The Chestnut Grower

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A Perspective on Chestnut Handling and Peeling

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Source: Northern Nutgrowers Assocation (NNGA) 94th Annual Report – 2003. **To view tables, see insert page.**

Introduction

A key factor in developing chestnut markets beyond fresh market and seasonal sales is the ability to shell or peel the chestnut. A peeled chestnut provides convenience as well as opportunity for value-added products, and thus expanded markets and utilization. Several "home remedy" techniques exist to peel chestnuts as well as some large-scale commercial systems that have a presence in Europe. Regardless of the technique for peeling, several variables exist that influence the ability to remove the peel and also which influence the peeled product quality.

In the peeling process, the goal may be to maximize the percentage of whole nuts, maximize percent recovery, or meet a certain quality status with the chestnuts. There generally is a trade-off in maximizing one of these goals as, for example, maximizing the percentage of peeled nuts may come at the expense of the percentage of whole nuts. Maximizing or optimization is accomplished through the flow rates, temperatures, and aggressiveness of the components on the line and/or through post harvest handling of the chestnuts.

The objective of this study, which is part of a broader study to develop a chestnut industry following a market-driven approach in contrast to one that is more traditional and production-driven, was to evaluate chestnut and peeler variables which impact peeling efficiency and effectiveness.

Materials and Methods

A commercial-level peeling system (Boema; Neive, Italy) was acquired as part of the overall chestnut market development project and the industry development objective **(Fig. 1, page 5)**. The peeling system, which is a continuous operation on this line, is based on a combination of a high temperature oven (brulage) and a high temperature water bath/process. The chestnuts are metered into the oven; conveyed through the oven (lp gas blast heated) within a screw auger cage to make the peel brittle; passed into a tangential cleaner containing rubber-ended paddles moving against steel rods which aggressively breaks away the peel and all or part of the pellicle; conveyed to a parboiler which is a closed screw conveyor one-half filled with water and heated with steam to 70–80˚C (~158–176˚F) to loosen any remaining shell or pellicle; then finally moved onto a skin separator which removes loose pellicle and shell with counter-rotating pairs of rollers as well as does a cleaning rinse. The feed rates, temperature, and residence time in each component can be varied.

The effects vary by component of the line as to how the final product is impacted by varying operating conditions. Increasing the residence time and overall heating of the **(cont. pg. 5)**

In this issue:

Chestnut growers expand horizons

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By: John Schmitz
Freelance Writer

New Chestnut Growers of America logo.

The Western Chestnut Growers Association announced recently that it has changed its name to the Chestnut Growers of America.

With the modification comes a change of scope aimed at not only promoting the crop to consumers around the country but recruiting new growers as well.

"The purpose of changing the name is really to be more inclusive and hopefully we'll get the organization to grow **(cont. pg 3)**

A Message from the President

CGA President
Hill Craddock,
Associate professor
Univ. of Tennessee
Dept. of biological and
Environmental sciences

Greetings from the President!

I like chestnuts. And I like to eat chestnuts.

In our family, we eat them lots of different ways. Paola likes the traditional Italian caldarroste. Emilio prefers them as a soup (his favorite chestnut soup recipe is in "The Joy of Cooking.") I eat them boiled. Tonight I fixed chestnuts in a spicy fish curry with coriander and coconut milk. Some friends of ours, Anita and Kate and Ben, had harvested the chestnuts locally and gave them to me as a gift. They were the first ripe chestnuts I've seen this season and they were really tasty. I look forward to preparing and tasting many more chestnuts in the coming few months. Some will be picked locally and others will have journeyed around the globe to get to my table.

I am flattered and humbled by my election to the office of President of the Chestnut Growers of America. Chestnuts can be, and should be, a part of a healthy diet and a healthy agriculture. As chestnut growers in the United States, we face challenges unique to our crop, but that we share with chestnut growers worldwide. Problems of cultivar choice, propagation, disease and pest control, harvest, handling, storage, and marketing are issues that we face together. Chestnut trees are being planted, all over the world, in the places that chestnuts have been grown traditionally, and in the places where chestnut growing has been only recently introduced.

