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# HAZELNUT GROWERS ASSOCIATION OF NEW ZEALAND

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Autumn Addition

## **The Hazelnut Tree is a Wonder – by Jeff Olson, Extension Agent, OSU**

Horticulturally speaking, the hazelnut tree is clearly out of the ordinary. It is more than just nutty. It is unique and wonderful. The way in which it achieves pollination in the winter and completion of nut set in the spring, is like no other horticultural crop that I have ever heard of. It is a "one of a kind", just like some of the people in our industry!

Over the years, many researchers have investigated the growth and development of the hazelnut, in an attempt to unlock some of the secrets of this unusual plant. In fairly recent times, 1979, Dr. Maxine Thompson, of OSU, published a very informative article about the growth and development of the hazelnut flowers and nuts. It is one of those information-packed articles that is peppered with words like: megasporocytes, achesporial cells, funiculus of the anatropous ovule...you know what I mean, light reading.

Maxine followed the development of the flower and nut from the time of pollination to harvest. And she found some fascinating things. Pollination takes place in January and February, with the wind being the pollinator. There are a pair of styles that are joined at the base by a tiny ovarian meristem. When the pollen lands on the stigmatic surface of the style, hopefully it germinates and forms a pollen tube. The pollen tube grows to the base of the style in 4 to 7 days and then it rests there until May. Four to five months lapse between pollination and fertilization of the ovary.

This research project looked at how long the stigma would remain receptive to pollen. Did you know that the stigmatic surfaces of hazelnut female flowers remain receptive for up to 3 months? This study used a controlled hand pollination to test the length of receptivity at five different stages of flower development, and

found them to be viable all the way up to March 13. Those old flowers were withering and necrotic, but the stigmas were still receptive.

The clusters that had not been pollinated successfully all dropped to the ground by the end of May. The flowers that were successfully pollinated continue with the development of the ovaries that become mature by the middle of June. Fertilization of the ovaries can then take place. The nut can now develop, and it reaches full size by the beginning of August. By July the shell begins to harden, and is hard by early August.

The cells that will form the following year's crop also form in the spring and summer, while the present crop is being set. The male flower, the catkins, differentiates at the end of May and beginning of June. The female flowers for the next year differentiate between July and September. So, you can see that there is an awful lot going on inside that hazelnut tree in the spring and summer.

Way back in 1925 Joseph Newell did a study of the bearing shoots of the filbert. He found that the number of fruiting buds was directly proportional to shoot length, with the number of fruit buds increasing as the shoot length increased. The diameter of a shoot was a good index to its length. In most cases he found that there is very little degree of negative correlation between a shoot's angle and the number of fruit buds. He noted that better light illumination results in better production in the upper third of the tree. Of course, this observation has been verified quantitatively by the more recent work of Dr. Anita Azarenko.

Newell found that in most cases the variations of illumination on different sides of trees was insufficient to cause any consistent variability in the number of fruit buds formed on the shoots. He observed that in Barcelona, a fair degree of

correlation exists between the male catkins and the number of fruit buds per shoot.

In 1957 John Painter and Henry Hartman reported that the greater the length of the shoot: 1) The greater the number of female flower clusters; 2) the greater the percentage of female flowers that had nuts set in May; 3) the greater the number of nuts in a cluster; 4) the greater the number of nuts matured; 5) the larger the nuts. Overall evidence suggests twigs greater than 6.25 inches long bore the largest and greatest numbers of nuts. Twig length did not effect distribution of blank nuts. They noted that filberts can not produce both extensive twig growth and extensive nut production in the same year, hence the alternate year effect.

In one of the few research studies on the root systems of hazelnuts that I have found, scientists in Italy exposed two adjacent halves of two neighboring trees. The trees were closely spaced at 13' x 13', so the roots tended to extend diagonally to the corners of a square but laterally only as far as the roots of the next tree. The bulk of the roots occurred in the 8-31 inch depths of the soil. Many feeder roots occurred in the soil directly under the trunk. The study was conducted on deep fertile soil and that had a practice of cultivating to a 10-inch depth, which were the factors mainly responsible for this type of vertical root distribution.

