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## Effect of date of sowing on the incidence of stripe disease of barley

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### Abstract

Stripe disease of barley caused by *Drechslera graminea* (Rabenh.) Shoemaker is a widely distributed disease in many barley grown parts of the world, but it has assumed more importance with the introduction of some new high yielding varieties. The present investigations were undertaken during 2007-08 and 2008-09 crop seasons with a view of elicit information on, effect of sowing dates on disease incidence and controlling the disease. In early sown crop i.e. 15<sup>th</sup> October there was no disease but in late sowings crop disease appeared.

**Keywords:** Barley, stripe disease, date of sowing

### Introduction

Barley (*Hordeum vulgare* L.) is an important cereal crop in the world with an annual production of around 132 million tons, ranking next to maize, wheat and rice. It is one of the earliest domesticated food crops. In India, it is an important *Rabi* season cereal crop in Punjab, Rajasthan, Madhya Pradesh, Haryana, Uttar Pradesh and Bihar. Total area under this crop in India is 656.25 thousand ha, with a production of 1747.45 thousand tons and an average productivity of 2663 kg/ha in 2016-17. Total area under this crop in Haryana is 20 thousand ha with a production of 73 thousand tones and an average productivity of 3650 kg/ha during 2016-17 (Anonymous, 2018) [1]. Barley is hardier than wheat crop and is inherently equipped to adapt itself admirably well under limited inputs and marginal lands. Because of its most versatile agro climatic adaptability even the high yielding varieties of wheat could not replace barley in the wheat bowls of India on rainfed, saline, alkaline soils and dryland etc. The raw material of barley is utilized for malting and brewing purpose besides food grain and cattle feeds. Barley crop suffers from a number of diseases such as stripe rust, leaf rust, covered smut, loose smut, net blotch, stripe disease and leaf blight etc. which cause significant losses to crop yield. Among these fungal disease, stripe disease (*Drechslera graminea* (Rabenh.) Shoemaker) is an important disease which may cause crop loss up to 70-72 per cent under epiphytotic conditions (Pant and Bisht, 1983) [4]. Due to the extensive cultivation of high yielding barley varieties, the problem of stripe disease has assumed a significant importance. The pathogen is seed borne in nature and it survives exclusively as mycelium on peri-carp or hull of the seed.

Diseased plant arise only from infected seeds and they become systematically infected, senescence early and produce a poor yield due to shrivelled seed. There is no spread of infection between plants during the growing season. The fungus produces masses of conidia (anamorph of *Drechslera graminea*) on leaves of diseased plants. These conidia are carried by the wind to developing seed on the ear of healthy plants with in the crop and in neighbouring crops. Developing barley seed is susceptible to infection from anthesis to soft dough stage (Teviotdale and Hall, 1976) [5]. Since, some of the spores germinate and infect the developing seed, there is potential for infection to multiply significantly from one season to next season. Initial symptoms of the fungal infection appeared in the form of small yellow spots, later on elongating into yellow brown stripes. These stripes started from the base extended to the tip of leaf causing necrosis of the infected tissue (Plate B). When observed under microscope, the necrotic tissues showed abundant sub hyaline to yellow brown coloured conidia. The conidia were thin walled, 2 to 7 septate and cylindrical in shape.

The pathogen has been reported as an obligate parasite, and practically no authentic record have been produced yet that conidia are produced on artificial media. But on the other hand, it has been reported that this pathogen successfully sporulates on the lesions on the foliages and glumes under natural conditions.

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In Haryana, the disease was first reported by Tyagi (1974)<sup>[6]</sup> on variety C-138 and Harichand (1976)<sup>[2]</sup> further reported on many commonly grown varieties. Disease plant arise only from infected seeds. After the germination of the seed, the pathogen becomes systemic and the plants senesce early and produce poor yield due to the shriveled grains. There is no secondary spread of infection. Since, these conidia germinate and infect the developing seed, so there is potential for the production of diseased seed, which act as source of infection for the next season. Being a seed borne disease, it is observed where the barley crop is grown throughout the world. Keeping this view in mind, an attempt was made to study the effect of date of sowing.

