

Risk estimation to predict tuber blight

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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 leaf 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 negate this risk.

The following (key) factors are important:

- Tubers must be present
- Inoculum must be present in the foliage or the soil
- Weather / soil conditions must be conducive for infection



Potato crop severely infected with *Phytophthora infestans*.

Risk estimation

A risk estimation can be made based on the relative conductivity 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 (conducive for tuber infection), soil type, composition of top soil layer and "tunneling" (influx of sporangia into the ridge) and therefore tuber blight levels. Infection risk is also influenced by the level of blight resistance of the cultivar and the virulence of the pathogen population.



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



Infected tubers resulting from a period with high inoculum pressure and heavy rainfall.

- weather ¹	Tubers ³		
	-	+	++
Inoculum ²	-	-	-
	+	-	-
	++	-	-

+ weather	Tubers		
	-	+	++
Inoculum	-	-	-
	+	-	+/
	++	-	+

++ weather	Tubers		
	-	+	++
Inoculum	-	-	-
	+	-	+
	++	-	++

No or very low risk
Low – medium risk
Medium – very high risk

Figure 1. Weather, inoculum and presence of tubers are key factors to estimate tuber infection risks. When all three factors are favourable tuber infection risks will be high.

¹ Weather: - = No rain; + = >1 – 4 mm rain; ++ = > 4 mm rain

² Inoculum: - = No blight in crop; + = sporadic lesions in the crop; ++ = frequent lesions in the crop

³ Tubers: - = tuber establishment or earlier; + = early tuber blight; ++ = late tuber blight

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