Assessment of *Aphanomyces euteiches* on aerial parts of pea

Method/protocol submitted by:

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Objectives of the method/protocol:

To estimate the effect of *Aphanomyces euteiches* on aerial parts of pea under field conditions.

Brief description of the method/protocol:

A visual scoring scale is given to assess the effect of *Aphanomyces euteiches* on aerial parts of pea.

Possible uses of this method/protocol:

This protocol could be used for instance determine the level of resistance of different genotypes to *Aphanomyces euteiches*.

Method/protocol:

- Observation unit

The assessment is made at the plot scale or on individual plants (10 to 20), twice or three times from the beginning of flowering until the middle/end of pod-filling stage, before the physiological maturity.

- Disease assessment

The following scale base on yellowing and dwarfism is used (see figure below):

1 = green plants,
2 = the leaves start discolouring,
3 = the plants are yellow on 25% of the height, the leaves are noticeably more discoloured than on a sound plant,
4 = the plants are yellow on 25-50% of the height, all the leaves are discoloured,
5 = the plants are yellow on 25-50% of the height, beginning of dwarfism (the weakness of the plant is clearly noticeable),
6 = the plants are yellow on 25-50% of the height, marked dwarfism (short internods, few pod stages),
7 = the plants are yellow on more than 75% of the height, pronounced dwarfism (very short plant, very few pod stages),
8 = the plants are completely yellow, very pronounced dwarfism (very short plant, one or no pod stage),
9 = dead plants

If dwarfism symptoms are absent or difficult to evaluate, the classes 5-6 and 8-9 can be merged and a scoring scale with 7 classes can be used.

The indexes can be weighted by the ones obtained on adjacent plots with a control variety.

Advantages/disadvantages of the method/protocol:

In some case, symptoms of yellowing due to the disease can be mistaken with physiological earliness

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

Pilet-Nayel M-L., Esnault R., Boitel-Devaux C., Roux-Duparque M. (2005). Test de criblage au champ pour la résistance au pois à *Aphanomyces euteiches* in Cahier des techniques de l'INRA, numéro spécial Méthodes d'appréciation du comportement variétal vis-à-vis des bioagresseurs, pp. 65-67.

Hamon C., Baranger A., Coyne CJ., McGee RJ., Le Goff I., L'Anthoëne V., Esnault R., Rivière J-P., Klein A., Mangin P., McPhee KE., Roux-Duparque M., Porter L., Miteul H., Lesné A., Morin G., Onfroy C., Moussart A., Tivoli B., Delourme R., Pilet-Nayel M-L. (2010). New consistent QTL in pea associated with partial resistance to Aphanomyces euteiches in controlled condition and multiple field environments from France and the United States of America. Theor Appl Genet (submitted).

Duparque M., Boitel C. (2001). Common root rot (*Aphanomyces euteiches*) reduces the yield of pea (*Pisum sativum* L.) depending on the resistance level of the genotype. Proc. 4th European conference on grain legumes, 8-12 July 2001, Cracow.