

The WESTERN CHESTNUT

Vol. 2 No. 2

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Spring 2000

Aware of Quarantines?

by Christopher Foster

Any grower can enumerate a multitude of problems one can encounter in growing chestnuts in the West. We certainly don't need to be importing any more! Fortunately, the Departments of Agriculture in the western states have been cooperating for many years to help maintain some significant advantages that we do have.

The states of California, Oregon and Washington have regulations on importing chestnut plant material, including raw nuts, from all states in the U.S. Sending, importing or bringing materials from east of and including Colorado, Montana, Wyoming and New Mexico is completely forbidden unless by special permit where the destination is a licensed quarantine station. The quarantines are for chestnut blight, large and small nut weevils, chestnut gall wasps and oak wilt. Domestic regulations regarding Midwest or eastern states are very similar to the USDA international rules, only less publicized. Just because a company or person is willing to send you something from east of the Rockies does not necessarily make it legal.

Nursery imports of chestnut material originating in states to the west of the above listed states are allowed, but are subject to common certification and labeling standards. Routine inspection procedures may apply. While there is no evidence of widespread outbreaks of any of the

See *Quarantine*, p. 5

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Pruning Chestnuts for Improved Productivity

Recommendations from 20 years research by Dr. Hitoshi Araki, Senior Researcher, Hyogo Research Institute, Japan, recorded by Peter Hall at a Conference organised by Premium Chestnuts Australia and HRDC, Beechworth, 29-30/8/98

by Peter Hall

Reprinted from *The Australian Chestnut Growers' Resource Manual* with permission of the author, Peter Hall, Premium Chestnuts Australia, and the Editor, Dan Ridley.

Premium Chestnuts Australia, an Australian chestnut export group, with the help of funding from the Horticultural Research and Development Corporation, sponsored a visit to Australia last year by Dr. Hitoshi Araki. Dr. Araki is a senior researcher at the Hyogo Research Institute in Japan. He has studied the production of chestnuts for more than twenty years, and has been credited with transforming the Japanese chestnut industry over that period. His pruning methods have led to the achievement of yields of up to seven tonnes per hectare, (6,245 lbs/acre) together with significant increases in nut size.

Dr. Araki spoke at a Conference in Beechworth on 29th August, followed by demonstrations of his pruning techniques the next day at High Grove Farm, Stanley.

It should be noted that Dr. Araki's research relates to the Japanese chestnut *Castanea crenata*, a somewhat smaller tree than the European or Spanish chestnut *Castanea sativa* upon which the Australian industry is based. He has developed techniques suited to the Japanese industry, characterised by small, densely planted chestnut orchards designed to maximise production from the limited land available. Australian growers will need to make their own judgment as to the applicability of his findings in this country.

Why Prune Chestnuts?

When Dr. Araki began his research of chestnuts more than twenty years ago, his aim was to substantially improve productivity while maintaining nut size. Dr. Araki concluded that to achieve this he had to address three factors:

- the number of pistillate (female) flowers produced
- prevention of flower dropping
- achievement of large nuts.

Pistillate flowers are borne on young wood – last season's growth, and new growth of the current season. One-year-old shoots are therefore termed 'mother branches'.

Dr. Araki demonstrated through research that:

- the vitality of mother branches, as indicated by their length and diameter, has a direct bearing on the number of pistillate flowers produced
- the vitality of mother branches is improved by increased access to sunlight.

He demonstrated a direct relationship between the intensity of sunlight within the tree canopy and the number of pistillate flowers per cubic metre of canopy. He went on to show that the proportion of early flower drop is also related to the level of relative solar radiation. And finally, he was able to show a relationship between average nut weight and the diameter of bearing shoots (thicker shoots bearing heavier nuts), thus linking nut size back to the access of sunlight within the tree canopy.

See *Japanese Pruning*, p. 6

Message from the President

This will be my first opportunity to thank the members for electing a new slate of officers at our annual meeting in January. I realize that I, along with the others, will have big shoes to fill and I, for one, will endeavor to not disappoint you. My goals as a chestnut grower are similar to all of our members. The information that we are able to share at our meetings and get together advances everyone's understanding of growing and marketing this strange fruit. One of the goals of this organization is to disseminate information to our members. Along with our members, I think educating our buyers is also a goal we should strive to address. The more we as growers know about our produce, the better we can represent our products to the consumer.

I am excited about the Grading Standards Committee. We have a good representation of our growers as well as many volunteers that are willing to provide information. By the response to the mailing, I think this is a very important issue to many growers. It will be important during our discussions that we consider the entire membership as it applies to grading and quality standards. There are many types of trees in our membership and we need to address the special needs of some of the less familiar varieties that are in production. I believe that the committee has enough diversity that all members will be represented appropriately.

I am constantly amazed by the general interest in chestnuts. My wife, Patty, and I are continuously contacted over the Internet with questions about chestnuts. I realize that many of our growers market their chestnuts over the Internet. However, I believe that the market is far larger than what is being serviced by current Internet Marketers. It has been mentioned many times at our meetings that our association needs, for a lack of a better term, a clearinghouse for nuts that are available for sale. The development of grading standards for chestnuts will make this somewhat more feasible. When talking with your fellow members you will be talking about the same produce. Again, this is important for our fellow growers as well as the consumers we market to. I feel this is going to be a very worthwhile project for our membership.

Please feel free to send me your comments and suggestions. I will forward this information to the committee as appropriate. We have a fairly short time period and agenda for our grading committee. If you have comments do not delay in getting the information to us.



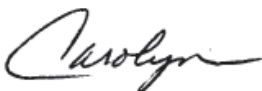
EDITOR'S NOTES

This issue is filled with useful information that you'll want to tuck away for future reference.

