Incidence of yellow patch in burley tobacco seed beds

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Burley tobacco transplant producers in southwestern Ontario were surveyed to determine incidence of yellow patch in seed beds. Soil fumigation and low greenhouse temperatures were associated with the disorder. Transplant losses ranged from 0-25%. The average transplant loss was 6.3%.

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Une enquête a été effectuee chez les producteurs de plantules de tabac Burley dans le sud-ouest de l'Ontario afin de determiner l'incidence des zones jaunes sur les lits de semences. La fumigation du sol et les basses temperatures de serre, ont été associees à cette maladie non-parasitaire. Les pertes de plantules ont varié de 0-25% avec une perte moyenne de 6.3%.

Introduction

During 1980 and 1981 a number of burley tobacco transplant producers experienced seed bed problems characteristic of yellow patch. Transplant losses have been attributed to poor emergence and stunting of seedlings in irregular patches in the seed bed. Although the majority of stunted seedlings eventually recovered, growth was delayed to such an extent that many of the affected plants were unsuitable for transplanting.

Yellow patch is generally attributed to nitrite accumulation and may be more severe on compact, wet areas of the seed bed (1) **(3)**. Organic sources of nitrogen such as manure and excessive inorganic fertilizer have been associated with an increased incidence of yellow patch (3). However, the problem occurs in seed beds that receive recommended rates of inorganic fertilizer. This suggests that nitrate fertilizer may not be the main factor involved in the etiology of yellow patch.

Factors affecting yellow patch have not been studied extensively. The lack of research may be attributed to confusion with other disorders that result in similar foliar symptoms such as excessive watering, insufficient fertilizer, salt damage, nematode damage and root rot.

Materials and methods

In 1981 commercial growers were surveyed to determine if a particular practice or environment might increase the incidence of yellow patch. Growers were questioned with regard to cultural practices, distribution of problem areas and appearance of affected plants. In addition, growers were asked to estimate emergence **loss** and the percentage of seedlings unavailable for transplanting. Transplants from affected areas at the Harrow Research Station and from several commercial seed beds were examined microscopically to determine if plant pathogens were present.

Results and discussion

Twenty-three transplant producers responded to the questionnaire. All producers were growing m.s. Bu 21 X Ky 10 which was seeded between March 22 and April 9. The majority of growers seeded during the first week of April. The average seed bed age was 2.8 years but ranged from 1 - 10 years. Fifty-seven percent of seed beds were steamed, 22% fumigated and 21% not treated. Fertilizer was applied to 61% of the beds. The majority of the fertilizer applied was formulated as 4-30-8. Most growers watered plant beds as required rather than on a regular schedule. Average high temperature in all greenhouses was 25.3°C (range, 21 - 32°C). Average low temperature was 5.4°C (range, 2 - 10°C). The average lowest temperature that occurred in greenhouses during April was 0.7°C (range, -4 - 7°C).

The average loss in plant stands from poor emergence and **loss** of transplants from stunting was 11.5 and 6.3% respectively. If only growers who reported problems were considered, emergence and transplant losses were 16.6 and 13.2%, respectively. Two growers reported a 25% **loss** of transplants.

The majority of growers indicated that uneven growth occurred along walls and in irregular patches scattered throughout the plant bed. Plants in these areas were yellow and stunted. Five growers reported symptoms of cold damage characterized by seedlings that remained green with an upward cupping of leaves. Two of these growers reported a loss in transplants but both reported symptoms of yellow patch in addition to leaf curling.

Few growers indicated that roots of plants in affected areas were necrotic. Five growers who described symptoms of yellow patch on the leaves reported that roots were healthy. This suggests that nitrogen deficiency may have been affecting some seed beds but four of these growers fertilized at the recommended rate. It is possible that growers did not observe roots closely or that observations were made after new roots were produced.

At the Research Station, emergence proceeded normally until leaves were 3 - 5 mm in diameter. At that stage, 3 - 4

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weeks from seeding, seedlings in affected areas began to wilt and die or became pale green to yellow in colour and remained stunted. The tips of the tap and the longest lateral roots of stunted plants appeared necrotic and frequently necrotic areas occurred at intervals along the entire length of older roots. New roots produced near the base of the plant appeared healthy. Microcopic examination of the necrotic areas did not reveal any pathogens. Similar results were obtained in examining stunted plants for several commercial plant beds. Soluble salt levels in seed beds at the Research Station were less than 100 which suggests that salts were not causing damage **(3).**

Table 1. Effect of various factors on loss of tobacco seedlings produced by commercial growers, 1981.

Factor		Number of growers reporting a loss	Number of growers reporting no loss
Steam sterilized		7	6
Fumigated		5	0
No treatment		4	1
Fertilizer applied		6	9
Fertilizer not applied		**5**	3
Age of seed bed	1 yr	4	3
	2-3 yrs	6	6
	4 yrs	**2**	2
Average high temp.	32 C	3	0
	27 C	5	5
	21 C	6	2
Average low temp.	10 C	**3**	**3**
	4 c	**4**	3
	2 c	**5**	0

The effect of several factors on incidence of yellow patch is presented in Table 1. Because of low sample number, significant relationships among cultural practices, environment and incidence of yellow patch were not evident: however, application of fertilizer did not appear to affect the incidence of the disorder. Factors that appeared to affect yellow patch were soil fumigation and average high and low greenhouse temperatures. These factors are known to affect nitrification (2) which in turn may affect nitrite concentration. However, these factors do not explain the patchy appearance of the disorder particularly in the central areas of seed beds. The patchy nature of the affected areas suggests that seed bed compaction or slight gradations in seed bed level which would affect soil moisture have a pronounced affect on symptom development as noted previously (1) **(3).** Questions regarding these two factors were not included in the survey because differences in compaction or bed level are often slight and would require critical measurement. Since fumigation was associated with symptoms of yellow patch it is possible that residual fumigant was present in compact areas of seed beds.

The survey does indicate that yellow patch can be of economic importance. If the main factor or factors contributing to the disorder could be identified, control programs might be devised to reduce losses of transplants.

Literature cited

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