Assessment of powdery mildew on wheat

Method/protocol submitted by:

Surname: Trottet, Rolland
First name: Maxime, Bernard
Organisation: INRA Rennes– UMR APBV
Email: Maxime.Trottet@rennes.inra.fr, Bernard.Rolland@rennes.inra.fr

Author(s) of the document:

Gérard Doussinault, Marie-Thérèse Pavoine

Objectives of the method/protocol:

To estimate the attacks of powdery mildew on wheat at the field scale.

Brief description of the method/protocol:

This protocol presents a sampling method and a scoring scale to assess powdery mildew development in field experiments on wheat.

Pathogens causing the disease

Teleomorph pathogen: *Blumeria graminis* (anciently called *Erysiphe graminis*).
Anamorph pathogen: *Oidium monilioides* .

Possible uses of this method/protocol:

Breeding of wheat varieties.

Method/protocol:

- Observation unit

The observation is carried out in micro-plots designed for varietal selection (distance between the plants: minimum 50 cm). The seeds are sown in hill plots (15 seeds/plot if the experiment is carried out under cover, 30 seeds/plot in field conditions).

- Observation period and frequency

3 to 5 observations are made between the end of tillering and the milk stage.

- Disease assessment

The disease is assessed thanks to a visual scoring scale with 9 classes. The first class corresponds to an absence of symptoms, and the ninth to an attack similar to the ones observed on the susceptible control variety.
Each plot is assigned to a class.
The scoring scale is described below:

Class	Symptoms on the plot
1	No pustule visible 1-2 pustules at the foot of some stems
2	Some pustules at the foot of the stems of some tillers Few pustules, but on all tillers
3	Numerous pustules at the foot of the stems of the tillers Some pustules on the first green leaves
4	All the stems are diseased. Some pustules are visible on the basal leaves.
5	Numerous pustules on the stems and the basal leaves. Numerous pustules on the basal leaves, and some on intermediate leaves.
6	Same description as for the class 5, but with a stronger sporulation. The intermediate leaves are covered with pustules, but no pustule is visible on the upper leaves.
7	Some pustules on the upper leaves. The other leaves show numerous pustules.
8	Same description as for the class 7, with a strong sporulation. The upper leaves are progressively covered with pustules.
9	All the leaves are covered with pustules. Very strong sporulation on all the plants.

Advantages/disadvantages of the method/protocol:

The main advantage of the method is the precision and a high repeatability between the observers.
The main disadvantage is that the method is very time-consuming and consequently does not allow to record an important number of plots.

References or examples of studies carried out by using this method/protocol:

Paillard S, Goldringer I, Enjalbert J, Trottet M, David J, de Vallavieille-Pope C, Brabant P (2000). Evolution of resistance against powdery mildew in winter wheat populations conducted under dynamic management. II. Adult plant resistance. Theoretical and applied genetics 101: 457-462