

# **Experience with some IPGRI apple descriptors and suggestions for new ones**

**Jan Blazek  
RBIP Holovousy  
Czech Republic**

**Third meeting of the ECPGR Malus/Pyrus Working Group,  
25-27 October 2006, Tbilisi, Georgia**

## Introduction

In the first meeting of the *Malus/Pyrus* working group besides 6 accession characters, 6 flower and 8 fruit characters were proposed (Janes, 1998).

- Malus flower descriptors: Season of flowering,  
Flower shape,  
Petal shape  
Position of petal margin  
Bud colour  
Upper flower colour
- Malus fruit descriptors: Harvest maturity,  
Fruit size  
Fruit shape  
Crowning of apex  
Flesh colour  
Ground colour  
Overcolour and Overcolour coverage

# Introduction

For possible inclusion in Minimum Descriptor Lists for *Malus* also another characters were suggested:

- 17 flower characters
  - 5 tree characters
  - 8 leaf characters
- 18 fruit characters

# Introduction

- In the second meeting of the *Malus/Pyrus* working group descriptors for assessment of scab (*Venturia inaequalis*), powdery mildew (*Podosphaera leucotricha*), Nectria canker (*Nectria galligena*) and 5 characters for sensory analysis of fruits were proposed (Lateur and Blazek, 2004).
- Rather complicated assessment scales were proposed for evaluation of scab infection on leaves and fruits (Lateur and Popular, 1996).
- The aim of our study, that took place in Holovousy 2004-2006, was to use these scales for evaluation of scab susceptibility in apple breeder variety collections.

# Material and methods

- Scab incidence was evaluated for 3 years in a breeder collection consisted of 25 cultivars and about 200 selections grown without using of fungicides.
- 3 researchers (A,B,C), well experienced with evaluation of apple diseases, evaluated all accessions individually during growing seasons.
- Results were calculated from data obtained by evaluation of scab on leaves made in the middle of August..

# Global assessment scale for scab infection (*Venturia inaequalis*) on leaves (Lateur and Populer 1996)

Scale	Field observations	Rating (%)	
		Incidence(*)	Severity(**)
1	No visible symptom	0	-
2	A few small scab spots are detectable on close scrutiny of the tree	<1	-
3	Scab immediately apparent, with lesions very thinly scattered over the tree	<5	-
4	X	X	-
5	Infection widespread over the tree, majority of leaves with at least one lesion	>50	<5
6	X	-	X
7	Heavy infection; multiple lesions or more large surfaces covered by scab on most	-	±25
8	X	-	X
9	Maximum infection; leaves black with scab	-	>75

X = intermediate rating

(\*) Incidence = proportion of infected leaves with at least one lesion

(\*\*) Severity = proportion of leaf surface covered by scab

## Results of evaluation of selected cultivars by 3 evaluators (A,B,C)

Cultivar	2004			2005			2006			Mean	Max
	A	B	C	A	B	C	A	B	C		
Golden Delicious	6	8	7	8	9	8	9	9	9	8.1	9
Julia	1	2	1	1	1	2	2	4	2	1.8	4
Melrose	4	5	6	4	4	5	6	7	7	5.3	7
Rubin	3	4	4	5	4	4	7	8	8	5.2	8
Rubinola	1	1	2	1	1	1	3	2	1	1.4	3
Mean	3.0	4.0	4	3.8	3.8	4	5.4	6	5.4	4.4	

## Conclusions regarding the use of the IPGRI descriptor scales for scab infection:

- The scales are a bit too clumsy for the routine use (they need concentration of the evaluators and a good knowledge of the scales - therefore errors are quite frequent).
- Severity of the scab infection is different in each year – the rating scale should be more flexible and relative to the actual severity of the infection.
- Susceptibility of varieties is not stable (new races and new pathotypes), usually the most commonly grown cultivars become more susceptible to scab after some years of growing. Therefore it is no need to be very precise in the rating of the susceptibility.

# Proposal regarding scab evaluation

- Scab (*Venturia inaequalis*) susceptibility or resistance evaluation: in the orchard without fungicide application under severe incidence of the pathogen (susceptible cultivars are severely damaged).
- Scab incidence should be evaluated separately on leaves or on fruits in relation to the most susceptible cultivars using a simple rating scale.

