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Growing Large Royal Gala

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With harvest over, it is time to scrutinize the results we obtained from the 1996/97 crop. Small fruit size has been a major feature of this year's crop and will have knocked the cream off grower returns.

Pricing signals over the years show us that to be in the money with this variety we need to be growing a large proportion of the crop in the 110 and larger fruit size counts. This means having mean fruit size of around 115 and certainly no smaller than 120. In fact, going on the 1996 returns there is a difference in return of around NZ$3.50 (one $NZ equals approximately $US .53) per carton between a crop averaging 115 and one averaging 130. If you can shift the size up to near 100 count then you can lift your average return by a further $3.50 per carton. Undoubtedly some yield will be shed in shifting size up to the 100 count range, but you have to consider the effect harvesting and packing costs have on your net on the tree return to put the yield-by-return equation into perspective.

Picking and packing costs for an export carton are about NZ$4.60, excluding packaging materials. If we take NZ$4.60 off the return to give an on-tree value ready to pick, the 130 count crop is worth only NZ$7 per export carton whereas the 115 count crop would be worth NZ$10.50 and the 100 count crop NZ$14 per export carton. Put another way, to match the value of a 2000 export carton/hectare (809 cartons/acre) crop of 100 count average fruit size, you would need 2666 cartons/hectare (1079 cartons/acre) export of 115 count and a massive 4000 cartons/hectare (1619 cartons/acre) of export at 130 count average.

Growing large export crops of small Royal Gala apples is great if you want to assist the government in reducing the unemployment, but is a difficult way to make a living compared to thinking smart and growing half the crop of large-sized fruit.

Furthermore, from what I have seen of Royal Gala in South Africa and South America, our competitive advantage with this variety lies in growing it big because they are quite capable of meeting the market demand for small Royal Gala without our help.

SMALL FRUIT SIZE PROBLEM THIS YEAR

Sure, we have had a difficult growing season this year in regard to fruit sizing and the season must take some of the blame. Perhaps 20%? Certainly from what I have seen, blaming the season for more than 30% would be generous.

This was a year when the rewards for getting it right were high compared to a less than adequate crop husbandry job.

Royal Gala is a naturally small fruited variety which we are trying to grow well above its normal size range. To grow it big takes considerable skill and leaves little margin for error. All along the way orchard practices and techniques need to focus on growing large fruit. At each step in the production cycle, precise management is required. There needs to be careful attention to detail with every step. Because of the large price differential large fruit size commands, the rewards for growing it well are high.

FRUITING WOOD SELECTION AT PRUNING IS THE FIRST STEP

It is possible to grow large Royal Gala fruit only on large caliber fruiting wood. With this variety, it is my opinion that fruit bud quality and the strength of the wood carrying the buds are more critical than the actual wood age itself. Even lateral buds of 1-year fruit wood will size well on strong wood greater than 10 mm in diameter. If this were not so, we would not get some of our best Royal Gala fruit from 3- and 4-year-old trees.

With this variety fruiting wood needs to be pencil thickness or greater in diameter if more than one or two fruiting buds are to be left on the fruiting lateral. Where growth is weak, or over-enthusiastic summer pruning has removed much of the better fruiting wood and the choice of fruit bud is poor, it is necessary to retain weaker fruiting wood to give sufficient fruit bud numbers to carry a full crop. Where weak wood has to be used to build fruiting site numbers, it must be shortened down to two to three buds. For good fruit size, Royal Gala needs adequate leaf to fruit ratios and the position of these leaves must be where they will support fruit development rather than fuel excessive vegetative growth. Bourse shoot growth which terminates early in the growing season maximizes fruit sizing potential. By shortening weak wood to two to three buds it is possible to stimulate these bourse shoots. Stronger fruiting laterals can carry more buds so should not be pruned back as drastically. Horizontal and pendant shoots which have good quality fruit bud need only be shortened up to about pencil thickness, otherwise bourse shoot growth will become excessively strong. Strong, slightly pendant fruiting laterals produce good quality fruit so long as they are well positioned in regard to sunlight.

As a rule, fruiting laterals with positive gradients should not be shortened until fruit weight pulls them down to, or beyond, the horizontal.

Shoots and laterals with gradients steeper than about 40˚ above the horizontal tend to become excessively strong if left in the tree, so they should be eliminated. Vertical growth, even if only one year old, arising toward the base of a fruiting lateral tends to shade and rob fruit carried farther out on the lateral, so it is necessary to prune off this type of wood.

