

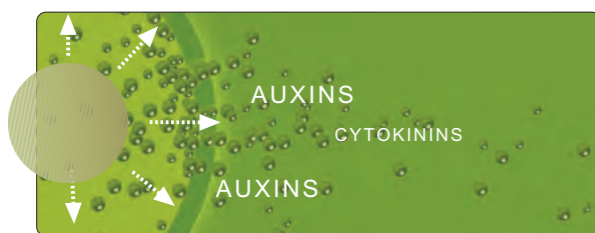
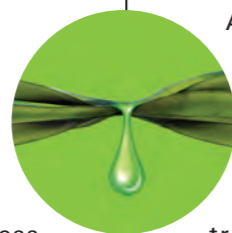
Kelp in a nutshell



The Macadamia nut tree, *Macadamia integrifolia*, is a member of the *Proteaceae* family and native to the tropical regions of Australia. It is currently cultivated worldwide and the nuts it produces are a valuable and important agricultural crop.

Some of the cultivation problems of Macadamia include low fruit set, specific climatic growing conditions and difficulties shelling the very hard shells of the nuts.

Kelpak, a liquid seaweed extract, is produced from *Ecklonia maxima* seaweed found along the cold West Coast of South Africa. It is produced using a patented cold-extraction process that ensures minimum degradation of the plant hormones in the seaweed. As a result, Kelpak contains a high level of auxins to cytokinins and this stimulates rooting and, also importantly, fruit set in plants. Trials have been done using Kelpak in foliar spray programs on Macadamias to evaluate the effect on general growth, fruit quality, fruit yield and fruit set. A concise description of the trials follows, including a recommendation for the application of Kelpak.



Trials | Malawi

A trial was done on a commercial farm where 120 trees were selected from each of six Macadamia clones. Half were left as controls and the other half (sixty) received the same Kelpak treatment protocol. Kelpak was applied at a rate of 2 L per hectare as a foliar application. The first application was on 1 June and repeated at monthly intervals for a total of four sprays.

All other management practices were the same throughout the trials. Visual evaluation during the growth season showed healthier leaves and more dense canopies on the treated trees, indicating increased vegetative growth. All Kelpak-treated clones had higher harvest yields than the control, varying from a 17% to 35% increase over each control (Figure 1). This suggests that the Kelpak treatments had a positive effect on fruit set. The Kelpak treatments produced a higher crackout percentage than the control with an average 35% more marketable kernels and, ultimately, produced a higher marketable return than the control.

Trials | South Africa

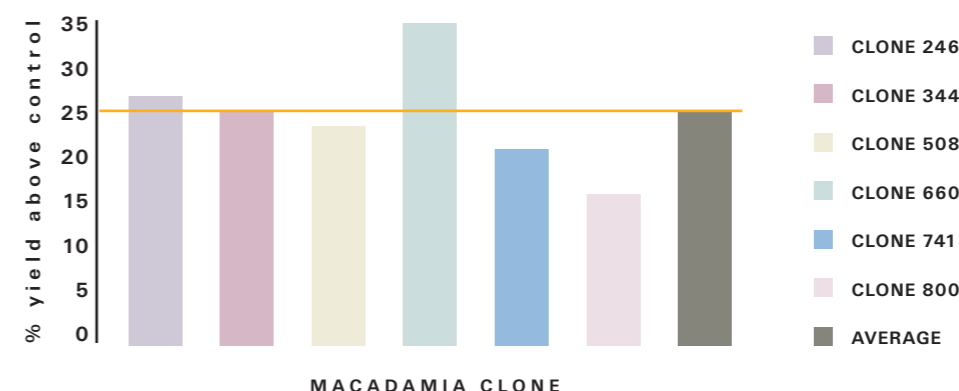
A trial was undertaken on a commercial farm in the sub-tropical Mpumalanga Region of South Africa. Two Kelpak treatments were compared to a control, namely a 0.2% Kelpak foliar application applied five times and a 0.3% Kelpak foliar application applied three times.

The application times for the 0.2% Kelpak treatment were 50% bloom, full bloom and three more applications after full bloom at four week intervals and, for the 0.3% Kelpak treatment, applications at full bloom and two more applications after full bloom at four week intervals.

Although both Kelpak treatments had more vigorous growth ratings than the control, the 0.2% Kelpak treatment had the highest overall growth rating (Table 1).

Significantly less nuts were dropped by both the Kelpak treatments, with the 0.2% Kelpak

