is used.

Harvesting

- Barley are harvested when straw turn brown.
- Harvesting is done by uprooted plant and cut with siekle. Threshing is done by machines.

Pests and diseases

- The attack of diseases and pest on barley is less as compare to rice and maize.

Insects

- Aphids.
- Chinch-bug.
- Hessian Fly.
- Grass hopper.
- Winter Barley
- Winter barley are more susceptible to winter killing.
- Rains at the time of harvesting causing discolouration of the grain, make them un-fit for malting.
- In order to store it is fully dried, the storage room is fumigated before storage to protect the grain from fungal and pests attacks.

Diseases Incited by Fungi

- Dwarf or Brown Rust of Barley:
Pathogen: *Puccinia hordei* Otth; Syn. *P. anomala* Rostk; *Puccinia Simplex* (Koern) Eriks and Henn.
- Stripe Disease of Barley
Pathogen: *Helminthosporium gramineum* Rabh.
- Covered smut of barley
Pathogen: *Ustilago hordei* (Pers) Langerheim.
- Powdery mildew of Barley
Pathogen: *Erysiphe graminis* DC. Var. *hordei* Marchal.
- Downy mildew (*Slerospora macrospora* Sacc).
- Powdery mildew (*Erysiphe graminis*).
- The Fungus *Erysiphe graminis*.
- Ergot (*claviceps purpurea*).
- Spot blotch (*Helminthosporium sativum*).
- *Rhynchosporium scald*, (*Rhynchosporium secalis*).
- Anthracnose (*collectotrichum graminis* Sacc).
- *Septoria* leaf blotch (*Septoria passerinii* Sacc).
- Black or Semiloose Smut, *Ustilago avenae*.
- Covered Smut (*Ustilago hordei* [Pers] Lagerh.
- Stripe Rust (*Puccinia glumarum* [Schm]).

Minor diseases of barley

- Neck blotch: *Helminthosporium teres* sacc.
- Root rot and foot rot *Helminthosporium sativum* and *cochliobolus sativus*.
- Sclerotial rot: *Pellicularia rolfsii* (curzi) west.
Leaf stripe: *Helminthosporium gramineum* Rabh

Virus diseases of Barley

- Barley yellow dwarf.
- Barley mosaic.

Both viruses are sap and aphid transmitted.

Non-parasitic diseases

- Virus diseases.
- Bacterial blight (*Xanthomonas translucens*).
- Pythium Root rot (*Pythium* spp).

Uses

- It is also used to make industrial alcohol and vinegar.
- Malt syrup is used for making candies, breakfast cereals, medicines and in textile industry. Malt sprouts and by-products of brewing are used as a feed for dairy cattle. The grains are used for the manufacturing pearl and powder products, which generally form the diet of sick people. Surplus grain provides feed for cattle and horses, straw is also fed to cattle.
- Its used for preparation of beer and whisky.
- The protein content varies from 7.5 - 15% of dry weight of grain and 50-60% starch content of the dry weight.
- For effective feeding the grain has to be rolled or ground after steaming; if fed whole, much of it remain undigested.
- For malting fully matured, medium size, plump, mellow grains free from cuts and blemishes and possessing a bright golden-yellow colour, with 100% visibility with nitrogen content of 1.2 - 1.4% on dry weight basis are suitable.
- It is eaten as pure flour or mixed with that of wheat or gram.

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May 11, 2005

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