Fruit quality of Elstar en Santana in the Netherlands

Fruchtqualität von Elstar und Santana in den Niederlanden

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Abstract

The growth of the market for Dutch organic apples is disappointing. Especially the large-scale introduction in the supermarket channel is not happening as fast as many hoped. One of the explanations given is that there is a gap between the quality as produced and the quality as expected by the retailers. In a three year project the Louis Bolk Institute together with many other partners in the sector have tried to facilitate talks on apple quality between actual partners in the different chains from producer till retailer. During this period we monitored the quality of Elstar and Santana on many farms and on the shelf in the different outlets. This has given us detailed information about the current quality of Dutch organic apples. Presented here are some preliminary results of the monitoring at the farms. The project will end mid 2004, final results will be published by the end of the year. Progress of the project can be followed through the website www. louisbolk.nl/projects/fruit/'classy apples'.

Keywords: fruit quality, chain approach, Elstar, Santana.

Introduction:

From 2001 to 2003 the Louis Bolk Institute has carried out a monitoring project on the quality of apples. This was part of the larger project "Classy Apples" in which we worked with the whole sector at tightening the gap between the quality as produced by the growers and the quality as desired by different segments of the market. The farms and plots were selected in such a way that they give a fairly representative picture of current organic apple quality in the Netherlands.. Our prime aim was not the collection of statisticaly sound data though but the gathering of data for use in the overal project. We used these data in discussions with growers, their advisers and their partners in the respective chains i.e. wholesale dealers and retailers. Through these discussions we hope to further the overall awareness on quality isues and to help tighten the gap between produced and demanded quality.

The harvest of 2003 is further monitored from the retail side of the chains and then traced back to the producer to gather more information on quality losses in the chain.

The data here presented give insight in the factors behind quality loss in organic apple-growing in the Netherlands. Also by comparing the data on Elstar and Santana we can discuss the merits of this new Vf-variety.

Interesting in this is the general question whether the introduction of new scab resistant varieties will enable Dutch growers to meet the standards set by demanding customers as the supermarkets and the top specialised organic retailers.

Material and Methods:

The quality of Elstar was monitored on 11 farms during 2001 and 2002. The same was done for Santana on 4 farms during 2002 and 2003.

Within the plots individual trees were selected in summer. Each year we selected a new set of trees aiming at representativeness and a total amount of 1200 fruits per plot to be harvested. Individual

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trees were scored for vigour, cropload and notable insect or fungal damages. Leaf samples were taken in august. Background data were also collected on weeding, fertilising and spraying.
The growers harvested the fruits of the selected trees on the same day as the rest of the plot. The fruit was put in cold store and collected within a day and transported to a central storage. The first pick was stored longterm, the second pick medium term and a third pick (if present) was assessed without storage.
A sample of the first pick was analysed for mineral content, firmness, starch, brix, acids, skincolour etc. After storage a second sample was analysed likewise.
Every single fruit was judged on size, percentage blush, rots, soft scald and skin damages caused by insects or fungi.
Combining these data with the gross harvest data as registrated by the growers for the whole plot we carried out simple calculations using different pricings for different qualities. We used three price scenarios to show the influence of growing quality demand on the growers returns. Scenario 1 (wholefood business as it used to be) is one where all apples over 55 mm with reasonable skinquality are valued at €1,15, industry price of €0,22 for the rest. In scenario 2 (current supermarket practice) only apples between 65-85 mm with minimum 33% blush receive full prices, smaller and larger apples are valued at €0,90, minimaly coloured fruit at industry prices. In scenario 3 (worst case scenario) only the best quality at sizes 70-80 mm are valued at €1,15, the rest is sold at prices of 90, 55 or 22 cents.
In 2002 we used the tast-panel of the Fachhochschule Fulda, Germany. In 2003 we hired the services of CSO, Wageningen, the Netherlands.

Results:

Registered production (tonnes/ha)

Gross production of Elstar is not very high compared to conventional production. Between growers there are substantial differences. Most farms are unable to curb bi-annual bearing which lowers their average production substantially. Gross production of Santana seems to be substantially higher because of the absence of bi-annualism. But also here, not every grower always reaches good productions.

Some important causes of losses

Losses are caused by many different factors, which vary substantially between farms and years.
Average losses look bearable but some growers have problems in different fields, thereby losing a large part of their crop.
Storage rots cause the biggest losses overall. For Elstar in some years scab can be a big problem.
Many insects are usually well controled, but occasionally bigger losses occur. Santana seems to be very little susceptible to rosy apple aphid.
Not visible in these tables are the losses due to apple blossom weevil and apple sawfly, which are mainly reflected in the lowering of the gross production.
Sunscald can cause big losses in some areas, particularly if there is no water (quality) for overhead cooling on very hot dry days.
In 2002 we found a small number of Santana fruits with scab, sooty blotch and fly speck, all in a tolerable amount. In 2003 these diseases were absent again in the same plots.