## Suggestion for a simple rating scale

Scale	
1	No signs of scab at all
2	X
3	Very low scab - scattered small spots
4	X
5	Intermediate scab – frequent small spots, seldom larger spots
6	X
7	High scab incidence - multiple spots or more large surfaces covered
8	X
9	Very heavy scab incidence - leaves or fruits black with scab or defoliation

X = intermediate rating

## Other suggestions

- Based on conclusions from the last meeting of the group (Dresden, 2002) the fruit taste should be evaluated as the fruit taste general and as acidity or sweetness. An excellent taste is mostly related in a harmony between the sweetness and the acidity, whereas a bad taste is most frequently connected to extreme acidity or sweetness.
- There is an another factor, however, that influence often the fruit taste general and that is bitterness or astringency. This factor is quite common in old cultivars or land races but very common in wild species and crabs. I think that a descriptor for this character should be added into recommended ones for *Malus*.

## Proposal for the descriptor

<b>Scale</b>	
<b>1</b>	<b>No bitterness at all</b>
<b>2</b>	<b>Very low bitterness</b>
<b>3</b>	<b>Low bitterness</b>
<b>4</b>	<b>X</b>
<b>5</b>	<b>Intermediate bitterness</b>
<b>6</b>	<b>X</b>
<b>7</b>	<b>High bitterness (astringency)</b>
<b>8</b>	<b>X</b>
<b>9</b>	<b>Extremely astringency</b>

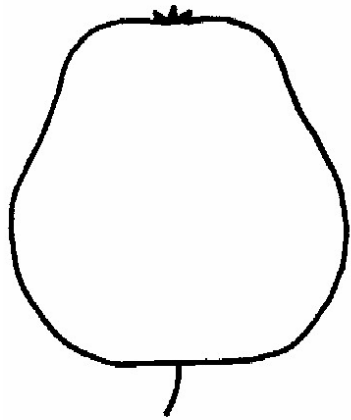
# We have still problems with description of fruit shape

State	Fruit shape	IBPGR	UPOV(1995)
1	globose	yes	yes
2	globose-conical	yes	yes
3	broad-globose-conical		yes
4	short-globose-conical	yes	
5	flat	yes	yes
6	flat-globose	yes	yes
7	conical	yes	yes
8	narrow conical		yes
9	truncate conical		yes
10	long conical	yes	
11	intermediate conical	yes	
12	ellipsoid	yes	yes
13	ellipsoid conical	yes	yes
14	oblong	yes	yes
15	oblong-conical	yes	yes
16	oblong-waisted	yes	

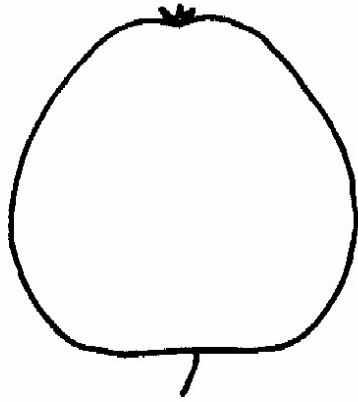
# How to describe the fruit shape?

- **An inexperienced evaluator should use pattern drawings of the shapes for the rating**
- **Difficulties arise if two or more different fruit shapes are found on the tree in the same time (a variability of the fruit shape)**
- **Therefore this evaluation should be less precise.**

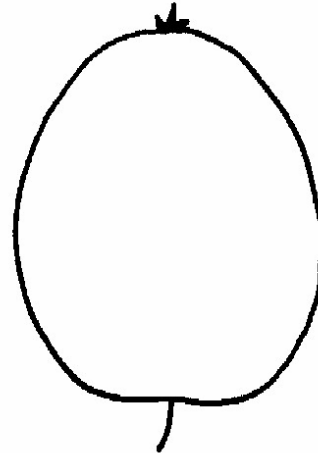
**Fruit general shape: 1-cylindrical waisted, 2- conic, 3- ovoid, 4- cylindrical, 5- ellipsoid, 6- globose, 7- obloid (Anonymous, 2005)**