At the annual meeting Anthony Boutard and Chris Foster agreed to look into the maintenance of the chestnut plot at OSU. Their article in this issue details the history of the plot and proposes how WCGA can be active participants in its continuation. Chris also shares quarantine information that each of us should be aware of.

Peter Hall, the author, and Editor Dan Ridley, Dept. of Natural Resources and Environment for the Victoria, Australia government have graciously allowed us to reprint the chapter on Pruning contained in the new DNRE publication, *The Australian Chestnut Growers' Resource Manual*. In addition I have included a review of the book itself with information on how WCGA members may place an order.

Enjoy!



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PUBLICATION AND DEADLINES

Fall issue	deadline 9/10	mailed 10/1
Winter issue	deadline 12/10	mailed 1/1
Spring issue	deadline 3/10	mailed 4/1
Summer issue	deadline 6/10	mailed 7/1

EDITORIAL OPINION

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Corvallis Plot Provides Research Opportunity for WCGA Member Growers

by Christopher Foster and Anthony Boutard

There is a plot of chestnut trees at the OSU's Lewis-Brown Horticultural Research Farm in Corvallis, Oregon established under the guidance of Robert Rackham, an OSU Extension Service agent now retired. The plot has a good selection of the important hybrid varieties developed in Europe and the US. Also present in the plot is one of the traditional and acclaimed Italian Piemontese nuts known as *Marrone di Lucerna*, a gallwasp resistant Japanese variety, and numerous seedlings of *Castanea mollissima* from China.

First Planting of U.S. Hybrids Took Place About 1987

The plot was established in three distinct phases. The first planting took place around 1987 with hybrids developed in the US. "Colossal," "Dunstan," "Layeroka," "Myoka," "Skookum," "Silver Leaf" and several Berganz "Colossal" seedlings were planted at that time. Berganz was a booster of the "Colossal" and "Silver Leaf" varieties. According to Rackham, those seedlings have not demonstrated any advantage over

Shawn Melhlenbacher (left) and Christopher Foster (right) are shown here in the Lewis-Brown Chestnut Demonstration Plot, OSU, Corvallis, OR.



the "Colossal" parent. The "Dunstan" hybrids are in very bad shape.

In 1989, Rackham visited Italy and France, and through contacts over the course of that trip, arranged for importation of scion wood, primarily from hybrids, hitherto unavailable in the US. This material was grafted and planted out in 1992. Seedlings from an old European tree in Mapleton, Oregon were used as rootstock material.

The importance of Rackham's successful effort in importing scion wood cannot be overstated. The French and Italians have been selecting improved chestnut varieties for centuries. Some of the Italian varieties trace their lineage back to the 12th century.

The effort continues. At the *Institute National de la Recherche Agronomique* (INRA) research station in Douville, eight hectares (nearly 20 acres) are devoted to chestnut research. In 1998, the station was evaluating 1,400 controlled cross hybrids for general characteristics. Selected hybrids are then evaluated for ink

disease (*Phytophthora*), blight (*Cryphonectria parasitica*) and chestnut mosaic virus (ChMV) resistance. The station also conducts research on cultural practices, such as irrigation and fertilization, and utilization properties, such as peeling, integument intrusion and keeping quality. It is important to recall that the latitude at Douville, France (west central region) and Turin, Italy, at 45 degrees, is roughly the same latitude as Corvallis, and the climates are similar, though our summers are distinctly drier.

The European hybrid selections are crosses between the Japanese (*Castanea crenata*) and European (*Castanea sativa*) species. One is a controlled cross and the others are natural hybrids. "Precoce Migoule," "Marsol," "Maraval" and "Marigoule" are natural hybrids between *Castanea crenata* and *C. sativa*, with the pollen coming from an unknown possibly wild tree. — In hybrid nomenclature, the maternal parent is given first. — "Bouche de Betizac" is a selection of a controlled cross between "Bouche Rouge," a highly regarded French *C. sativa* variety from the Ardèche, and *C. crenata* developed by INRA.

In addition, three pure Japanese varieties were introduced to the plot. Of these, unfortunately, only one variety, "Tsukoba," remains. It is gall wasp resistant. This very serious pest is not present in the Pacific Northwest, though it has been found in the southeastern U.S.



Christopher Foster inspects the European selections (left) and "Colossals" (right) at Lewis-Brown.

Chinese Chestnuts Obtained Through the American Chestnut Foundation Were Planted in 1993

During the third phase, a group of Chinese chestnuts were planted in the plot around 1993. They were brought into the country through the auspices of the American Chestnut Foundation for breeding purposes. The Foundation was planning to use the trees as a source of resistance to the chestnut blight in the American Chestnut, *C. dentata*. Since that time, they have shown no interest in the trees, and the trees have not produced nuts of commercial quality. Unless there is some interest in using the trees for breeding purposes, they can be removed to make room for other commercially important varieties.



Ailing “Dunstan” hybrid at Lewis-Brown. The “Silver Leaf” trees in the background were planted at the same time.

Following Rackham’s retirement, oversight of the plot has shifted to Shawn Mehlenbacher, an internationally recognized hazel nut breeder at OSU. At the annual meeting of the Northwest Chestnut Growers Association, there was great interest expressed in having the Association maintain and improve the plot, and we offered to advance that objective. We met with Mehlenbacher in early March to discuss the future of the plot.

Mehlenbacher was pleased the Association has taken an interest in the plot. Recognizing that his primary research effort is devoted to hazelnuts, we assured him that the plot responsibilities

would not become a distraction or burden. Mehlenbacher quizzed us closely regarding the purposes of the plot.

