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Resistance to apple scab by some apple varieties.

1. Unsprayed apple varieties

Through 3 years the apple scab infection is observed in 15 unsprayed apple varieties planted in 1983. Infection is observed at the foliage through the season, and at the fruits at harvest.

Tabel 1. Percent leaves and fruits infected by apple scab (*Venturia inaequalis*) in 1988, 1989 and 1990 on 15 varieties.

Variety	% infected leaves						% infected fruits at harvest		
	1988		1989		1990		1988	1989	1990
	20/6	28/7	26/6	26/7	7/6	13/7			
Bramley Seedling	15,0	23,0	8,5	7,0	0,0	3,0	44,5	6,0	1,8
Discovery	-	-	-	-	0,0	0,0	10,5	4,0	1,8 I
Filippa	2,0	15,0	1,0	2,5	0,0	2,5	19,0	4,5	2,5
Rød Ananas	18,0	34,0	0,5	10,0	3,0	15,0	28,2	8,0	27,7
Belle de Boskoop	17,0	48,0	9,5	27,5	2,5	14,0	42,5	38,5	8,0
Ildrød Pigeon	-	-	-	-	6,5	17,5	87,0	11,0	12,8
Ingrid Marie	7,0	27,0	22,5	38,0	0,0	22,5	41,5	50,5	35,5 II
James Grieve	-	-	-	-	10,0	27,0	77,0	23,5	29,8
Transparante Blanche	25,5	59,5	25,5	47,5	4,0	31,0	30,0	26,5	35,0
Skovfoged	-	-	-	-	1,0	23,0	50,5	15,0	23,0
Cox's Orange	-	-	-	-	4,0	28,5	38,0	67,0	52,3
Gravenstein	32,0	66,5	10,5	35,0	3,0	28,5	90,5	-	29,5 III
Guldborg	21,0	53,0	18,0	64,0	24,5	62,0	64,5	29,0	68,3
Mutsu	33,5	-	10,0	65,0	27,0	55,0	100,0	60,0	
Summerred	60,0	83,0	38,0	54,0	47,5	75,0	98,0	43,0	91,3

I: Varieties which are most resistant to scab.

II: Varieties which are medium infected by scab, or react different through 3 years.

III: Varieties which are very much susceptible to scab.

Until 1988 the trees were sprayed very little. Only 3 times (in the spring) against scab, as normal for private gardens. In 1988 heavy scab infections were seen in Denmark. 1989 was more dry during the spring so infections were not so heavy as in 1988. 1990 medium infections were seen.

The varieties most resistant to apple scab was Discovery and the old Danish variety 'Filippa'. 'Bramley' was also rather resistant. Varieties which got too much scab unsprayed were 'Summerred', 'Mutsu', 'Gravenstein' and the old Danish variety 'Guldborg'. But the pathological picture were different, fx the scab infected apples of 'Summerred' became smaller with cracks, which often were infected by other diseases. The other varieties got a lot of scab spots, but most of the fruits developed a good size.

2. Apple varieties sprayed with copper and sulphur

11 varieties, which are common planted in Denmark, were sprayed against scab with copper and sulphur, which are allowed in Danish, organic fruit growing. Tabel 2 shows the spaying program for 1990.

Tabel 2

Spaying plan for organic fruitgrowing 1990

	<u>1990</u>	
20/3	copper	0,25%
9/4	sulphur	0,40%
17/4	-	0,40%
27/4	-	0,20%
15/5	-	0,20%
6/6	-	0,20%
15/6	-	0,20%
28/6	-	0,20%
13/7	-	0,20% *
11/8	-	0,20% *

* 13/7 and 11/8 only the varieties 'Summerred', 'Mutsu' and 'Jonagold' were sprayed.

Tabel 3. Percent leaves and fruits infected by apple scab (*Venturia inaequalis*) in 1988, 1989 and 1990 on 11 varieties planted in 1987.

VARIETY	% infected leaves						% infected fruits at harvest	
	1988		1989		1990		1989	1990
	20/6	1/8	27/6	2/8	11/6	16/7		
Aroma	0	3	1	1	0	0	0	0
Cox's Orange	0	14	7	7	0	0	2	2
Discovery	0	1	0	0	0	0	0	
Elstar	0	17	4	8	0	0	1	1
Gloster	0	4	2	3	0	2	0	
Jonagold	2	4	8	18	0	7	5	
Mutsu	0	8	0	1	1	7	-	
Rød Boskoop	1	1	0	7	0	0	2	1
Rød Ingrid	1	5	0	1	0	1	0	0
Spartan	1	3	4	12	0	3	1	0
Summerred	7	37	42	34	2	24	5	1

Only small infections by scab were seen in the II varieties. Copper and sulphur can reduce the apple scab to an acceptable level in young trees of these varieties.

3. Apple scab in some Danish organic orchards

13 varieties were examined for apple scab during the summer 1990.

Tabel 4. The level of scab in 13 organically grown apple varieties. Unsprayed, or sprayed with sulphur. (1 = no infection. 10 = full infection).

<u>Variety</u>	<u>Unsprayed</u>	<u>Sulphur</u>
Boskoop	2.2	1.8
Cortland	4.0	7.3
Cox`s Orange	1.7	1.5
Filippa	1.2	1.2
Golden Del.	10.0	6.5
Guldborg	2.6	1.2
James Grieve	3.1	1.5
Katja	4.9	2.0
Lobo	6.6	2.6
Rød Gravenstein	6.5	2.0
Rød Ingrid	3.2	2.2
Spartan	5.3	2.6
Stark Earliest	5.9	1.9
<u>Average</u>	<u>4.4</u>	<u>2.6</u>

Spraying with sulphur reduced the level of scab in most of the varieties.

SUMMARY:

Widerstandsfähige Apfelsorten gegen Apfelschorf

Durch drei Jahre ist der Größe der Widerstandsfähigkeit gegen Apfelschorf in 15 ungespritzte Apfelsorten gemessen worden.

Der Apfelschorf ist mit Kupfer und Schwefel in 11 Apfelsorten bekämpft. Der Größe des Apfelschorf ist auf Früchte und Blätter durch drei Jahre gemessen.

In 1990 ist der Größe des Apfelschorf in ökologischen Obstbau registriert.