Advances in plant breeding and molecular biology promise us blight-resistant and phytophthora-resistant chestnut trees. New (and newly rediscovered) knowledge about the ecological benefits of tree crops makes the chestnut more important now than ever before. Exciting new marketing opportunities are opening up to chestnut growers around the globe that allow farmers and consumers alike to benefit from locally grown and locally processed chestnuts. Our organization is the fulcrum for the lever of change in North American chestnut growing, and I am excited to be a part of it.

Hill

Chestnut growers expand horizons (cont. from page 1)

and generate some funds to put together a chestnut marketing effort," said Sherwood, Ore., grower Ben Bole.

WCGA was founded in the mid-1990s. The group was originally formed so that growers in Oregon and Washington could exchange information. "It started out pretty low key," Bole said.

Since that time additional farms have come into existence in the Pacific Northwest, and most have done well in moving their small crops. But it has taken a lot of individual effort.

"The crop keeps growing, and everybody is able to sell their product," said Bole, who is one of the larger growers in the country with 25 acres of certified organic Colossals at various ages. He planted his first trees in 1992, and last year he harvested 12,000 pounds.

There are several challenges facing the national association.

For starters, it's estimated that less than 1,000 acres of commercial chestnuts are being grown in the United States by only about 85 association members, most of those very small growers.

With dues only $25 for singles and $35 for couples, not much of a promotional campaign can be launched, even in the smallest of cities.

"There aren't enough chestnuts being grown to make a nationwide push," Bole said, adding that the object now is to get everybody working on a small scale in their own markets and making it a unified effort.

Another challenge is that – should by some miracle chestnut demand increase significantly – there probably would not be enough producers to satisfy it.

Subsequently, increased production is going to have to come first, and that will take several years. What's more, during the ramp up, prices would be soft as production will temporarily exceed demand.

One disadvantage chestnuts have when it comes to marketing in this country is that few Americans are familiar with the nut. To date, the majority of consumers come from Asian and Italian backgrounds, and some of that demand has been on the wane.

Bole said the new national association has discussed hiring a grant writer to help obtain funds from public and private sources. But members nixed that idea since all of the production is already pretty much sold out every year.

"The consensus was that if you don't have the supply there's no sense to try to push the demand," said Ray Young, a grower in Ridgefield, Wash.

Young, a retired Southern California schoolteacher who planted 10 acres of Colossals – about 650 trees – in 1999, said he would like to see more large growers enter the chestnut industry and join the association.

"Most of the members are pretty small potatoes, one and two and five acres. And also a lot of them are not in it for the profit, unfortunately. Membership is open basically to anyone interested in chestnuts. You don't have to be an established grower."

Young sells most of his crop, fresh and dried, online and on the farm. He has been getting $4.50 to $5.50 a pound retail, depending on size. He wholesales 50-pound bags for $3.50 a pound.

About 60 percent of Bole's crop is sold fresh to markets and restaurants in Portland. The remainder is sold fresh and dried off the farm and on the Internet.

Young and Bole have also teamed up to make chestnut flour, which is made with Young's mill.

Since chestnuts are a small, niche crop with few middlemen, new growers will have to go out and find their own markets, Young said. But this gives them the advantage of setting their own price in many cases, he said.

"If you're willing to put in the work, and willing to get out and sell them, it's a profitable crop," he said.

The association name change took place during a recent meeting in Tualatin, Ore. Growers from as far away as Kansas and Missouri attended.

The primary chestnut variety growing on the West Coast is Colossal, which was developed and is grafted in California. Young said that in addition to limited demand in the U.S., chestnut growers here face stiff competition from China and, less so, Korea. "They (China) have hundreds and hundreds of thousands of trees. And they can ship in cheaper than we can produce."

Chinese and Korean quality is "spotty," though, he said.

The biggest pest Northwest chestnut growers have to contend with is the tiny shothole borer, which bores into the bark of the tree. "But there are lots of places in the country where it's unheard of," Young said.