Authors Propose Continued Use of OSU Plot

Following the sentiment expressed at the annual meeting, we suggested the plot should serve as a varietal library of sorts where growers and nurseries can evaluate the growth habits and vigor of important commercial varieties, and secure properly identified scion wood for orchard development and research. The plot is also essential for student and faculty research. We encouraged Mehlenbacher to direct students towards chestnut research. Some of the areas of importance are *Phytophthora* resistance, pollination timing and ambrosia fungus resistance.

In order to keep the project manageable, we offered to do the following. Here is our general proposal as it evolved during the meeting.

1. The NW Chestnut Association members are willing raise the money needed to cover the annual rent. Currently, Lewis Brown rent is \$1,500 per hectare. The plot rent would be roughly \$600 annually. Rent includes basic horticultural services (irrigation, fertilization, mowing and weed control).
2. We (Boutard and Foster) will organize a field and work day in the plot tentatively planned for 17 June. We urge all members to join us on that day. We will send out a reminder and agenda as the day nears.
3. We (Boutard and Foster) will make sure the trees are properly labeled. This is important because Mehlenbacher and other professors visit the plot with classes.
4. Members of the Association will donate named varieties of trees and some pure American Chestnut specimens to round out the selections in the orchard. We will also try to secure some of the varieties being evaluated at the University of California, Davis.

Chestnut Varieties Represented in Lewis-Brown Plot

Parentage after *Chestnuts: Production and Culture*, by Michael Crawford. (Note: It is our opinion that the tree mapped as “Belle Épine” is actually “Marrone di Lucerna,” based on the nut and tree characteristics.)

Variety	Parentage	# in plot
* Marrone di Lucerna	European	1 (2)
Bouche de Betizac	Euro. x Japanese	4
Colossal	Euro. x Japanese x Chinese	9
Dunstan	American x Chinese	8
* Belle Épine	European	1 (0)
Fowler	Euro. x Japanese x Chinese	1
Layeroka	Euro. x Chinese	1
Skookum	Euro. x Chinese	1
Maraval	Euro. x Japanese	3
Marigoule	Euro. x Japanese	1
Precoce Migoule	Euro. x Japanese	2
Primato	Euro. x Japanese	1
Marsol	Euro. x Japanese	1
Silver Leaf	Euro x Eastern Chinquapin	4
Tsukoba	Japanese	1
Myoka	Euro. x Chinese	1
Berganz Colossal Seedlings		7
Berganz pollenizer		4
Numbered Chinese Seedlings		26

* Tree identified as Belle Épine may actually be *M. diLucerna* based on twig morphology and nut characteristics.

For further information contact Anthony at aboutard@orednet.org or Chris at foster@europa.com.

Quarantine, cont'd. from p. 1

quarantine pests in the West, spotty but largely unconfirmed reports of blight and weevils do occasionally come in. Cautions in transferring material among the western states cannot be entirely dismissed.

These quarantine pests and diseases can be devastating. Weevils can infect over half a nut crop. Sometimes a farmers' entire crop is refused by processors or wholesale buyers when the infestation exceeds a certain percentage. In the southern U.S., the chestnut gall wasp has put most of the commercial growing under by severely reducing nut production. Many of the western chestnut tree types are vulnerable to the virulent blight commonly found in the East. Control measures are the subject of experimentation and research, but these guys are tough customers; they make other troublesome "imported" pests like shothole borers look like weenies! How would you like to be responsible for letting one of these things loose?

While the quarantines make obtaining quality plant material from other parts of the world a difficult task, it's in our best interest to support efforts maintaining the significant advantages that we do have. Though not widely known, a quality assortment of germplasm already exists on the West Coast. Besides the plantings at UC Davis and OSU, there are several good private collections around. The quarantine "roadblock" is less of a problem than getting certain varieties that already exist here propagated locally and out for trial in orchard conditions.

The Western Chestnut Association will print a short reminder about the quarantines on a regular basis.

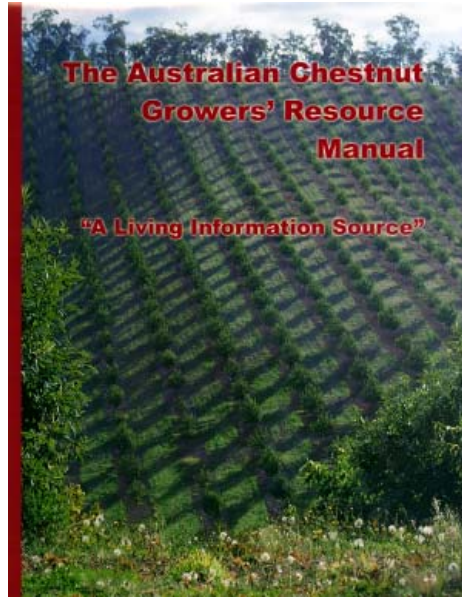
The Australian Chestnut Growers' Resource Manual Provides Super Source of Info

Growers seeking information about any or all aspects of growing chestnuts typically go from one resource to another gathering bits and pieces as they go. In my efforts to unearth information for publication in this newsletter I've made a few contacts around the world. In an email conversation one day with Jennifer Wilkinson, Editor of *The Australian Nutgrower*, I happened to ask her who would be considered an expert source of information about chestnuts in Australia. Her response was Dan Ridley. Dan is a Dept. of Natural Resources and Environment Research Scientist for the Victoria government, and works out of the Ovens Research Station in Myrtleford. He also holds the position of CGA Industry

Liason Officer. In our email conversation he happened to mention that he had just finished editing the Growers' Resource Manual along with Co-Editor, Jenny Beaumont, also of DNRE. After he described the content I ordered it immediately and have found it to be extremely comprehensive, accurate and reliable.

The manual is considered a "living document". It is a 3-ring binder style publication which allows for the addition of documentation as it is published.