So, you see that the quest for understanding the marvelous hazelnut tree have been going on for decades. Significant discoveries have been made, and certainly more await discovery.

### **Linguine with Mushrooms and Hazelnuts**

30g (2tbsp) butter.  
400g (1 lb) mushrooms of your choice, sliced into 6mm slices.  
2 cloves of garlic, minced.  
225g (8oz) dry linguine.  
30-50ml (2-3 tbsp) Hazelnut Oil.  
1/2 cup chopped parsley.  
125g (1/2 cup) toasted Hazelnuts, chopped.  
Salt and freshly ground black pepper to taste.

While the linguine is cooking, prepare the mushrooms.

Heat the butter in a large skillet and add the mushrooms and saute' for a short time. Add a cover and a small amount of water and simmer for 5 minutes or until they are tender. Remove the cover and evaporate the liquid. Add the garlic and saute' until aromatic. Remove from the heat and season well to taste with salt and pepper.

When the linguine is tender, drain and return it to the pot and toss with the mushrooms, hazelnut oil and parsley until well combined. Garnish with hazelnuts and enjoy.



### **Interesting and Useful Websites**

- [www.evergreenorchards.com/update/\\_02.html](http://www.evergreenorchards.com/update/_02.html)
- [www.extension.oregonstate.edu/yamhill/orchardcrops/pruning](http://www.extension.oregonstate.edu/yamhill/orchardcrops/pruning)
- [www.icserv.com/nnga/links.htm](http://www.icserv.com/nnga/links.htm)
- [www.lifestyleblock.co.nz/articles/275-hazelnuts.htm](http://www.lifestyleblock.co.nz/articles/275-hazelnuts.htm)
- [www.badgersett.com/Hazhandbook1.html](http://www.badgersett.com/Hazhandbook1.html)
- [www.ciaronet.com/thompson/](http://www.ciaronet.com/thompson/)
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## ***Hazelnut Growers' Corner***

In this issue our growers' corner takes a look at Hazelwood Hazelnuts, and in we are listening to Ted Kempe of Amberley, who is one of the pioneer leaders in New Zealand's young hazelnut industry. Ted has kindly given us the statistics of his operations.

<u>Planted:</u>	August 1989
<u>Area:</u>	3.5 acres (1.4 ha)
<u>Soil:</u>	Wakanui: Comparatively shallow topsoil on a clay base.
<u>Shelter:</u>	Tasman Poplars. These are compatible to a saline atmosphere.
<u>Block Sizes:</u>	6 x 50m x 50m blocks
<u>Spacing:</u>	Shelter Belts: 4m in rows with 5m between rows.
<u>Headlands:</u>	5m between last hazelnut and shelter belt. (Not Enough)
<u>Irrigation:</u>	Pump water .5km from well. Irrigated shelter belts with 4litre drippers. Irrigated hazelnuts with 2 x 4 litre drippers, 1m either side of the tree.
<u>Fertiliser:</u>	Nitrophoska TE Blue special
<u>Weed Control:</u>	Roundup with Versatil to remove clover.
<u>Sucker Control:</u>	Paraquat (Gramoxone)
<u>Block Layout:</u>	1 row pollinators to 5 rows Whitehearts.
<u>Hazelnuts:</u>	180 pollinators; 560 Whitehearts.

## **Hazelwood Mistakes**

<u>Shelter:</u>	Planted six months prior to planting hazels, resulting in wind damage.
<u>Irrigation:</u>	High iron content resulted in blockage of drippers. Hazels stressed due to lack of moisture.
<u>Headlands:</u>	Not big enough for turning machinery at end of rows.

## **Comments**

- Whiteheart is an excellent hazel with many qualities.
- Prune to a vase shape for first two years.
- Weed control is essential.
- Nuts fall onto the ground when ripe. Eventually mechanical harvesting is necessary.
- Moisture content of harvested nuts has to be reduced from around 24% to 9%.
- Yield: Suggest 4kg at year 10 seems to be realistic.
- Beware of poplars and willows for shelter because their surface root systems will chase water (from your irrigation system) and deprive your hazels.
- Roughly allow \$1.00 per kg for maintenance/growing expenses per year and \$1.00 per kg harvesting costs. These costs reduce as your orchard becomes more productive. Greater productivity does not necessarily mean greater expenses.