Young said he paid $5,300 an acre to establish his orchard, exclusive of land cost. More information on chestnuts is available at **wcga.net** or **chestnutsonline.com/.**

Nutgrowing Book Now Available: "A Guide to Nut Tree Culture in North America, Vol. 1"

Published by the Northern Nutgrowers Association (NNGA), more than 18 experts offer advice and information ***o***n nut tree growing for pecan, walnut, hickory, hazelnut, pine nuts, beech nuts and chestnuts in this book. Price is $65/copy for NNGA non-members; $45 for members plus postage of $5 to a US address. Discounts available for multiple copies.

Book can be ordered online at **www.nutgrowing.org**. Contact Nancy Pettit at **chestnutsunltd@email.msn.com** for quantity orders.

Annual Meeting of the Western Chestnut Growers

Contributed by: Ben and Sandy Bole; **Photos:** Harvey Correia

On July 9th, the annual meeting attendees met at the Sweetbrier Inn in Tualatin, Oregon, to assemble for the trip to Woodburn Fertilizer Company in Woodburn, Oregon. Woodburn Fertilizer Company, a division of Wilbur-Ellis, is a major supplier of custom blended fertilizer mixes for the widely varied agricultural enterprises in the Willamette Valley and the surrounding area. Andy Burlingham led the group on a very informative tour of the extensive storage and blending facility. Woodburn Fertilizer is also a receiving station for the many varieties of grass seed that are grown in the Willamette Valley. Grass seed cleaning, blending and storing is a significant part of their business

Our next stop was Ayers Creek Farm in Gaston, Oregon. Ayers Creek Farm is owned by Carol and Anthony Boutard. The operation is totally organic and they specialize in fruits, vegetables and grains grown in smaller quantities and sold through local farmer's markets. The varieties that they grow are chosen for their flavor, nutritional value and adaptability to the soil and climate of Ayers Creek Farm. There also is a young chestnut orchard primarily planted to French varieties. The Boutard's approach to the organic production of food crops is very enlightening.

Anthony Boutard (check directory for spelling) explaining the organic products he uses in his diversified operation that includes a young chestnut planting.

Lunch and the annual meeting were at Magness Tree Farm in Sherwood, Oregon. Magness Tree Farm is owned by the World Forestry Center in Portland. It is an educational facility designed to promote sustainable forestry practices. The most significant item on the agenda for the annual meeting was the approval by the membership of the name change to "Chestnut Growers of America".

After the business meeting, Heather Samm of the Food Alliance gave a presentation on how the Food Alliance works to promote sustainable agriculture through producer certification and coordination of the marketing of Food Alliance certified products to Food Alliance Distributor Partners and Food Alliance Food Service Partners nationwide. Jeff Olsen of the Oregon State University Extension Service led an open forum for the discussion of various chestnut growing questions, ranging from pruning and grafting to nutrients and shot hole borer.

Nearby Ladd Hill Orchards was the final stop of the day. After a tour of the orchard and the fresh chestnut processing line, the group checked out the processing line for shelling dried chestnuts and the state certified processing room that is required when a food product is produced for sale. After the shell has been removed from a chestnut, it is then considered a food product and must then be handled in a state approved food processing facility for processing and packaging. Dinner followed under the trees at Sandy and Ben Bole's home.

Ben Bole explaining the operation of his mower (mows in the tree row).

On Sunday morning we traveled to Carolyn and Ray Young's Allen Creek Farm in Ridgefield, WA. The Youngs also have a state approved food processing facility in which they grind chestnut flour and make their wide variety of added value chestnut products. The new barn that will house their chestnut drier had recently been erected.

Carolyn Young discusses their value-added products. Stone mill for processing chestnut flour in background.

After lunch in Hood River, Oregon, the wind surfing center of the United States, we visited Kim and Mark Beam at Nutquacker Farm. The Beams purchased a Savage Harvester in 2004. It can be pulled by their Gator and it was of great interest to the group. The Beams are included on an orchard driving tour through the Hood River Valley, and they sell a great deal of their production from the farm. We concluded the tour and the meeting weekend with a visit to Dan and Lynn Roberge's young chestnut orchard on a hill overlooking the Hood River Valley. This will be an organic orchard when it comes into production in a year or so.

