Risk estimation to predict tuber blight

P.J. van Bokkum1, A. Everhuis2 & G.J.T. Kessel1

Introduction
Tuber infections can result in high yield losses at harvest and/or during storage. Infected tubers also form a source of inoculum for following cropping seasons. Therefore, fungicides are applied intensively to prevent and subsequently tuber blight.
To prevent tuber infection and to minimize the fungicide input, prediction of tuber blight infection risks can help to identify critical periods for tuber infection so that preventive measures can be adapted to specifically mitigate this risk.
The following five factors are important:
- Tuber must be present
- Inoculum must be present in the foliage or the soil
- Weather / soil conditions must be conducive for infection

Points crop very severely infected with Phytophthora infections.

Risk estimation
A risk estimation can be made based on the relative contribution of the combined key factors for tuber infection (Figure 1). A more detailed risk estimation could also include additional risk factors such as soil conditions (closeness for tuber infection), soil types, composition of the soil layer and "homogenization factor" of sowing position into the ridged and therefore tuber blight levels. Infection risk is also influenced by the level of pathogen resistance of the cultivar and the virulence of the pathogen population.

Phytophthora spore which can be washed off the soil and subsequently infect tubers.

Figure 1. Weather, inoculum and susceptibility of tubers are key factors to estimate tuber blight infection risks. When all three factors are in favorable tuber infection risks will be high.
1 Weather: ++ = hot; ++ = 20 - 25°C; +++ = 25 - 30°C
2 Inoculum: ++ = no inoculum in the crop; +++ = heavy inoculum in the crop
3 Tuber: ++ = tuber blight at earlier; +++ = early tuber blight; +++ = late tuber blight