STRIP OUT WEAK WOOD

Much of the small fruit we see in Royal Gala is carried on weak, shaded, fruiting wood close into the leader or dangling off the lower fruiting arms. Pruning needs to target this wood for ruthless removal.

Higher up the tree poor fruit size is often seen on lateral buds of weaker 1-year-old shoots found on the end of horizontal or pendant laterals. Again this type of wood needs ruthless removal because it is too weak to give adequate leaf to size fruit and does not respond well to chemical thinning.

LIGHT EXPOSURE ABSOLUTELY CRITICAL

Royal Gala shows extreme sensitivity to sunlight. Quality falls off rapidly if the fruiting wood is shaded. To maintain good light in the lower tree, its shape must be pyramidal in order to let satisfactory light penetrate to the lower branches where fruit is cheapest to produce. The upper tree, therefore, needs to be furnished with numerous branches which become progressively smaller and weaker toward the tree top. The upper tree branches should not be encouraged to develop massive structure, but kept confined to single unbranched structures furnished largely with fruit bud.

The lower branches are larger and will need more structure to enable them to develop their full fruiting canopy potential. At pruning, wood on these lower branches needs to be maintained in a single plane to avoid within-branch shading. Uprights and weak pendant wood must be removed.

As well as attending to light requirements, this type of tree assists with pest and disease control too. By keeping the upper branches young and maintaining high light levels within the tree, burrknot development is discouraged, thus minimizing mealybug problems. Spray coverage is easy to achieve and their open nature allows quick drying, ideal for easy apple scab control.

Moderate vigor balance is critical to maintain high light levels throughout the season. Pruning levels need to be carefully judged so as not to stimulate high vigor.

BIG HEALTHY LEAVES ESSENTIAL

If you are going to grow large Royal Gala, strong healthy leaves are important to supply the photosynthates necessary to size the fruit. Adequate levels of fertilizer, particularly nitrogen and potassium, are needed. Royal Gala does not show sensitivity to low calcium-related disorders so can stand higher levels of potassium than bitter pit prone varieties such as Braeburn or Cox's Orange. This means that with Gala we can be a bit more generous with potassium than on calcium-sensitive varieties.

Pests and diseases which injure leaf quality must be well controlled. Leaf curling midge, mites, powdery mildew and black spot all have potential to take the shine off Royal Gala returns if they get a chance.

CROP LOAD CRITICAL

Royal Gala is a variety capable of overset so it needs careful thinning management. Crop load needs to be established early. Appropriate chemical thinning is the main tool for regulating crop load on this variety once pruning has eliminated weak bud and surplus fruiting sites.

Satisfactorily thinned Royal Gala trees need to look as if there is no crop left 4 to 6 weeks after flowering for good fruit size by harvest. Adjusting crop level with later hand thinning is usually necessary unless exceptional results have been achieved with the chemical thinning program. Careful fruit counting to establish crop load is necessary at hand thinning and the greed factor put on the back burner. Much of this year's disappointing fruit size in Royal Gala was due to failure to establish a satisfactory fruit load at thinning time.

Crop load also has a profound effect on the time of fruit maturity and amount of fruit color by harvest. A recent paper in the French journal *Fruits and Legumes* reports a crop loading trial on

Royal Gala. The trees used were fifth leaf on Pajam 2 (a vigorous M.9 selection also known as Cepiland), grown as central axis trees planted at 4m x 2m.

Three levels of crop loading treatments were used, 120 fruits per tree representing five fruits cm^2 trunk cross-sectional area, 180 fruits per tree representing seven fruits cm^2, and 240 fruits per tree representing nine fruits cm^2. Initial thinning was carried out 20 days after flowering and final crop load treatments established 50 days after flowering. Relative to our cropping levels, these crop loads were quite low so fruit size in all treatments was well above our average size this year. The two lighter treatments both had around 90% of their fruit count 100 size and larger and their heavy crop treatment about 70% of the fruit 100 count and larger.

Differences in time of maturity between the treatments were highly significant. The light crop trees had 58% of their fruit ready for harvest at the time of the first main pick, medium crop trees 44% and the heavy crop trees only 27%. At the time of the first main pick, the percentage red color was 75% for the light crop trees and only 55% for fruits of the heavy crop treatment. If you are aiming for early market premiums, setting a low to moderate crop load early in the growing season is very important.

REFERENCE

Regnard, J.L., J.J. Kelner, M. Dufour and G. Ferne. 1997. Fruits and Legumes 150:26-27.