

BACKGROUND

Since 2018, the European Union and several other countries banned the sale and use of many pesticides containing thiram and thiamethoxam molecules, which led to preventing seed shipments treated with these chemicals from entering these countries (Gautier, 2004). Accordingly, an alternative fungicide formulation to Celest top (thiamethoxam 262.5 g/l + fludioxonil 25 g/l + difenoconazole 25 g/l) and Vitavax (carboxin 200 g/l + thiram 200 g/l), should be sought.

The common bunt is one of the most widespread seed-borne diseases and causes high losses in grain yield and quality. It is caused by two very closely related fungi, *Tilletia tritici* (syn. *Tilletia caries*) and *T. laevis* (syn. *T. foetida*) (Wilcoxson *et al.*, 1996). The main objective of this research focuses on comparing the fungicide activity of a new formulation against the common bunt in wheat as well as their impact on crop growth and productivity.

METHODOLOGY

The research was conducted using both *in vivo* and *in vitro* methods, using two bread wheat (Faiza and Najia) and two durum wheat (Faraj and Jabal) Moroccan varieties during 2023 season at the Seed Health Laboratory, ICARDA's platform, Rabat-Morocco. The new formulation (fludioxonil 25g/l + sedaxane 25g/l) proposed by Syngenta was tested in comparison with Celest top (thiamethoxam 262.5 g/l + fludioxonil 25 g/l + difenoconazole 25 g/l).

Each 50 gr of wheat seeds for each wheat variety was inoculated with 1 g spores of *Tilletia* spp. (Ezzahiri, 2001). 48 hours after inoculation, the inoculated seeds were treated with fungicides according to the instructions suggested by the producer. Healthy seeds were also treated to evaluate the seed germination and the impact of fungicides used on wheat varieties (Maksimov *et al.*, 2002). The experiment was conducted under greenhouse conditions in three replicates (Figure 1). A centrifuge washing test was performed on all harvested seeds to evaluate fungicides' effectiveness.



Figure 1. Ms Fatima Zahra Bouanba (MSc student) is preparing the greenhouse experiment, ICARDA, Rabat-Morocco, 2023.

OUTCOME

- The results revealed that the new tested formulation (fludioxonil 25g/l + sedaxane 25g/l) exhibited significant effectiveness against common bunt, achieving a 100% success rate compared to Celest top, which also showed high effectiveness (99.67%) (Figure 2).
- The tested new fungicide formulation outperformed Celest top in all evaluated parameters related to growth and production. Preliminary results showed that the germination rate of the 4 wheat varieties used was not significantly affected when treated with fungicides (Figure 3). However, these data must be confirmed using a large quantity of treated wheat seeds and under field condition mainly for the new fungicide formulation (fludioxonil 25g/l + sedaxane 25g/l).
- The results obtained revealed that Faraj durum wheat variety showed a higher susceptibility, with a greater percentage of decayed seeds (3.79%), whereas Jabal durum variety showed a slightly lower percentage of decayed seeds (2.70%).
- No visible infections were observed in the inoculated bread wheat control, confirming the higher susceptibility of durum wheat to common bunt. In addition, the results indicated a greater predominance of *Tilletia foetida* spores in both durum and bread wheat varieties within the positive control group.
- Based on the results obtained, it is recommended to test the new fungicide formulation against other seed-borne fungal diseases affecting wheat as well as other ICARDA's crops (barley, food legumes).

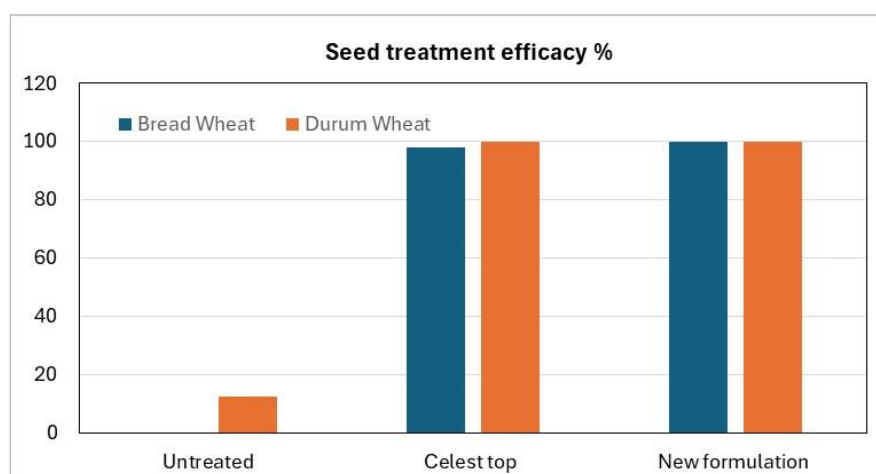


Figure 2. Fungicide effectiveness rate against common bunt on bread and durum wheat varieties. The new fungicide formulation is “fludioxonil 25g/l + sedaxane 25g/l”.

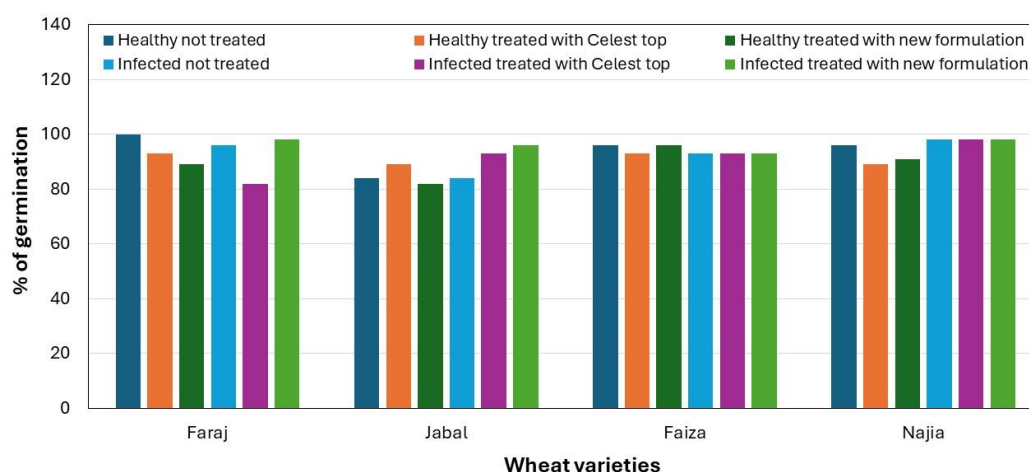


Figure 3. Germination rate (%) of treated and non-treated seeds of four bread and durum wheat varieties.

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