Chestnut Handling and Peeling (cont. from page 1)

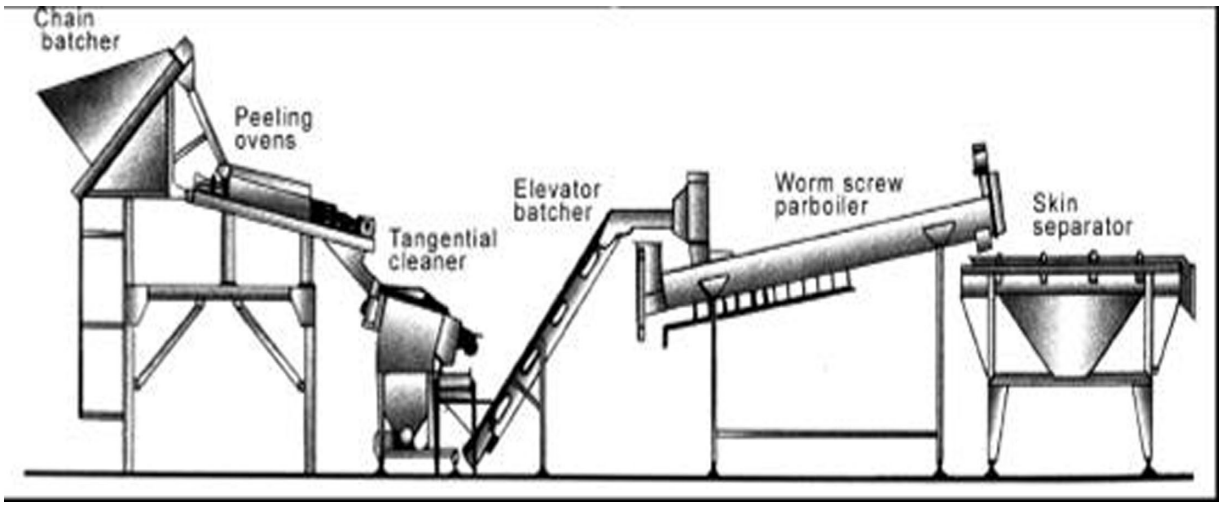

FIGURE 1. Schematic of integrated components of brulage chestnut peeling line.

chestnut in the brulage oven will generally increase the brittleness of the outer shell which can aid peel removal, however, over-exposure to the intense heat can itself pop off the shell and thus burning of the actual meat of the chestnut can occur. With the tangential cleaner, it is possible to vary the speed of the rotating paddles. Increasing the speed relates to a more aggressive action which can increase peel removal, however, increased aggressiveness can also lead to more breaking of the chestnut from wholes to pieces of varying size. Increasing the residence time in the hot water bath and/or increasing the temperature of the water generally has the impact of increased loosening of any remaining shell or pellicle left on the chestnut following the initial brulage operation. However, increase in heat exposure can begin to change the characteristic of the final product, which may or may not be desirable. Adjustments on the final skin separation component are primarily made for throughput and chestnut size purposes.

From initial runs with the peeler, it became apparent that several chestnut conditions or variables also influence peeling. These conditions include: variety of chestnut; production environment/conditions; maturity of chestnut; moisture and temperature management after harvest; and temperature of chestnut entering peeler. The importance of these conditions became readily apparent as initial runs of chestnuts, which varied in cultivar, maturity, and handling, yielded a very broad range of peeling results under similar peeling line operational settings.

First year studies (2002) were established and designed to gain an understanding of the operation of the line and make an initial comparison of the peeling of Chinese chestnuts and the widely planted European x Japanese cultivar 'Colossal'. Input variables were cultivar or variety of chestnut and drying time prior to peeling. The chestnuts were dried at zero, one, two, and three hour durations in a drying oven the day before peeling. Drying was also accomplished for some experiments using a drying oven immediately before peeling and, in a third scenario, by removing the chestnuts from the cooler and subjecting them to ambient temperature drying five days prior to peeling. Outputs measurements were weight loss during peeling and percent of fully peeled (clean) final product. Three runs/replications of each cultivar and condition were conducted with approximately 10 pounds initial starting weight.

