SCORING PROCEDURE (version September 2014)

The following procedure has been developed to assess incidence and severity of apple scab on the differential hosts of the initiative VINQUEST.

Material needed

- Copy of the evaluation scale
- Evaluation table (see annex I)
- Loupe
- Digital camera
- Paper envelopes to collect apple scab infected leaves
- Large plastic bags to remove infected shoots/trees (if you decide so, see later)

Evaluation scale

The scale of evaluation is an adaptation of the one developed by Lateur and Populer (1994).

Score	Definition of the symptoms	Proportion of affected leaves (%)
0	No observation (missing plant)	**-**
1	No visible lesions	**0 %**
2	One or very few lesions detectable on close scrutiny of the tree.	**0 to 1 %**
3	Immediately apparent lesions in general clustered in few parts of the tree	**1 to 5 %**
4	Intermediate	**x**
5	Numerous lesions widespread over a large part of the tree.	**± 25 %**
6	Intermediate	**x**
7	Severe infection with half of the leaves badly infected by multiple lesions	**± 50 %**
8	Intermediate	**± 75 %**
9	Tree completely affected with (nearly) all the leaves badly infected by multiple lesions	**> 90 %**

This scale has to be applied only to quantify clear sporulating lesions on leaves **without any reaction of the plant** (e.g. chlorosis or necrosis around the lesion). In the case you observe scab on fruits, use the same scale, but indicate the scoring separately from those of the leaves. The whole tree has to be scored. On some genotypes, such as h(3) and h(8) you may recognize non-sporulating resistance reactions on the leaves together with sporulating lesions. In this case only the proportion of affected leaves showing sporulating lesions (**without any reaction of the plant)** has to be estimated.

Sporulating lesion on h(3) (to be included in the assessments)

Resistance reaction on h(3) (not to be included in the assessments)

Probably the two classes most difficult to differentiate are classes 2 and 3. Generally, to find scab on class 2 plants you really need to look at every single leaf of the tree and you will find only few sporulating lesions on the whole tree. On class 3 plants you will find scab after a few seconds of observation of the tree. On these trees you may find some nested scabbed leaves. As described in the evaluation scale, up to 5% of the leaves will be scabbed.
From class 4 onwards, the scab symptoms are generally already visible while approaching the tree. In these cases the evaluation of the tree is quite easy as you need only to (roughly) estimate percentage of scabbed leaves. Miss-scoring of these genotypes of one class between 4 and 9 does not have major consequences as the breakdown of the resistance is obvious.
The information on severity is used as a first validation of incidence. The higher the severity score, the stronger is the evidence for resistance breakdown (i.e. the presence of a virulent isolate).
An example of a scoring table is enclosed in Annex I, which can also be downloaded from the homepage of the initiative www.vinquest.ch.

What to do when you discover sporulating lesions on hosts (2) to (15)

No further action is required with host (0) ('Gala') and host (1) ('Golden Delicious') since finding scab on these two genotypes is considered "normal". They are mainly used to assess disease pressure and to identify infection periods in each season.

For hosts (2) to (15) the protocol is as follows:

1. After having estimated the severity of the infection on the tree and recorded the score in the table, you are asked to take digital pictures of the symptoms you scored. Make sure that the picture is sharp and representative of the scoring you did. Please take a picture (macro) that clearly show one to two lesions and if the severity is high, take a second picture to support your score.
2. Then, if you discovered scab on a differential host for the first time you should collect few (2-3) infected leaves and to put them in paper envelopes.
3. Air-dry the leaves in the laboratory (or preferably in a sterile bench) at room temperature (about 20°C)
4. Notify me per e-mail (andrea.patocchi@agroscope.admin.ch) on which host you have found scab, how much, and whether you collected leaves (you can send me your scoring table). Together we will decide if it will be worth to prepare single spore cultures from the samples.
5. If you know how to prepare apple scab single spore cultures, please prepare 2 to 3 cultures from each tree and send the pure cultures together with a leaf of the tree on which you find the isolates to me. It may be necessary to verify whether the tree is "true-to-type".
6. If you cannot do the monospore cultures yourself and your institute is in an EU country, you can send the dried leaves to the address below without the need of a Swiss import permit. If you are not in an EU country, I must first organize an import permit for you. This regulation applies also to the pure cultures.
   If you need an import permit, please do not send me samples without it!

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Advised measures to avoid the spread of virulent isolates

Depending on which differential host you find scab and on the severity of the infection, you may decide to remove all infected leaves or the whole tree and/or to proceed to one or more fungicide treatments in order to avoid the spread of the virulent isolate(s). How to proceed is responsibility of the partner, but I can support you in taking the decision.

ANNEX I: Advised scoring table

Scoring Date:
Scorer:

Class	Definition of the symptoms	Proportion of affected leaves (%)
0	No observation (missing plant)	-
1	No visible lesions	0%
2	One or very few lesions detectable on close scrutiny of the tree.	0 to 1 %
3	Immediately apparent lesions in general clustered in few parts of the tree	1 to 5 %
4	Intermediate	x
5	Numerous lesions widespread over a large part of the tree.	± 25 %
6	Intermediate	x
7	Severe infection with half of the leaves badly infected by multiple lesions	± 50 %
8	Intermediate	± 75 %
9	Tree completely affected with (nearly) all the leaves badly infected by multiple lesions	> 90 %

				Scab class		
Row	Position	Block	Host	scab on leaves	scab on fruits	Picture n° / comments
1	1	1	H0			
1	2	1	H8			
1	3	1	H20			
1	4	1	H5			
1	5	1	H6			
1	6	1	H9			
1	7	1	H17			
1	8	1	H18			
1	9	1	H11			
1	10	1	H1			
1	11	1	H15			
1	12	1	H7			
1	13	1	H2			
1	14	1	H19			
1	15	1	H16			
1	16	1	H13			
1	17	1	H12			
1	18	1	H14			
1	19	1	H3			
1	20	1	H4			
1	21	1	H10			
1	22	2	H0			
1	23	2	H2			
1	24	2	H20			
1	25	2	H3			
1	26	2	H8			
1	27	2	H10			