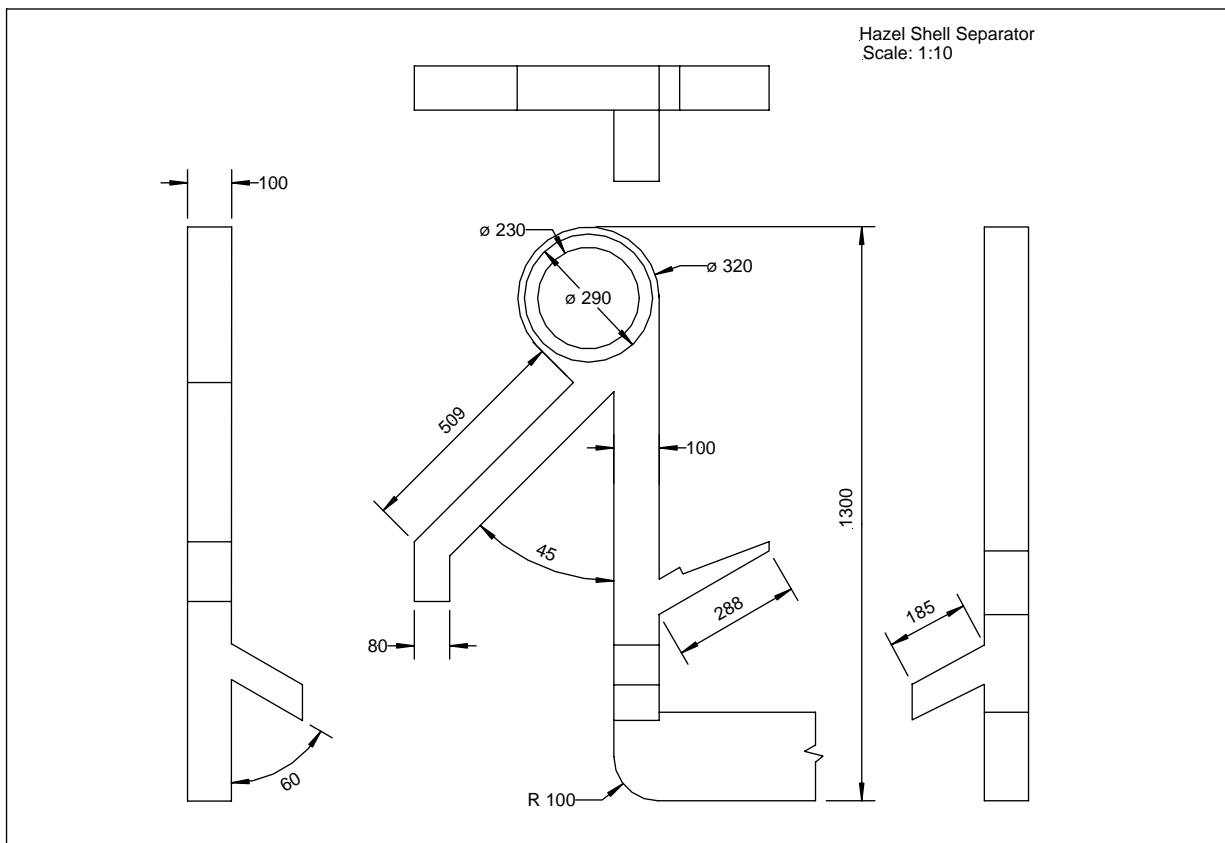
Ted Kempe  
Hazelwood  
307 Beach Road  
Amberley

The HGANZ newsletter will become a source of valuable information concerning our organisation and all members should feel comfortable contributing to the growth of our fledgling industry through it. Valuable and important information could take the form of:

- ❑ Important dates or social events
- ❑ Field trips
- ❑ Advice for the orchard
- ❑ New machinery to make our work easier
- ❑ Marketing tips, advice, or theory
- ❑ Hazelnut business opportunities
- ❑ Useful research (old or new...professional or amateur)
- ❑ Hazelnut issues or questions that you have wondered about that someone else might have an answer to.