The major section is comprised of twelve chapters including Industry Information, Money and Sales, Chestnut Economics, The Tree, Soil Water and Nutrition, Pruning, Pests, Diseases and Weeds, Chestnut Harvesting, Quality Standards, Processing, Marketing Opportunities, and "More Stuff". Section B contains a review of world literature, major issues and best practices, and is



intended for those growers who seek more comprehensive information and understanding.

The full-color photographs, most of which are attributed to Dan Ridley, are of outstanding quality and the Quality Standards Pictorial Reference Guide is like none you have ever seen.

The amount of research that has gone into the publication is impressive -- more than three pages of references. If you are looking for an all-encompassing book on chestnuts and willing to pay the price (about \$88 including the book, postage and cost of an international bank draft) this is the book for you. You may want to check on availability with Dan. You can reach him at Dan.Ridley@nre.vic.gov.au

Hats off to the Aussies for a class publication!

Field Day
June 17
(tentative date)

at the Lewis-Brown Plot

OSU, Corvallis

Mark your calendars now!

The Australian Chestnut Growers' Resource Manual
Order Form

Enclose an International Bank Draft *in Australian dollars* made payable to DNRE

	\$ Australian	Approx US\$	Mail your order to:
Resource Manual	\$A85.00	\$52.00	Dan Ridley, DNRE
Airmail	\$A40.00	\$24.70	Ovens Research Station
Economy mail	\$A30.00	\$18.52	PO Box 235
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Japanese Pruning *cont'd. from p. 1*

Dr. Araki has concluded that chestnuts are the most demanding of all fruits with regard to their need for sunlight. Apples, for instance, need 30% relative solar radiation to achieve good quality and taste. Dr. Araki has shown that chestnuts need 35% relative solar radiation just to bear fruit. This is illustrated in Figure 1 below.

Transition of the Japanese Chestnut Industry

Dr. Araki set about convincing Japanese growers that to increase production they needed to let more light into their trees, and

Dr. Araki is now continuing his research to assess the benefits of limiting tree height to 2.5m (8.2 ft.).

Pruning Technique

Pruning to achieve trees of the shape advocated by Dr. Araki needs to start in the first year and continue regularly throughout the tree's life. Dr. Araki observed that many growers are happy to prune trees early in their life, but as the trees grow older they tend to defer pruning in order to get more fruit. Leaving pruning till later simply increases the pruning work load, as more wood has to be removed. It also means that part of the

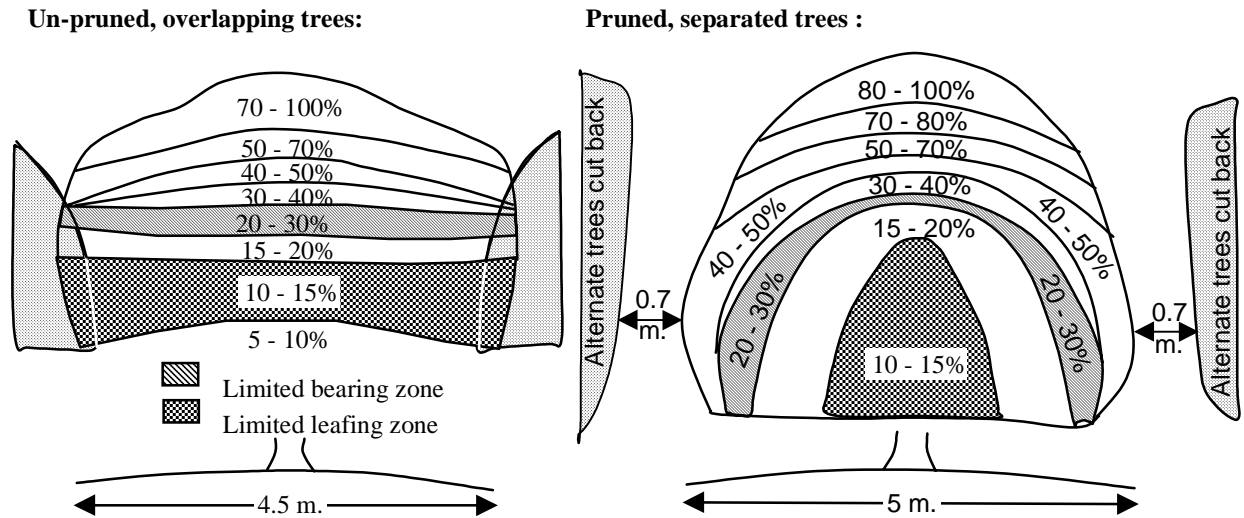


Figure 1 – Measurements of Relative Solar Radiation within the Tree Canopy

that this would require regular pruning. The industry resisted his suggestions, believing pruning to be arduous, especially for trees exceeding 5m. (16.4 ft.) high.

Dr. Araki worked to develop pruning techniques that would ease this burden, while also demonstrating the effectiveness of pruning in an orchard attached to his Research Institute. There he achieved production volumes of 6 tonnes/hectare (5,353 lbs/acre) despite setbacks by typhoons and extensive insect problems, with 7 tonnes/hectare (6,245 lbs/acre) in the better years. These figures compare with 1 to 2 tonnes per hectare (892 to 1,784 lbs/acre) which has been considered good in Australia. Figure 1 – Measurements of Relative Solar Radiation within the Tree Canopy.

Two measures which Dr. Araki adopted to make pruning easier were:

- limiting trees to a maximum height of 3.5 – 4 m. (11.5 to 13.1 ft.) (with older trees this was achieved by cutting them hard back, followed by regular pruning of the re-growth)
- restricting the distance from the edge of the canopy to its centre. He achieved this by adopting an elliptical tree shape. The change in tree shape is depicted in Figure 2 (right).