Fig1. % Yield increase above control, Kelpak trial Malawi



Kelpak treatments produced a higher marketable return than the control

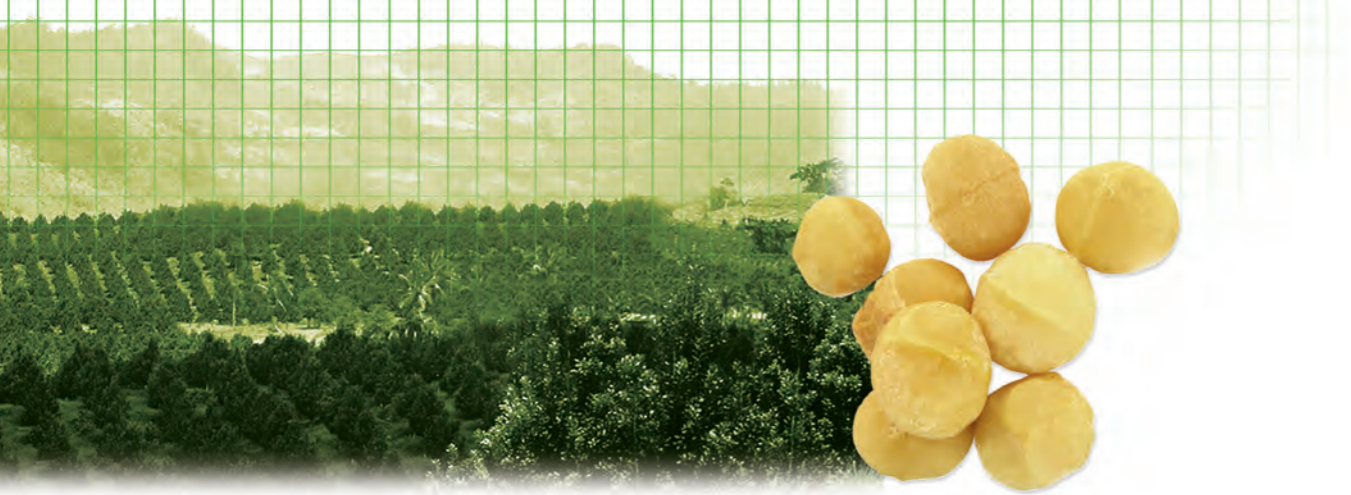
All other standard management practices were followed in the trial orchard. Tree vigour was evaluated during the season; fruit drop was measured during the main drop stages and at harvest fruit yield per tree and crackout percentage were measured.

treatment producing 36% less total fruit drop compared to the control. Visual evaluations at this time illustrated the increased fruit set of the Kelpak treatments compared to the control treatment (Figure 2). Both Kelpak treatments produced numerical increases in

Table 1. Evaluation of Kelpak trial on Macadamia, Mpumalanga Province, South Africa

TREATMENT	GROWTH SCORE	TOTAL FRUIT DROP (KG)*	TREE YIELD (KG)*	CRACKOUT %
Control	2.96	38a	18.6a	34 ns
Kelpak 0.2%x5	3.58	24b (-36%)	21.4b (+15%)	34 ns
Kelpak 0.3%x3	3.12	30ab (-21%)	20.1 ab (+8%)	33 ns

*Values with the same letter do not differ significantly from each other; ns = not significant



yield compared to the control, with the 0.2% Kelpak treatment's increase of 15% significantly higher than the control. All treatments produced a similar crackout percentage.

It is clear from these results that the Kelpak treatments resulted in greater fruit set (less fruit drop) and a resultant higher yield of similar quality to the control. This will have resulted in a higher final return for the Kelpak treated trees.

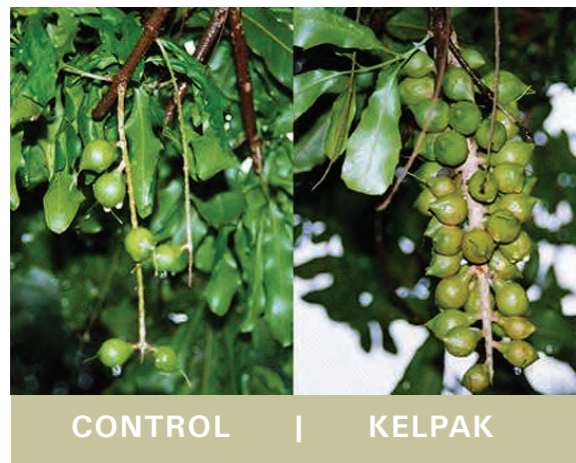


Figure 2. Visual effect on Macadamia fruit set: Mpumalanga Province, South Africa

Conclusions and recommendations

In both trials the effect of Kelpak in the reduction of fruit drop was clearly shown, due to the Kelpak enhancing fruit set. This led to improved yield and final return for the producer. The general growth vigour of the trees was also improved. The current



It is clear from these findings that the Kelpak treatments resulted in greater fruit set and a resultant higher yield

recommendation for Kelpak on Macadamia trees for optimum balance between cost and return is as follows:

Established orchards 0.2% Kelpak solution (200 ml Kelpak per 100 L water) applied five times in a full coverage foliar spray program, namely at 50% bloom, full bloom, 4 weeks after full bloom and 8 weeks after full bloom.

New orchards The use of Kelpak to reduce transplant shock and assist with the establishment of a strong root system is well known, and is also the reason why seedling tray dips are recommended for vegetable and ornamental transplant crops.

For new orchards, the recommendation is to apply a 0.5% Kelpak solution (500 ml Kelpak per 100 L water) as a soil drench around the plant directly after transplant. A volume of 0.5 to 1 L of the mix per plant can be applied.

Another option is to soak the nursery bag with the solution before planting. A popular farming practice used for transplanting trees and vines is to soak the roots of the plants



in a fungicide solution prior to transplant. Kelpak can be added to this treatment at 1 L Kelpak per 100 L solution to replace the soil drench directly after transplant.

To ensure strong development during the growth season, the root drench treatment is combined with 3 to 5 foliar sprays at 21-day intervals with a 0.2% Kelpak solution (200 ml Kelpak per 100 L water).

Please keep in mind the following additional directions: Kelpak should never be diluted more than 1:500 (0.2%); the pH of the final spray mix should not be higher than 7, and sufficiently buffered to remain below 7 until application has been completed; Kelpak should generally not be applied at intervals of less than 14 days; Kelpak is mixable with most nutrients and pesticides; the use of a surfactant is recommended when applying Kelpak.

With the all important benefit of improved fruit set and tree vigour, the use of Kelpak is a vital tool for the producer to ensure a greater return while maintaining tree health.

As the demand for Macadamia nuts increases, additional pressure is placed on producers to improve yield per hectare. Furthermore, there is a worldwide realisation that farming practices should have as little impact on the environment as possible. Kelpak, being an organic product, can assist the producer with these important factors.