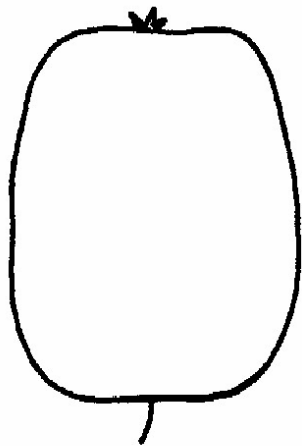
1  
cylindrical waisted



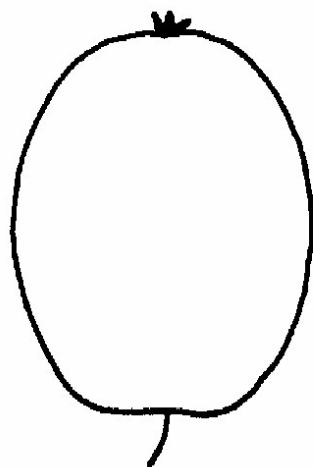
2  
conic



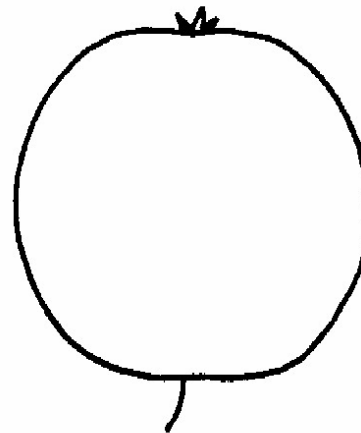
3  
ovoid



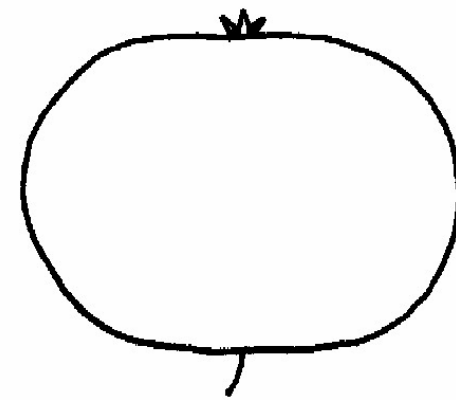
4  
cylindrical



5  
ellipsoid



6  
globose



7  
obloid

For further distinguishing of the shapes another descriptor should be added that is based upon height/diameter fruit ratio:

<b>H/D ratio</b>	
<b>very small</b>	<b>less 0.8</b>
<b>small</b>	<b>0.8-0.9</b>
<b>medium</b>	<b>0.9-1</b>
<b>large</b>	<b>1.0-1.1</b>
<b>very large</b>	<b>over 1.1</b>

**Similarly also over colour rating should be divided into two descriptors:**

<b>Hue of overcolour</b>	<b>Intensity of overcolour</b>		
	<b>light</b>	<b>medium</b>	<b>dark</b>
<b>Orange red</b>	<b>Egrcmont Russet</b>	<b>Cox's Orange Pippin</b>	
<b>Pink red</b>	<b>Lady Williams</b>	<b>Cripps Pink</b>	<b>Delorgue</b>
<b>Red</b>	<b>Winter Banana</b>	<b>Gala</b>	<b>Akane</b>
<b>Purple red</b>			<b>Spartan</b>
<b>Brown red</b>	<b>Sturmcr Pippin</b>	<b>Fiesta</b>	<b>Lord Burgley</b>

# Useful could be also pattern of over-colour

## Pattern of overcolour

<b>1</b>	<b>only solid flush</b>
<b>2</b>	<b>solid flush with weakly defined stripes</b>
<b>3</b>	<b>X</b>
<b>4</b>	<b>solid flush with strongly defined stripes</b>
<b>5</b>	<b>weakly defined flush with strongly defined stripes</b>
<b>6</b>	<b>only stripes (no flush]</b>
<b>7</b>	<b>stripes and mottled</b>
<b>8</b>	<b>flushed and mottled</b>
<b>9</b>	<b>flushed, striped and mottled</b>

Thank you very much for your  
attention!