After much persuasion, the Japanese industry has followed his lead, and his recommendations are now standard practice. New orchards are planted very densely by Australian standards, with trees at 4m x 4m (13.1 ft. x 13.1 ft.) spacing. Trees in alternate rows are pruned to an elliptical shape, while those between are pruned to maintain at least a 2m (6.5 ft.) gap between tree canopies.

As the orchard matures (after 5 or 6 years) these intermediate trees are removed altogether, leaving elliptical trees on a 4m x 8m (13.1 ft. x 26.25 ft) spacing (126 trees per acre).

tree's growth energy is wasted in branches that will later be removed.

The target initially should be to promote a leader and two main branches, appropriately positioned. In year three the aim should be to encourage the tree to spread out (Figure 3, upper right). This involves thinning the inward growing branches. Leave good limbs if they're in the direction you want, but be prepared to cut off good

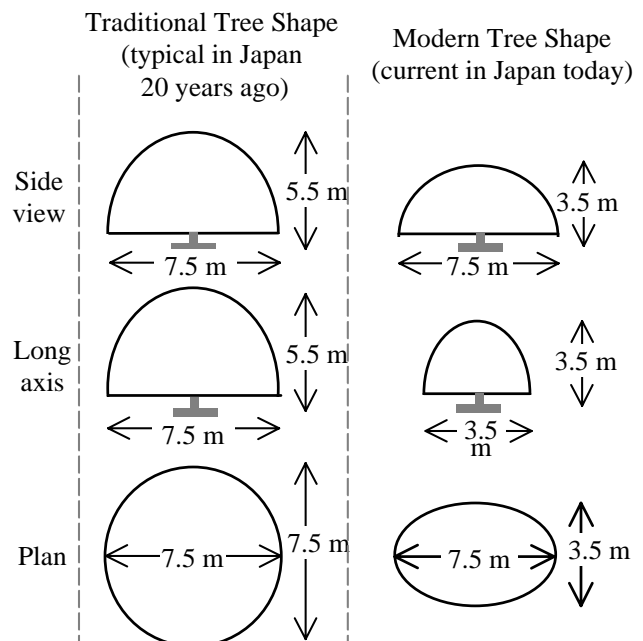


Figure 2 – Re-shaping of Chestnut Trees in Japan

limbs if they're not in the right direction. The overriding consideration when pruning should be the long-term shape of the tree.

An elliptical tree requires only two good scaffold branches. It is best to leave the central leader while these develop, but this can be removed later. The space required under the scaffold branches will depend on orchard practices including mechanisation.

In the case of mature trees, it is better not to thin out all in one go. Cutting back progressively enables the tree to continue its production without setback. Cutting back

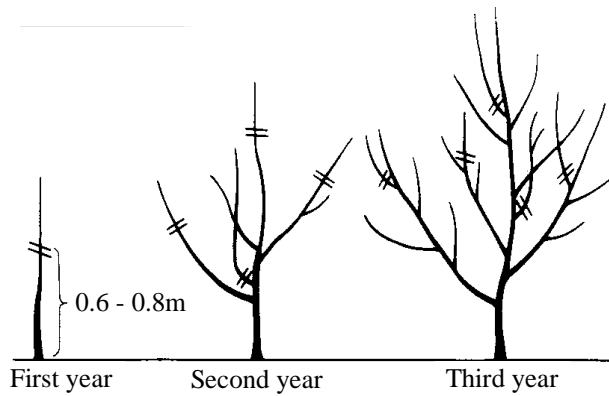


Figure 3 -- Pruning a Young Tree in Three Successive Years

pruning of re-growth the trees could be kept down to a manageable height of 3.5-4m (11.5 ft to 13.1 ft.).

For old trees that still have lower limbs, staged cutback may be appropriate, as illustrated in Figure 6 (See following page).

The Chestnut Industry in Japan

The Japanese chestnut industry experienced rapid growth throughout the 1960s. During the '70s production tailed off and, since 1980, it has been in decline. This reflects similar changes in the area under production. (See Figure 7, following page).

Meanwhile demand has been sustained, though preferences are shifting away from fresh roasted chestnuts to processing and the use of chestnuts as an ingredient in luxury foods. The shortfall in local production has

been met by imports – those from China increasing steadily over a long period, with rapid growth in imports from Korea since the late '70s. However, these are both now tailing off. Demand has slackened for the Chinese product (a smaller, inferior nut), while rising wage rates in Korea are limiting expansion of the industry in that country which is already exporting most of its production.

Chestnut processors in Japan are now worried about future supply. There is still a possibility of increasing imports from China, but local production is continuing to fall. Japanese producers are now positioning themselves at the higher end of the market, seeking higher prices for lower volumes of quality product.

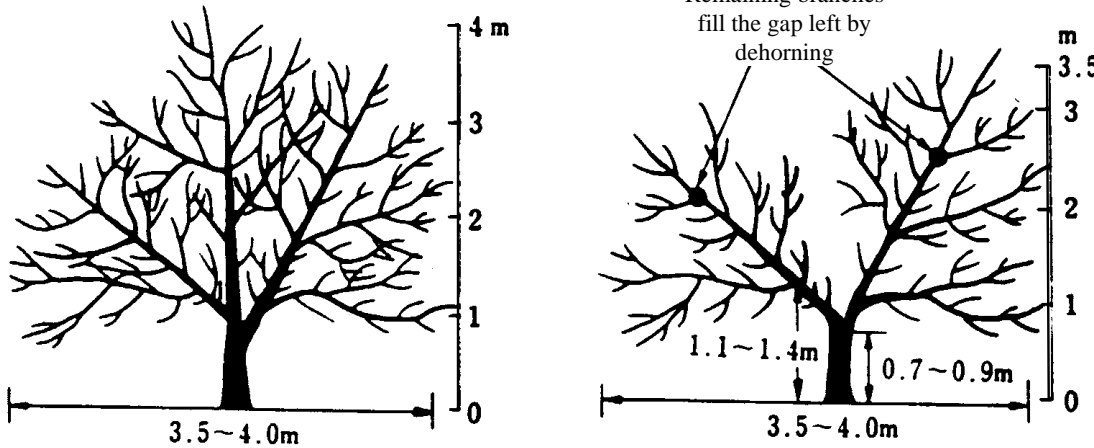


Figure 4 – De-horning the Central Leader (above)

too much can be counter-productive, as too little growth is left for flowering.

