

Criteria for picking plums (*Prunus domestica* L.) at the optimum maturity stage for the fresh fruit market

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Introduction :

The Norwegian plum growers and the marketing organizations are working on improving the status of plums in the fresh fruit market by:

- Introducing new large fruited cultivars (Avalon, Reeves, Excalibur, Jubileum a.o.)
- Improving the orchard management (thinning, fertilization)
- Training the pickers using colour charts and firmness testers
- Picking 2-3 times each week and when the plums are close to eating ripe
- Keeping continuous cool chain from producer to consumer
- Using gradingmachines measuring both size and colour

This poster presents some of the methods helping pickers to judge optimum maturity stage.

Materials and methods:

Plum fruit of important cultivars in Norway were picked at different maturity stages. Ground and blush colour was evaluated by a trained panel according to scales from 1 (=green or no blush colour) to 10 (=yellow/100% cover colour). Firmness was measured by a DUROFEL instrument (see pictures) and soluble solids was measured by refractometer. Consumer tests at festivals etc were performed to find the range for acceptable firmness as measured by the DUROFEL firmness tester. To compare the readings by the DUROFEL instrument and an Instron penetrometer, 28 Jubileum plums were measured by both methods.

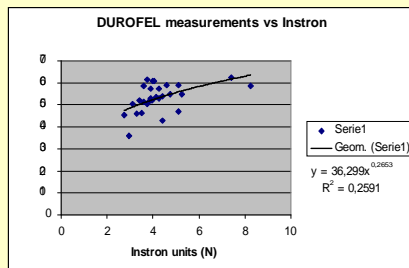
Colour charts:

Ground colour changing from green to yellow is probably the best way to judge the ripeness of plums. In plum cultivars with partly red or blue blush coloured fruits this is fairly easy to see. However, in dark red or blue plums the change in ground colour is difficult to assess due to the cover colour. The plums of Jubileum turn dark blue 1-2 weeks prior to optimum harvest date. In this cultivar firmness is a better way to judge the maturity stage.

Table 1. The correlation between soluble solids content and important quality factors in 'Jubileum' plums

	2002	2004	P-value
Diameter	0,18	0,01	n.s
Firmness	- 0,43	- 0,17	< 0,001
Blush colour	0,35	0,10	(0,07)
Ground colour	0,31	0,07	(0,10)

Fig. 1. Correlation between DUROFEL firmness tester and Instron penetrometer measurements



Firmness measurements:

The DUROFEL firmness tester can easily be used in the orchard during training of pickers, and can also be used at different stages in the marketing chain. This tester measures the elasticity in the outer fruit flesh without penetrating the fruit skin. The correlation to traditional penetrometers is not always close (see Fig 1). However, the DUROFEL measures what the pickers will feel when they gently squeeze the fruit.

In addition the force needed to remove the plum from the stem must be considered. As the maturation reach a "ready to eat" stage, the fruit can be removed from the stem without leaving a wound making the plums susceptible to postharvest fruit rot. Plums are most often marketed stemless.

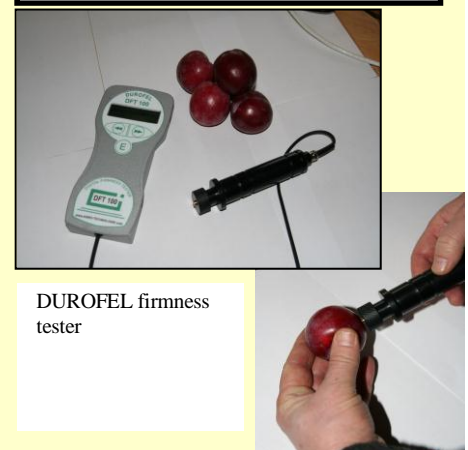
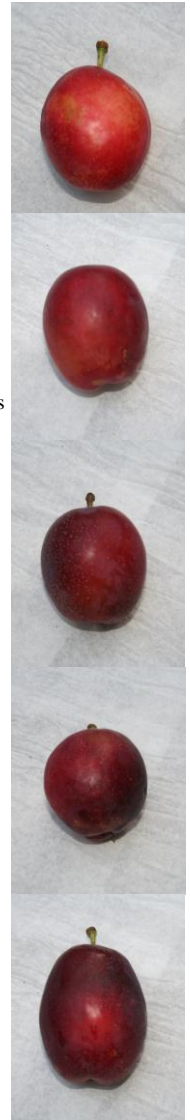
Conclusions:

Through better training of the pickers using colour charts and firmness testers, plums can be picked at a slightly more mature stage than has been done in Norway in the later years. The fruit quality will be higher and more uniform, making Norwegian grown plums a high quality product with a good reputation among consumers. In this way more plums can be produced and marketed at a better price.

Exampel of colour chart for

Jubileum plum

1. Immature, not to be picked
Firmness > 80 units
2. Slightly mature should be allowed to mature on the tree until next picking
Firmness 70 – 80 units
3. Tree ripe should be picked
Firmness 60-70 units
4. Eating ripe for immediate marketing
Firmness 50-60 unis
5. Overripe not to be marketed
Firmness < 50 units



DUROFEL firmness tester