

# Reduced copper treatments in strawberries by cultural methods

## Effect of cultural methods on leaf spot (*Mycosphaerella fragariae* Tul.) and yield in strawberries

### There is **A** problem ...

Leaf spot caused by *Mycosphaerella fragariae* Tul. is one of the most common diseases of strawberry. The control of leaf spot mostly relies on the application of protective fungicides (MAAS 1998). In organic agriculture the use of copper products is effective (VUKOVITS 1980) but this has a negative influence on soil fertility (BERGMANN 1993). Therefore its use in strawberry crops should be reduced.

The field study evaluated the effects of cultural methods on leaf spot incidence and yield. Influence of planting density and removal of dead and leaf spot infested leaves in March before sprouting were the investigation criteria. The potted green plants cv. Senga Sengana were planted in August 2000 on raised beds. The planting systems are described in Table 1 below.

### ... **B**ut there is also a solution ...

Tab. 1: Description of cultural methods and their effects on *M. fragariae* and yield at Frick 2001. Cv. Senga Sengana.



Width / Height of raised beds	40 cm / 20 cm	25 cm / 20 cm
Distance of rows	Between the middle of the raised beds: 150 cm. Between the rows on the raised beds: 25 cm	75 cm
Distance between each plant	33 cm	33 cm
Plants per m <sup>2</sup>	4	4
	without leaf sanitation	with leaf sanitation
<i>M. fragariae</i> incidence (% infested leaf surface on June 21 <sup>st</sup> 2001)	<b>71.8 a</b>	<b>5.6 b</b>
Yield/plant (g)	<b>199 a</b>	<b>245 b</b>
	without leaf sanitation	with leaf sanitation
	<b>34.2 a</b>	<b>4.1 b</b>
	<b>238 b</b>	<b>325 a</b>

Means within each field followed by different letter are significantly different (P = 0.05, Tukey Test)

In the single row system *M. fragariae* incidence (treatments without leaf sanitation) were lower and yields were higher than in the double row system. In both systems leaf sanitation decreased *M. fragariae* significantly and yield was increased (Table 1).

### ... which enables to reduce the **C**opper input in organic strawberry crops.

In this trial, it was possible to achieve an acceptable low leaf spot incidence without any copper treatments (Figure 1). It can therefore be suggested for Central European conditions to apply a single row system combined with leaf sanitation. Leaf sanitation should be done carefully, healthy green leaves should remain intact, otherwise fruit weight could decrease significantly (data not shown). The best period to conduct the leaf sanitation is during a frost period in early

spring before plants begin to sprout. Removal of dead leaves can be done by besom, but removal of green leaves infested by *M. fragariae* should be done by hand. The time required for leaf sanitation is about 40–100 hours per ha<sup>-1</sup> which corresponds to 2–5 % of the amount of working time in strawberry. It is conceivable to do this work in future with a crop adapted machine with brushes, similar to the one used for cleaning streets.



Fig. 1: Examples of *M. fragariae* incidence on after harvest in treatments without leaf sanitation (left) and with leaf sanitation (right). Cv. Senga Sengana

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