Once the trees are under control, annual reduction pruning helps to maintain their yield by maintaining good light access into the canopy. Cutting off a fifth to a third of last year's growth is about what you should aim for – a half is too much.

It is important to maintain good spacing between trees to let in the light. Figure 5 illustrates how Dr. Araki achieves this in a densely planted orchard which is to be later thinned.

Orchard Renovation

When Dr. Araki developed his pruning techniques he had to find ways of dealing with existing orchards, many of which had grown into forests of interlocking trees, fruiting only on their top-most canopy.

Faced with trees up to 10m (32.8 ft.) tall, his approach was to cut them back severely – to a height of around 1.5m (4.92 ft.) – so that with subsequent

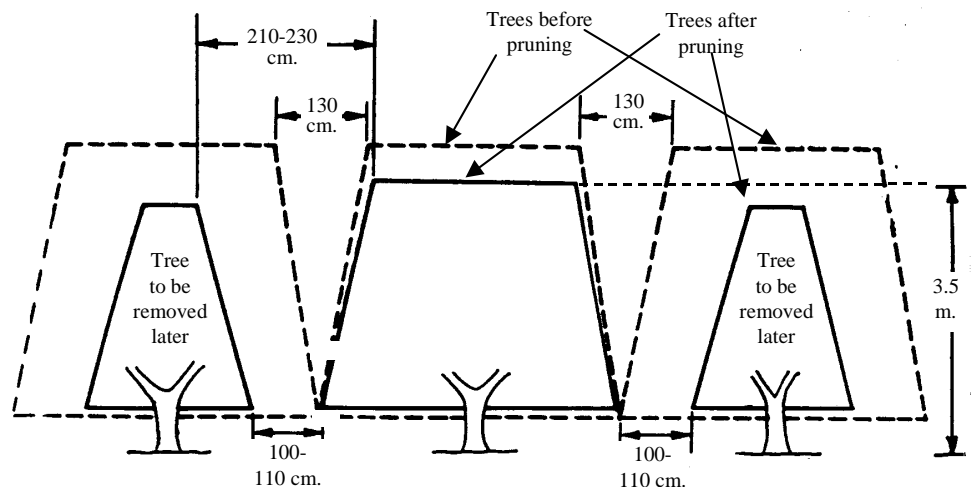


Figure 5 – Pruning to achieve inter-tree spacing

WCGA ANNUAL MEETING MINUTES

The Annual Meeting was held on January 29, 2000 at the Columbia River Doubletree. Approximately forty people attended. The meeting was called to order by Ben Bole at 2:05 PM.

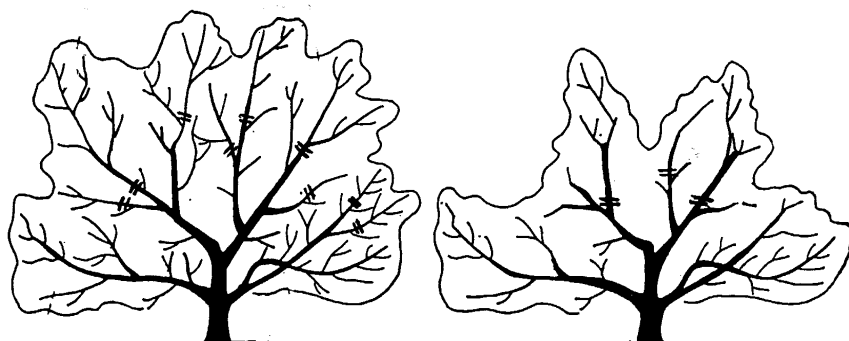
Ben called for a motion to accept the minutes of last year's meeting as published in Volume 1, Number 1 of *The Western Chestnut*. A motion was made, seconded and carried.

The Treasurer's report was read (see below). A motion was made to accept the Report as read. The motion was seconded and passed by a voice vote.

Carolyn Young presented a summary of the first three editions of the Newsletter and an estimate for the spring issue. Her report is attached.

John Schroeder, as Chair of the nominating committee, presented the slate of officers shown below. There were no nominations from the floor so a motion was made, seconded and passed to elect these officers for the year 2000. Ben thanked the previous officers for their contribution to the Association.

Ben reviewed the status of the Federal Disaster program as it applies to the poor 1999 chestnut harvest in Oregon and Washington. Growers interested in applying for funds should contact their local USDA representative.