Summary of some apple quality parameters, Elstar and Santana 2001-2003, the Netherlands

	Elstar '01-'02 11 growers			Elstar '02-'03 11 growers			Santana '02-'03 5 growers *			Santana '03-'04 4 growers *		
	mean	min.	max.	mean	min.	max.	mean	min.	max.	mean	min.	max.
Production level, mean prices per scenario												
Gross production tonnes/ha	26	12	50	24	17	43	30	16	37	29	6	40
Percentage between 65 and 85 mm with minimum 33% blush	76	57	94	81	59	92	83	72	92	80	72	86
tonnes/ha gradable after	21	8	38	20	13	41	22	7	32	27	6	38
Mean price in euro/kg scenario	0.98	0.80	1.11	0.84	0.55	0.96	1.02	0.94	1.10	1.09	1.04	1.12
Mean price in euro/kg scenario 2	0.93	0.76	1.08	0.81	0.53	0.93	0.98	0.92	1.08	1.05	1.01	1.19
Mean price in euro/kg scenario 3	0.78	0.64	0.95	0.66	0.46	0.74	0.80	0.67	0.91	0.84	0.75	0.92
Returns x1000 euro/ha scen. 1	26.2	9.6	55.5	17.4	9.0	39.4	26.2	12.1	40.7	29.6	6.3	42.5
Returns x1000 euro/ha scen. 2	25.0	9.1	52.5	16.8	8.3	38.1	25.3	11.8	40.0	28.5	6.0	40.2
Returns x1000 euro/ha scen. 3	21.1	7.8	44.0	13.8	6.6	30.3	20.7	8.8	33.7	23.4	4.4	32.7
Percentage losses at grading after storage:**												
Scab	2.6	0.0	11.4	1.4	0.0	9.7	0.1	0.0	0.3	0.0	0.0	0.0
Storage scab	1.0	0.0	9.4	0.4	0.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0
Rosy apple aphid	0.0	0.0	0.1	2.4	0.0	13.1	0.0	0.0	0.0	0.0	0.0	0.0
Spring caterpillar spec.	0.8	0.2	1.4	1.2	0.1	2.9	1.6	0.6	3.2	1.3	0.6	2.6
Tortrids late damage	1.5	0.1	5.0	1.8	0.2	7.0	3.0	1.3	3.9	1.5	0.1	2.6
Apple sawfly	0.3	0.0	2.5	0.1	0.0	0.6	0.1	0.0	0.4	0.1	0.0	0.3
Green capsid	0.3	0.0	0.9	0.1	0.0	0.4	0.0	0.0	0.1	0.9	0.3	2.3
Codling moth	0.2	0.0	0.7	0.0	0.0	0.3	0.3	0.2	0.4	0.4	0.0	0.9
Mechanical damage	2.1	0.4	5.3	0.7	0.1	2.1	1.2	0.4	2.4	1.2	0.4	1.5
Earwig/ Wood-louse	2.1	0.5	4.1	0.9	0.1	2.1	2.0	0.7	4.0	1.5	0.6	2.2
Sunscald	0.8	0.1	2.7	2.1	0.1	6.1	2.3	0.0	4.8	0.0	0.0	0.0
Sooty blotch	0.1	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
Flyspeck	*	*	*	0.0	0.0	0.3	9.1	0.2	40.6	0.0	0.0	0.0
Storage rots	10.3	2.0	21.0	6.6	2.0	13.0	4.6	2.0	8.0	2.3	0.5	5.1
Internal quality of the first pick												
Firmness at harvest	6.2	5.7	7.2	7.5	7.0	8.3	7.6	6.9	8.7	7.6	7.2	8.0
Firmness after storage+ 5 days shelf	5.0	4.5	5.5	4.8	4.3	5.3	4.2	3.7	4.5	4.5	3.7	4.8
Firmness after storage+9 days shelf	*	*	*	3.6	2.8	4.0	3.5	3.1	3.7	4.1	3.8	4.4
°Brix at harvest	12.8	11.7	13.5	13.0	12.2	14.0	12.7	11.7	13.6	13.1	12.2	14.1
°Brix after storage+ 5 days shelf	14.4	13.1	15.8	14.2	13.3	15.1	12.1	11.0	13.0	13.2	12.6	13.9
Acidity at harvest (g/l)	7.8	6.8	9.0	9.5	8.3	10.9	9.8	8.6	11.6	11.0	10.0	12.0
Acidity after storage+ 5 days shelf	5.9	5.1	7.6	6.2	5.7	7.2	7.7	6.7	8.2	6.6	6.2	7.1
Taste score (1=bad; 10=best; 5=satisfactory.) after 5 days shelf	*	*	*	6.1	5.4	6.5	4.2	3.7	4.6	5.8	5.0	7.7
mg N/100 g fresh weight	45	29	53	48	32	71	38	32	46	56	51	60
mg P/100 g fresh weight	11.4	10.5	12.7	14.5	12.2	16.5	10.8	10.0	13.0	11.8	10.2	13.8
mg K/100 g fresh weight	127	102	160	134	113	160	91	74	117	115	87	150
mg Ca/100 g fresh weight	5.8	4.9	8.0	3.8	3.2	5.2	4.6	4.0	4.3	6.2	4.2	7.7

*plantings of 4-5 years old, so relatively good quality.
**counted here are only such symptoms as would the product unfit for sale (Dutch KCB standards)
***very light: no influence on salability.
**** russeting was scored in 5 categories: 0= no russeting, 1=<10% of skinarea russeted, 2=10-20%, 3=20-30%, 4=>30% . weighing factors: 0=0, 1=x1, 2=x3, 3=x5, 4=x9.