As you run across items that you think that others of us could also profit from, pass it on to Dave at [nutt.ranch@xtra.co.nz](mailto:nutt.ranch@xtra.co.nz) so they can be added to the next quarter's newsletter.

As our hazel crops become larger, the need for a shell separator becomes more important to the business. This model works well with Hazels, pecans and walnuts. The drawings below are compliments of [www.nuttranch.co.nz](http://www.nuttranch.co.nz)



## **Report of Hazelnut Field Day 12 April at the property of Keith and Kathie Hanning, Fernside.**

The field day at Keith and Kathie Hannings place was very well attended. The weather played its part, and we saw two harvest systems, both using vacuum suction, one a Ciferelli (available from ITEC or Fruitfed) mounted on a quad bike demonstrated by Gordon Mounsey, and the other a much bigger affair mounted on a tractor and demonstrated by our host Keith Hanning (this machine is available for hire). Both worked efficiently picking up the nuts and separating the trash, the tractor mounted machine was much faster and more suited to the large orchard. Raking the nuts into rows prior to harvesting was said to be beneficial, but a leaf blower/vac was also demonstrated that was able to blow all the nuts into a wind-row and then to blow the leaves away without disturbing the nuts too much. Several possible ways of combining the blower and vacuum pickup systems provided some stimulating discussion.

Other topics mentioned were two commercial ventures. Bev Taylor spoke about her experiences setting up the “Divine Taste of Canterbury” in Prebbleton which is run in conjunction with a 600 tree orchard managed by her husband Gordon Mounsey. The outlet sells a number of hazel based products both locally and through outlets throughout the country. Ellen Loader summarised the status of The Hazelnut Company which is expected to commence processing nuts shortly. It will sell dry roast nuts in specially designed packaging. The nuts being sourced from grower-shareholders.

Drying and storage of nuts was mentioned. Nuts should be dried to 4% moisture for long term storage. This can be done in a well ventilated dry place that is warm (but not above 28 degrees C).

In distributing a survey Bryan Thomas expressed a desire to ensure growers achieve an adequate return for their investment and labour. Responses to the survey will be used to determine a benchmark yield which should be achievable by all growers, and seeks to provide guidance to those who are having difficulty achieving good returns. A timely reminder here for all to return their survey forms please if you have not already done so.

Many thanks to our hosts Keith and Kathie

## HGANZ HAZELNUT YIELD STUDY

The committee is concerned that not all growers are getting an economic yield from their hazelnut orchards. In order to identify reasons for this we are asking you to provide some basic data on yield as well as relevant details about orchards and orchard management. This will enable us to determine a yield benchmark, and may help in identifying why some orchards fall short of the benchmark. Please take a little time to answer the questions below whether you consider that you have a poor yield or a good yield. It is voluntary and you don't have to answer all the questions, but the more responses we get the greater the benefit for all growers. We intend to publish summaries of the results but individual responses will be treated as confidential. Please return completed forms to any of the following

Bev Taylor, Divine Taste of Canterbury, Blakes Road R D 6

Bryan Thomas, 175 Tancreds Road, R D 2

Cristina Hansen, 26 Bicknor St, Templeton

Or any other committee member

If you have several blocks planted with different cultivars you may find it easier to make copies of the form below and fill in a separate one for each block.

Number of production trees	
Cultivar	
Number of pollinator trees	
Cultivar(s)	
Dimensions (including headlands)	
Tree spacing	
Year planted	
Yield for season 2003 (specify Kg/tree, Kg/block etc)	
Yield for season 2002 (if available)	
Yield for season 2001 (if available)	
Is this yield in line with the expectations you had when you planted the orchard?	
Irrigation type (e.g. drip, micro-spray none)	
How do you gauge irrigation requirement e.g. soil moisture probe, rainfall records, evapotranspiration data, other (specify)	
Do you have regular soil and/or leaf testing to determine fertiliser requirements	
Do you regularly apply boron	
Name	