Pruning in the first season
Pruning in the second season
Figure 6 – Progressive Pruning of Senescent Trees

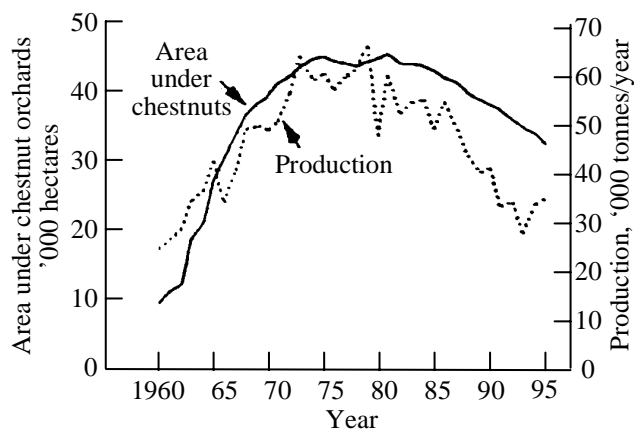


Figure 7 -- Chestnut Cultivation and Production in Japan

Fertilisation and Soil Management

Fertiliser needs vary by orchard depending on soil type and depth as well as the age and spacing of trees. The Hyogo Research Institute has published a standard of recommended application rates. The suggested rates (kilograms per hectare) for phosphorus (as P_2O_5) and potassium (as K_2O) are approximately 10 times the tree age in years. For nitrogen, a year is added to the tree age before multiplying by 10. These recommendations relate to densely planted Japanese orchards, with tree spacings of 4 x 4 m (13.1 ft. x 13.1 ft.) (young orchards) and 4 x 8 m (13.1 ft. x 26.2 ft.) (older orchards), and even there it is suggested that they be taken only as a guide, to be varied according to local circumstances.

Nitrogen is the most critical fertiliser requirement, and there is a need to study tree habit and vigour to assess the amount of nitrogen required. Heavy pruning will reduce fertiliser needs in the short term, possibly to the extent of not requiring any for a season. Fertiliser is needed for both fruiting and tree growth, though the effect on limb growth can take two to three years to become apparent. As to timing, the following is the recommended standard for Hyogo Prefecture:

Season	Winter (December in Japan)	Summer (end of flowering)	Autumn (post harvest)
Purpose	Tree growth inc. mother branches and new shoots	Fruit development	“To say ‘thank you’ to the tree”
Nitrogen	50%	20%	30%
Phosphorus	100%		
Potassium	50%	30%	20%

Table 1 – Timing of Fertiliser Application

After heavy pruning it may be appropriate to miss the summer and autumn applications. Even the winter application in the pruning season may be unnecessary when cutting hard back, as the tree may have sufficient inherent vigour to promote new growth.

The need for fertiliser can be assessed in part by the growth of mother branches. Typical growth expectations are shown in Table 2.

Tree age (years)	Typical length of shoots
2 - 3	60 – 80 cm (23.6” - 31.5”)
4 – 6	50 – 60 cm (19.7” - 23.6”)
7 – 8	40 – 50 cm (15.7” - 19.7”)
9 +	30 – 40 cm (11.8” - 15.7”)

Table 2 – Expected Growth of Mother Branches

Ben also reported on discussions with Polly Owen of the Nut Growers about possible cooperation in the future. No steps have been taken to make any formal relations at this time and no additional meetings are planned.

There was a discussion about the need for quality standards. The article in the Newsletter (July '99, p6) describes how the issue is being addressed in Australia. Size is the most commonly used criteria. Several of the members expressed concern that size is not meaningful when discussing different cultivars. On the other hand, size is the first item mentioned by most buyers. Steve Jones said that as the new president creating a quality standard was going to be his number one priority.

Ray and Carolyn Young passed around a booklet they had purchased from the Australian Chestnut Growers Association. Many of the members expressed interest in obtaining a copy of the book. The Youngs were requested to see if we could obtain a license to publish the book in the US.

Chris Foster and Anthony Boutard presented a case for the Association to take over the financial responsibility for the chestnut orchard started by Bob Rackham at OSU, thereby assuring the safety of these trees. The University is under pressure to do something with the plot of ground. After some discussion Chris and Anthony were authorized to contact OSU on behalf of the Association to obtain the

University's requirements for such an arrangement.

The business meeting was adjourned at 3:05 PM.

Jeff Olsen, OSU Extension, gave a talk on fertilization of chestnuts. His opening remarks were that a literature search for the mineral requirements of chestnuts did not yield much information so he was going to draw on his experience with hazelnuts and walnuts.

Nitrogen: young trees should receive about 0.1 lb for each year of growth with mature trees getting between 1.5 and 2 lb/year which amounts to 150 to 200 lb/acre depending on the method of application. In the PNW mother nature applies about 30 lb/acre/year of nitrogen. The application should be just before bud break. Leaf samples are best taken in August.

Boron is essential for good nut set. Because boron is very soluble it leaches out of the orchards and should be applied every two or three years at a rate of 0.1 lb/tree. For mature orchard about 5 lb of Solubor per acre (1 lb of boron). For immature orchards the application should be reduced in proportion to the size of the canopy relative to a mature orchard.

Potassium (as K₂O) rates for hazelnuts is 6 to 10 lb/tree/year and 15 to 20 lb/tree/year for walnuts, so an intermediate amount is probably appropriate for chestnuts. Note, if potassium is

applied as KCl, the chlorine must be washed out of the soil prior to the growing season, i.e. apply in February. The use of K₂SO₄ avoids this problem.

For low pH readings lime should be applied. The recommended rates are: pH<5.2, 4 to 5 tons/acre; 5.2<pH<5.5, 3 to 4; 5.6<pH<5.9, 2 to 3; and 5.9<pH<, 1 to 2. When the pH is less than 5.5 the absorption of other nutrients is affected.

Lorin Amsberry (Fowler Nursery) opened his talk with questions for the local growers regarding the weather patterns in the spring of 1999. Based on this discussion he concluded the poor harvest was due to the lack of pollination. The weather conditions are very critical for pollination. Rain is very detrimental. If 1999 turns out to be a typical spring multiple pollinators may be required.

Over the past several years Fowler has experimented with grafting Nevada onto Nevada and Colossal root stock. They have decided to abandon the Nevada on Colossal combination. A new pollinator, now named "Okei", will be their standard in the future. The Okei was developed at UC Davis and was originally designated 6-10. The University has also developed a new nut tree they are calling "Fowler". This tree has good tasting nuts that are smaller than Colossal.

ppp

Shoots need to be thick at the base. This is a function of *how much light they're getting*.

