

Tree Fruit.

What happens to trees after harvest?

Orchardists would be wrong believing that not much happens to their trees once the fruit is picked.

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Although the trees no longer need to support a crop, photosynthesis continues and will do so until all the green pigment in the leaves, called chlorophyll, has disappeared, and the leaves have dropped off.

Photosynthesis is the process where leaves absorb carbon dioxide from the air and water from the soil to make carbohydrates, also called sugars. This highly complicated process is driven by the energy that the leaves get from sunlight. The carbohydrates are the building blocks from which all other plant materials are made.

Apart from carbohydrates, the tree also needs nutrients for growth and development of leaves, shoots, buds, flowers and fruit. The roots take up nutrients together with water in the soil. Of all the nutrients needed, nitrogen (N) is needed most.

So, what happens in autumn to the carbohydrates and nitrogen, when the trees no longer need them for vegetative growth and growth of fruit? To answer this question, we need to look at the roots. Roots are often forgotten, but are a critically important part of a tree. Although difficult to see and observe, roots regulate growth and performance of the tree.

Roots absorb water and nutrients from the soil and translocate them to the parts of the tree above the ground. Roots make hormones, which are necessary for breaking dormancy, and for growth. Roots also act as an anchor against the weather.

Roots also store carbohydrates, such as starch; and nutrients, especially nitrogen, to be used in spring to open flowers, set fruit and produce the first leaves.

Other parts of the tree, such as the trunk and shoots, also store carbohydrates and nutrients just under their bark. But the roots store most of the carbohydrates and nutrients.

About 80% of new growth in spring is due to stored carbohydrates and nitrogen. For about eight weeks after bud movement the tree relies on these reserves. After this the trees start to use carbohydrates produced by the new fully-grown leaves. As the temperature of the soil increases the roots become active and start to take up nutrients.

Figure 1 shows that concentrations of carbohydrates in roots are high in winter and are being used in spring and summer. As soon as the fruit has been harvested, the tree "pumps up" its roots with a new lot of carbohydrates.

You can see how important it is that leaves remain healthy and green after harvest, so that they can keep photosynthesising and producing carbohydrates for next season's early growth.

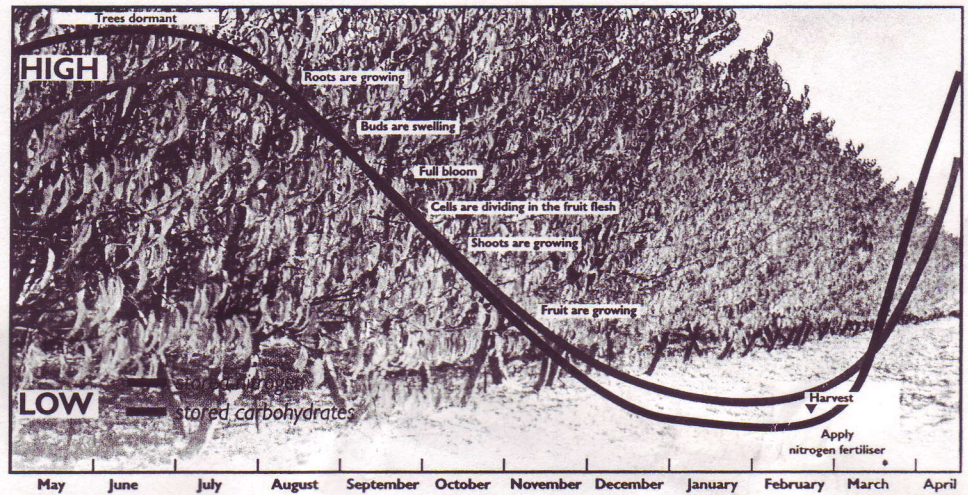


Figure 1: Seasonal concentration of stored nitrogen and carbohydrates in roots

The blue line shows what happens with stored carbohydrates in roots of mature fruit trees. As soon as the fruit has been harvested, the tree starts to replenish its roots with carbohydrates, ready for next season's growth.

The red line shows what happens with the stored nitrogen in roots of mature fruit trees. It also shows when you should apply nitrogen fertiliser to help the trees regain the level of stored nitrogen of the previous winter, for growth next spring.

Photo: The level of stored carbohydrates and nutrients will be high in these peach trees, ensuring a good start of growth in spring.

The accumulation and use of stored nitrogen is also shown in Figure 1, and is similar to accumulation and use of carbohydrates, except that the nitrogen is accumulated and used more gradually than the carbohydrates.

About 50% of the nitrogen in the leaves moves back into the roots, trunk and shoots after harvest. In due course, part of the nitrogen in the leaves that have fallen in autumn, is mineralised in the soil, so also becomes available for the trees.

The level of stored nitrogen is known to affect cell division in fruit. A high level of stored nitrogen can lead to fruit with more cells and firmer fruit than those in fruit from trees with a low level of stored nitrogen.

How can you make sure that your trees go into winter with plenty of stored carbohydrates and nitrogen?

- Keep the leaves on your trees as long as possible. When the leaves turn yellow in late autumn, you can be sure that your trees have been able to accumulate enough carbohydrates and nitrogen to see them through spring (Figure 1).
- Nitrogen fertiliser applied just before harvest helps the roots, trunk, shoots and buds to store nitrogen. Little or none of this nitrogen is translocated to leaves or fruit just before harvest.
- Nitrogen fertiliser applied after harvest (early autumn) helps the roots to store nitrogen.
- Foliar sprays of low biuret urea after harvest (early autumn) increase concentrations of stored nitrogen

in buds. Little nitrogen from sprays in early autumn is available to other parts of the trees.

- Always apply nitrogen fertiliser when the leaves are still green.
- Trees take up nitrate-nitrogen more quickly than they take up ammonium-nitrogen. With dried fertiliser, about 30% of the nitrogen is lost through leaching, volatilisation, growth of weeds and ineffective placement, and so is not available to the roots. With fertigation through drip lines, 90% of applied nitrogen is taken up by roots
- Leaf analysis in mid summer will tell you if the nutritional status of your trees is deficient, low, adequate or too high. Have a look at how vigorous your trees are, as indicated by the length of the shoots. The leaves should also be deep green. Use these indicators to calculate how much actual nitrogen you should apply to boost the nitrogen stored in your trees.

Nitrogen fertiliser applied just before or after harvest does not affect vegetative growth and avoids too much nitrogen going into the fruit. Fruit that is high in nitrogen is prone to fungal infection, storage disorders and breakdown. Nitrogen fertiliser applied in spring increases vegetative growth and produces fruit with high concentrations of nitrogen.

Looking after your trees after harvest is a vital part of orchard management. A good level of stored carbohydrates and nutrients, especially nitrogen, is insurance for a good start of a new fruit season.