Size and colour

The part of the crop that is marketable is further determined to a large extend to size and colour distribution. Fruit under 65 and over 85 mm or lacking in blush is often not marketable for a good price. Again variation between farms is large: 20% difference between top and bottom.

Internal quality and taste

Traders tend to place high value on firmness. We noted a tendency among growers to pick too late. This is partly caused by late colouring but also by a wish to harvest reasonably ripe fruit with well developed taste. Organic fruit should be mature and tasty but we found that many batches of fruit had a limited shelf life. Growers could pay more attention to ensuring development of optimal firmness and colouring during the growing phase.

Because of its high brix values and aroma content, Elstar tends to score well in tasting even when lacking a little in firmness. Santana is valued for its taste but can also be to sour or to flat in taste.

Financial returns

When applying the different price scenarios its is clear that growing quality demands lower the mean price per kg. This is painfull for all growers but is an real problem to those with relatively low production and suboptimal quality. The better growers can cope with the supermarket scenario. Scenario 3 becomes very costly for the growers. More important than quality is the amount of fruit harvested per ha. Growers with stable and high productions can afford to set high quality standards. These data were compiled to show growers that it pays to give a lot of attention to quality enhancing measures in the growing phase.

Discussion:

In the Netherlands the market for organic apples is growing very slowly. The general opinion is that supermarkets provide the best chance to enlarge the market. Until now not many apples are sold through this channel. Growers complain that supermarkets only want to buy the best part of the crop at relatively low prices. Potential buyers complain about the substandard (outer)quality and the high prices for Dutch organic apples which would hold down sales rates. This tendency to ask for lowers prices and better outer quality is also visible in the wholefood business.

This so called ‘quality gap’ can be reduced from two sides: growers can produce more fruit per ha of a better quality and at a lower cost and wholesale and retail partners can put more effort in selling a larger proportion of the crop. In our project we have been working at this problem from these two sides. Very important in our experience is to establish a more intensive contact between partners in a chain. Organic growing is a high cost and risky business which should ideally be embedded in a chain that is willing to deal with varying qualities. A simple example we encountered is fruit-size. It is very understandable that retailers prefer to have size 70-80 only: well accepted by the consumer and easy to pack on a tray. A small size range further reduces logistic costs. Provided that a reasonable volume of fruit can be sold its is possible to sell more sizes. On the other hand the growers should do there utmost to bring the production of undesirable sizes back to a minimum. To reach such an understanding the market should be less anonymous. More frequent contact between producers, wholesalers and retailers is part of the solution.

In our talks its became clear that quality is mostly defined in terms of size, colour, unblemished skin and firmness. In this respect organic quality is still measured mainly to conventional standards. This is not only true for conventional supermarket chains but also applies to a large part of the wholefood business. In this respect the organic product is mainly judged for what it lacks and very little emphasis is laid on its potential good qualities, for instance taste. To be fair: at the moment organic quality guarantees the consumer a good agricultural practice but not always a good internal product quality.

On the farms we monitored you find a very diverse quality. This is due to many factors like the location and personal qualities and aims of the grower. Not every grower is good at everything. Viewed from outside some people seem to be operating in the wrong chain. We think there is a lack of awareness among growers that there are different styles of working, each with there own merits. An important key to success is recognising one's own strong points and finding the corresponding partners in the chain.

Many growers expect much of the new scab resistant varieties. For the Netherlands Santana is an example of this. Will a shift to these new varieties enable growers to satisfy the wishes of demanding customers? Our experience with these new varieties is still very limited but there are already lessons that we have learned.

One is that scab resistant varieties are not the easy way out of all the troubles of organic growing. Many problems like storage rots, irregular production with accompanying fruit size problems, losses to insects etc are not related to scab resistance.

Scab sprays are a central issue in our pest and disease management system though. Reducing the use of sulphur and copper may open possibilities for a better management of some insects. The reduction of phytotoxicity may lead to higher productions which will remain the easiest road to reducing the cost per unit. Less fungicide spraying may be beneficial to skin quality (less russetting?)

Introduction of new varieties in the market is very hard. The looks and the taste of the product are the important items here, not the fact that it is easier to grow organically. Traders can be made aware of the fact that introducing new varieties is an important part of the development of organic apple growing. Most of them are aware that better results for the grower are also to their own benefit. In the end the grower has to make the choice what to plant. More effort should be made however to involve the whole chain into these choices and create commitment to further developing organic fruit growing and trading as a better integrated activity.