Dr. Araki made the following observations about fertiliser requirements:

- If getting too much growth, reduce fertiliser quantities or don't fertilise in summer or autumn.
- If getting long (50 – 60 cm) (23.6" to 31.5"), strong fruiting shoots on mature trees, fertilising in summer and autumn is probably unnecessary.
- If getting good (30 – 40 cm) (19.7" to 23.6") fruiting shoots on mature trees, follow the standard.
- If getting short (15 – 20 cm) (15.7" to 19.7"), weak bearing shoots, increase summer fertilising. Look also at other factors – insects, pruning, etc. For instance, lack of pruning may be retarding growth. It pays to look at other people's orchards.
- If getting basically no growth – almost die-back – look at other factors such as soil, drainage, tree height, light, etc. before reviewing the fertiliser regime.

Pruning Demonstrations

On that Sunday, Dr. Araki demonstrated his pruning techniques at High Grove Farm, Stanley. His subject trees were:

- ten year old Colossal, not previously pruned
- Lucenti tree reworked to Purton's Pride by top-grafting 12 months ago
- fifteen year old Buffalo Queen producing only medium-sized nuts. The centre of the tree had been thinned two years ago with limited effect
- three year old Purton's Pride, demonstrating pruning to achieve an elliptical shape
- large old Buffalo Queen which had been cut back heavily last year and now showing substantial new growth.

Conference Proceedings

Peter Hall has prepared a comprehensive set of Proceedings of the Conference and Workshop (34 pages) from notes taken during the presentation together with diagrams and tables supplied by Dr.

Araki (including a number not presented to the conference). Japanese notations have been translated to English. Also included are:

- notes of a Varieties Workshop with a panel comprising Peter Guest, Joe Rinaudo, Robert Sinclair, Andrew Guest
- notes of a session on 'Reworking Older Trees' by Joe Rinaudo
- notes of a supplementary session by Chris Poole of *Rarewoods* on 'How to Sell your Pruning Wood'
- photographs of top-grafted trees and before and after photographs of each of Dr. Araki's pruning demonstrations.

To secure a copy please write to Bill Connoley, Treasurer, Premium Chestnuts Australia, P O Box 157, Batlow, NSW 2730 enclosing a cheque for A\$20. Please allow at least 6 weeks for the fulfillment of order, as this price can only be achieved by grouping orders together for publication. Enquiries should be directed to Bill on 02 6949 1364.

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PESTICIDE NOTIFICATION NETWORK UPDATE

by John Schroeder

In the last issue of *The Western Chestnut* (Winter 2000, p 7) I gave a very brief description of WSU's Pesticide Notification Network (PNN). Since that time a web site has been created where all the PNN's can be viewed. The URL is: <http://www.tricity.wsu.edu/~mantone-newpnn.html> under Notifications. This site is also linked to the Pesticide Information Center On-Line: <http://picol.cahe.wsu.edu>

Looking at the PNN's at these sites is not very efficient because the initial screen does not list the crop so it is necessary to pull up an additional screen for each entry.

The following table summarizes the PNN's issued since the last update that apply to chestnuts. There are several ways growers can obtain the complete label; contact your local supplier of agricultural chemicals or county extension agent. In addition, most of the manufacturers have labels available via their web sites.

RECENT PNN's FOR CHESTNUTS

Number	Date	Type*	Ingredients	Manufacturer	Product	Comments
1999-352	12/20	I	endosulfan	Gowan Co	Imidan	70WSB - added use directions for nuts
1999-353	12/21	I	hexythiazox	Gowan Co	Hexygon	for non-bearing nut trees
1999-354	12/21	F	metalaxyl	Uniroyal	Quel	Fungicide for non-bearing chestnut
2000-16	01/28	I	azadirachtin	Amvac	Ecozin	3% EC Bot. Insecticide for chestnut
2000-18	01/31	H	Glyfos & Glyfos X-Tra	Cheminova		
2000-24	02/16	H	glyphosate	Micro Flow	Gly-Flo	
2000-32	02/16	P	BT kustaki	Cillus Tech	Prolong	Biological Larvicide & Targa Bio. L.
2000-34	02/17	H	glyphosate	Monsanto	Roundup	Ultra Dry Herbicide

* I = insecticide; F = fungicide; H = herbicide; P = pesticide

Classified Section



England's Orchard & Nursery

316 SR. 2004
McKee KY, 40447-9616

E-mail: nuttrees@prtcnet.org
On the web at: www.nuttrees.net

The following caveat appears on each PNN: "The information contained in this notification is not be used as a substitute for obtaining and reading pesticide labels. Information provided by the PNN is neither a recommendation nor an endorsement by either Washington State University or the Washington State Commission on Pesticide Registration".

Membership Application Western Chestnut Growers Assn., Inc.

New Member Renewal

Please print clearly:

Name(s) Date of application
 Business Name
 Address
 City State/Province
 Zip/Postal Code
 Phone () Fax ()
 Email: Website URL

Variety	# of Acres	# of Trees	Yr Planted	Current Production	lbs
_____	_____	_____	_____	_____	lbs
_____	_____	_____	_____	_____	lbs
_____	_____	_____	_____	_____	lbs
_____	_____	_____	_____	_____	lbs
_____	_____	_____	_____	_____	lbs
_____	_____	_____	_____	_____	lbs

Photocopy this form.

Send this form with your check for \$20.00 per person made payable to Western Chestnut Growers Assn., Inc. to John Schroeder, Secretary/Treasurer WCGA, 38002 NE 124th Ave., Amboy, WA 98601.