### Materials and Methods

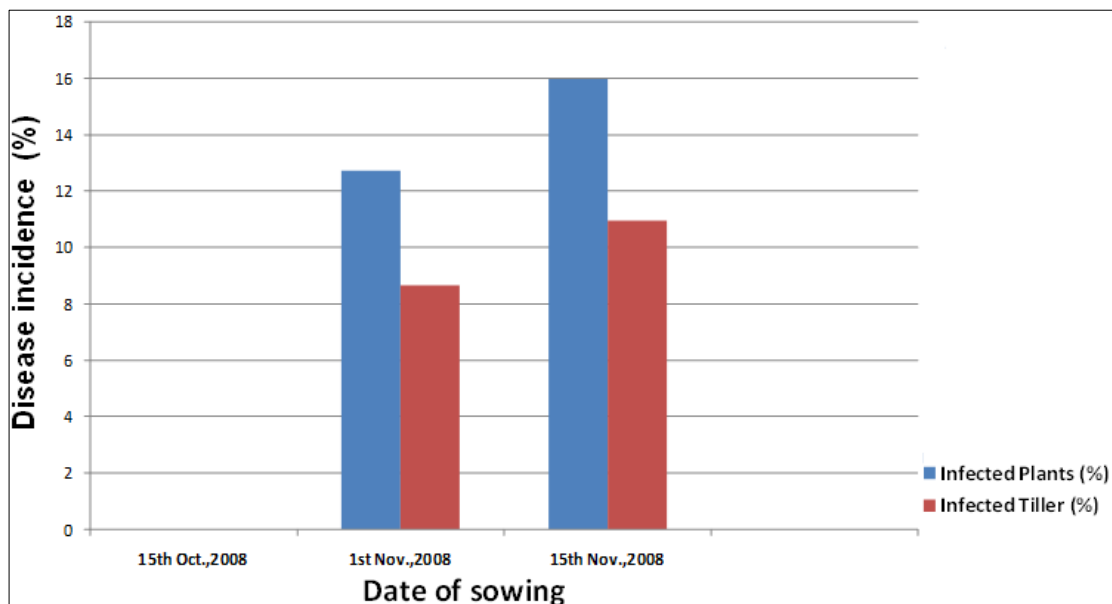
The present investigation entitled, "Effect of date sowing on the incidence of stripe disease of barley" were carried out during 2007-08 and 2008-09 *Rabi* seasons. The field experiments were conducted at the experimental research area of the Department of Plant Pathology, CCS Haryana Agricultural University, Hisar is located at 215.2 M above the mean sea level with a longitude of 75°46'E and latitude of 29°10'N has a wide range of temperature fluctuation during summer and winter seasons and is characterized as a Semi

arid Zone. The minimum and maximum temperature ranges from 0°C to 48°C, respectively. The annual average rainfall is 430mm. The major part of rainfall is received during monsoon season which occurs from July to September. A few millimeters of rainfall can be expected in winter too. During 2007-08 crop season the diseased plants were selected at the experimental research area, Department of Plant Breeding (Wheat and Barley section), CCS Haryana Agricultural University, Hisar in the seed production area of variety BH-393. At maturity these selected plants were harvested separately, thrashed and the seed obtained was used for carrying out further studies. Seed of highly susceptible barley variety BH-393 was sown at three different dates during 2008-09 crop season to study the effect of sowing time on disease development. The three sowing dates at fortnight interval were; 15<sup>th</sup> October, 1<sup>st</sup> November and 15<sup>th</sup> November.

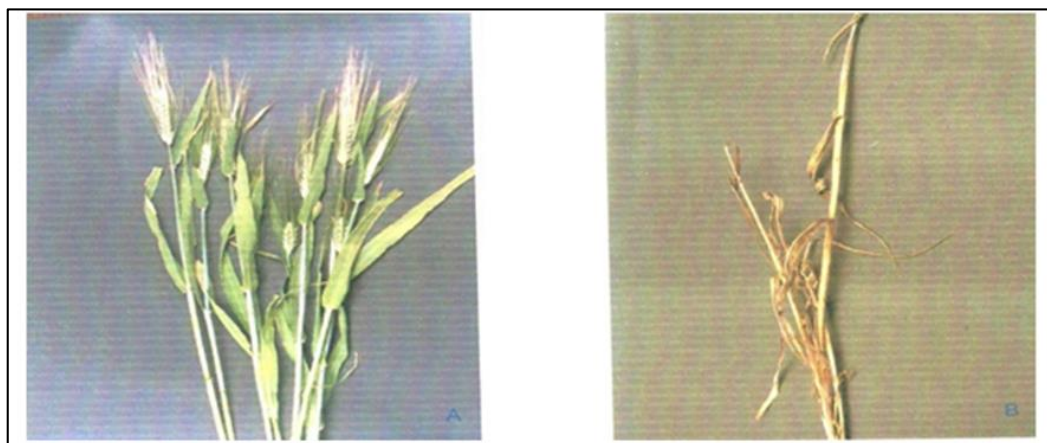
**Table 1:** Effect of date of sowing on stripe disease of barley

Date of sowing	Infected Plants (%)	Infected tillers (%)
15 <sup>th</sup> Oct, 2008	0.0 (1.81)	0.00 (1.81)
1 <sup>st</sup> Nov, 2008	12.72 (20.90)	8.66 (17.15)
15 <sup>th</sup> Nov, 2008	15.97 (23.52)	10.94 (19.26)
L.S.D (p=0.05)	0.92	1.19

Figures in parentheses are angular transformed values



**Fig 1:** Effect of date of sowing on stripe disease of Barley



**Plate (A):** Healthy Plate

**(B):** Plant showing typical symptoms of *Drechslera graminea*

## Results

The studies were carried out with sowing of diseased barley seeds at three different dates i.e. 15<sup>th</sup> Oct., 1<sup>st</sup> Nov. and 15<sup>th</sup> Nov. 2008. It is evident from the data shown in Table and Figure that in 15<sup>th</sup> October sowing there was no disease in the early sown crop. There was an increase in disease incidence in late sowings i.e. 1<sup>st</sup> and 15<sup>th</sup> November. However, in 1<sup>st</sup> November sowing there was 12.72 and 8.66 per cent disease incidence on plants and tiller basis, respectively. In 15<sup>th</sup> November sowing there was 15.97 and 10.94 per cent disease on plant and tiller basis, respectively was recorded. These findings are in conformity with those of Mathur and Bhatnagar (1990) [3] who reported that early sown crop with recommended dose of balanced fertilizer reduce the disease Significantl.

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