

Physiological susceptibility of European wheat cultivars to infection and development of Karnal bunt

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Introduction and aim

We report about the task aimed at determining the physiological resistance/susceptibility to *Tilletia indica* (causal agent of Karnal bunt) of European bread and durum wheat cultivars within the framework of the EU Karnal Bunt Risks Project. *T. indica* is difficult to control and can cause economic damage through quality losses and losses in export markets.

Materials and methods

Fifteen winter, 15 spring and 11 durum European representative wheat cultivars and the susceptible Indian cultivar WL-711 (control), were tested for physiological susceptibility to *T. indica*. Three *T. indica* populations (India, Mexico, USA) were used to prepare a mixed inoculum of allantoid sporidia (Fig. 1a) (10,000 sporidia ml⁻¹). Plants were inoculated by boot injection (Fig. 1b) of 1ml inoculum at GS 45 (Fig. 1c).

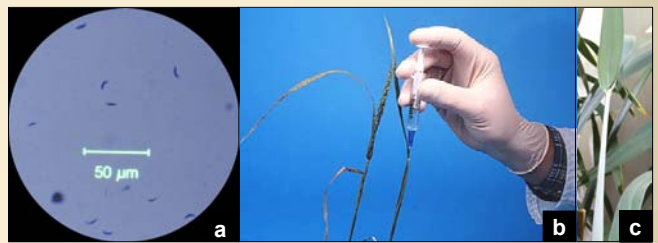


Fig. 1. Plant inoculation with *T. indica*.

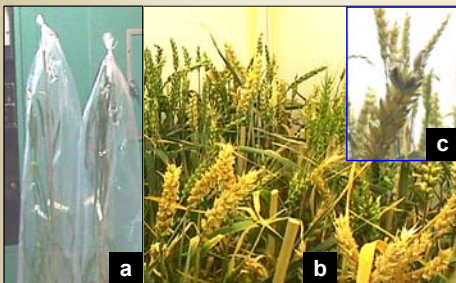


Fig. 2. Incubation, growth and symptoms.

INFECTION CATEGORY	SYMPTOMS	NUMERICAL VALUE FOR CALCULATING C.I.
0	Healthy	0
0.1	Point infection (iracei) ca. 5% seed bunted	0.25
1	Well developed point infection ca. 25% seed bunted	0.25
2	Infection spreading along groove ca. 50% seed bunted	0.5
3	2/3 of seed converted to sorus ca. 75% seed bunted	0.75
4	Whole seed converted to sorus ca. 100% seed bunted	1.0

$$\text{C. of infection} = \frac{N1 \times 0.25 + N2 \times 0.5 + N3 \times 0.75 + N4 \times 1}{\text{Total N of grains}} \times 100$$

COEFFICIENT OF INFECTION	REACTION
0	1R Highly resistant
0.1-5.0	2R Resistant
5.1-10.0	1S Moderately susceptible
10.1-20.0	2S Susceptible
> 20.1	3S Highly susceptible

Tab. 1. Karnal bunt assessment.

Conclusions

The range of susceptibility of European wheat cultivars to *T. indica* is similar as in countries where Karnal bunt is established. Other studies on European winter wheat indicated higher levels of susceptibility (Peterson *et al.*, 2000, *Phytopathology*, 90,S60; A. Inman, unpublished). In conclusion, European wheat cultivars were found to be physiologically susceptible to *T. indica*, indicating their potential to support establishment of the pathogen in Europe and for *T. indica* to cause economic losses.

Results

A large variability in susceptibility of European cultivars to *T. indica* was observed. Only six out of 41 cultivars were highly resistant. The percentage of infected seeds ranged from 0 to 94.7 (Fig. 3). The coefficients of infection ranged from 0% to 93.4% (Fig. 4).

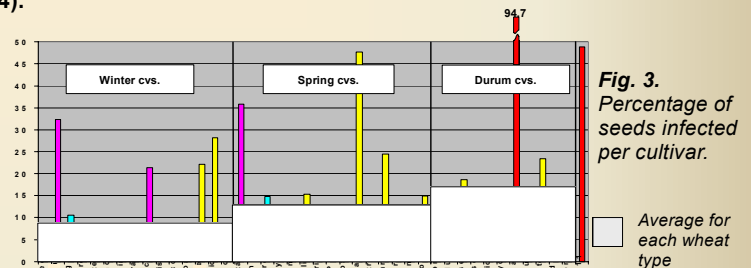


Fig. 3. Percentage of seeds infected per cultivar.

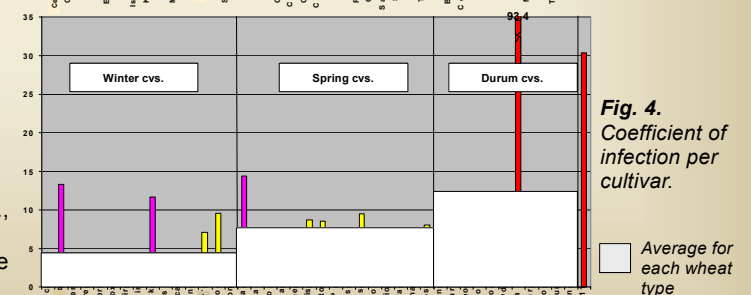


Fig. 4. Coefficient of infection per cultivar.