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Resistance of eleven barley varieties to the root lesion nematode *Pratylenchus thornei* – Trangie 2011

Rohan Brill NSW DPI, Coonamble and Steven Simpfendorfer NSW DPI, Tamworth

Introduction

The root lesion nematode (RLN) *Pratylenchus thornei* (*Pt*) is widespread in cropping soils through central and northern NSW including much of the farmed grey clay soils on Trangie Agricultural Research Centre (TARC). This nematode can cause significant yield loss in certain susceptible crops, especially wheat and chickpeas. Barley varieties generally tend to have moderate levels of **tolerance** to *Pt* which allows them to maintain relatively high yield in the presence of this nematode species. However, barley varieties can also vary in their levels of **resistance** to *Pt* which is related to the extent which they build-up *Pt* populations in the soil, which dictates their effect on subsequent crops in the rotation. That is, more susceptible varieties allow greater multiplication of *Pt* in their root systems over a season. The higher resulting *Pt* population left in the soil then has the potential to increase the negative impact of *Pt* on yield of subsequent crops.

A barley variety sowing time experiment was conducted at TARC in 2011 (yield results reported in Autumn 2012 Northern Grains Region Trial Results). The harvested plots were left intact and soil cores were taken in March 2012 to assess the effect of barley variety choice on the build-up of *Pt* in the soil under the 2011 crop. This type of testing determines the **resistance** of barley varieties to *Pt*.

Site details

Location: **Trangie Agricultural Research Centre**

Previous crop: **Faba beans**

RLN (*P. thornei*): **10,200 *Pt*/kg soil (0–30 cm)**

Soil type: **Grey vertosol**

Treatments in 2011

Three sowing times of:

1. 6th May
2. 18th May
3. 9th June

Eleven varieties, ranging in maturity from the long season, dual purpose winter type Urambie[®] to the quick variety Grout[®].

Nematode testing

Ten small soil cores were taken from the 0–30cm zone from each harvested plot of the second sowing time (18th May 2011) in March 2012. Three varieties (Commander[®], Buloke[®], and Hindmarsh[®]) were also sampled across the three sowing times. The cores from each plot were bulked and sent to the South Australian Research and Development Institute (SARDI) for PreDictaB analysis of *Pt* numbers within each soil sample based on this sensitive and selective DNA test.

Key findings

Barley variety choice can have a moderate impact on the build-up of the RLN, *Pratylenchus thornei* in the soil.

Pratylenchus thornei populations were approximately double in the most susceptible variety Gairdner[®] compared to the most resistant varieties Urambie[®] and Oxford[®].

Sowing time did not have a significant effect on the build-up of *Pt* populations in barley.

Results

The barley varieties differed in their levels of resistance to *Pt* (Figure 1). Six varieties reduced the *Pt* population to below the starting level of 10,200 *Pt*/kg soil.

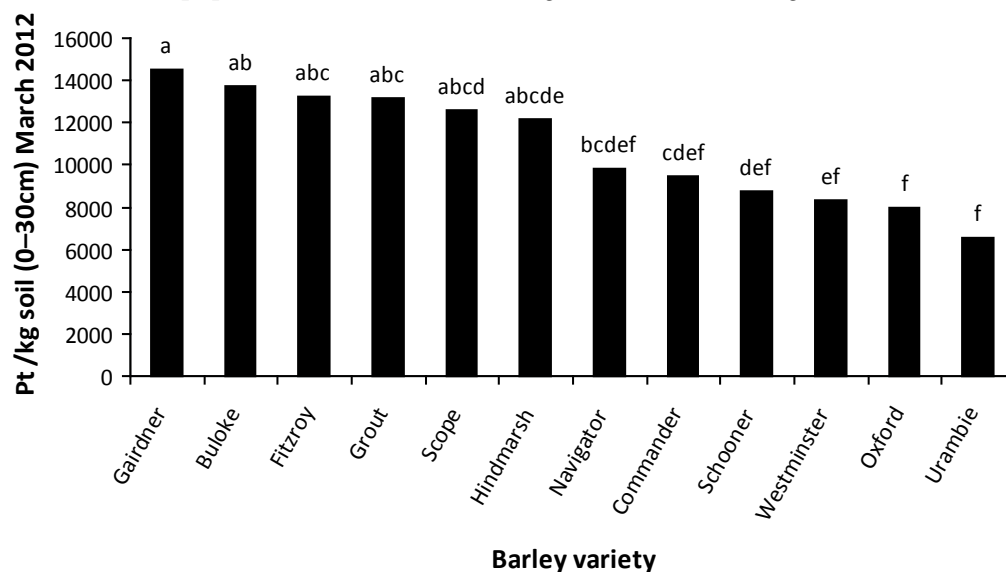


Figure 1: Resistance of 11 barley varieties to *Pratylenchus thornei* – Trangie 2011
Starting *Pt* population at sowing 2011 of 10,200 *Pt*/kg soil (0–30cm). Bars followed by the same letter are not significant at the 95% confidence level.

At the more susceptible end of the resistance ratings, the barley varieties only resulted in a modest build-up in *Pt* populations (max. 14,500 *Pt*/kg soil with Gairdner[Ⓛ]) over the starting population (Figure 1).

Sowing time did not have a significant effect on the build-up of *Pt* populations under the various barley varieties over the 2011 growing season.

Conclusions

Barley variety choice had a moderate effect on the build-up of *Pt* soil populations over the 2011 season. In 2012, remaining *Pt* populations were approximately double after the most susceptible variety Gairdner[Ⓛ] compared to the most resistant varieties Urambie[Ⓛ] and Oxford[Ⓛ]. However, even though the most resistant varieties reduced the actual levels of *Pt* compared to what was present at sowing in 2011, the populations were still above the threshold (2,000 *Pt*/kg soil) for yield loss in intolerant varieties at sowing in 2012.

This trial was conducted in the same paddock as the wheat variety sowing time experiment. Although not statistically comparable the barley varieties appear to have similar levels of resistance to *Pt* as the majority of the wheat varieties, with the exception of Lincoln[Ⓛ] and Axe[Ⓛ] which appear very susceptible.

Barley is an option for growers in situations where *Pt* is a concern as all varieties generally have moderate levels of tolerance to *Pt* which maximises yield in the presence of this nematode. However in these situations it would be recommended to choose a relatively resistant variety to. Several barley varieties do appear to have a moderate level of resistance to *Pt* which will also limit the build-up of populations within the soil. However, variety choice can still influence the build-up of *Pt* populations in the soil as significant differences (although smaller than seen in wheat) still exist in the resistance of barley varieties to *Pt*.

Acknowledgements

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