Second year studies (2003) were conducted with the primary focus on cultivar comparison. With peeled chestnuts as a potential for expanding utilization, adding peeling effectiveness and peeling yield into the varietal selection equation is important. Conditions on the line were held constant. Twenty-two cultivars were obtained from Missouri. Each sample was weighed to approximately a five-pound sample. Each sample was input to the peeler and the peeler was purged between samples. Outputs measured were percent of product recovered, percent completely (cleanly) peeled, and percentages of whole chestnuts and pieces.

Results and Discussion

The study in the first year was challenged with minimal control of the chestnut samples. The Chinese chestnuts were from a mixture of various production sites and the 'Colossal' samples were from various sites (including the West Coast), various harvest dates, and had been subjected to varying handling. Results of the studies showed some trends across all experiments. The greater the extent of drying obviously resulted in greater weight loss prior to peeling. The weights of total material recovered after peeling did not show dramatic differences between samples, however, samples dried longer had a slightly lower yield. The results indicated the drier samples yielded a greater percentage of clean-peeled product. The improved peeling of the drier chestnuts helps to explain the above observation of lower total yield from the drier samples. The final product of the less dried samples contained more moisture-soaked peel and pellicle remains, which would account for increased yield (albeit undesirable material).

Drying of the nuts by whatever means likely has at least two actions that affect the peeling. Removing moisture from the peel would enhance the action of the brulage oven in making the peel more brittle. Additionally, drying the whole chestnut results in the meat of the chestnut shrinking away slightly from the pellicle, thus somewhat naturally beginning the separation process.

Comparison of peeling of cultivars in this first year of preliminary testing showed a broad range of peeling efficiency due in part to some variability of settings on the processing line, but likely much more in part from preprocessing history and handling of the chestnuts. The Chinese-based cultivars showed a higher and narrower range of peeling efficiency than 'Colossal' **(See Table 1, insert).** The cultivar 'Colossal' has a characteristic of much greater variegation than does the **(cont. pg. 9)**

Exploring the Australian Chestnut Industry … a brief look at what's going on

By: Carolyn Young
email: Carolyn@ChestnutsOnLine.com

Freezing winter weather and the Northwest's winter blahs were great motivation to escape for a few weeks to Australia in March where we could walk into summer. When I edited The Western Chestnut I had set up an exchange with Jennifer Wilkinson, Editor of The Australian Nutgrower, and Ray and I were continually impressed with what we saw going on in the Australian chestnut industry. It appeared they were light years ahead of the U.S. and we wanted to see for ourselves. So it was off to Melbourne.

Australia has an estimated 340 growers

Current production in Australia is estimated at 2,400,000 pounds a year, or less than 8,000 pounds per orchard. About 70-80% of the chestnuts grown in the country are produced in Victoria's northeast, in the Ovens Valley and surrounding areas. It's an area smaller than Oregon's Willamette Valley with an estimated 70,000 chestnut trees. The remaining orchards are in Western Australia, South Australia, New South Wales, Queensland and Tasmania. It's estimated that there are about 340 growers currently but that may decline to about 300 within 5 years. The larger growers expressed concern over some of the newer orchards and what they would do to the market. Like the U.S., they have hobby growers and commercial growers, and many of the hobbyists, not depending on their crop as a source of income, sell at low prices undercutting the others.

Left: Jane Casey demonstrates making her chestnut soup at a Myrtleford community wine festival. **Below:** Alf Pizzini's harvester has seen many years of use.

Nearly all growers belong to Chestnut Growers of Australia

We met no growers who were not associated with their national growers association and assumed that nearly all did. They pay an annual levy based on production, which helps to fund their marketing materials and research. There appeared to be generous governmental subsidies for some of these projects. Another form of government support they enjoy is the prohibition of foreign nuts in the country. Australia is interested in supporting its agricultural base.

The five growers with whom we visited represented as diverse a group of growers as you could find anywhere. The first orchard was a serendipitous find. We had booked an apartment via email in the town of Bright in the Ovens Valley, and explained that we would be in the area to visit chestnut growers. James Nicholson, the owner, replied that his father-in-law had a chestnut orchard and asked if we might like to visit. With a host like this we knew the accommodations would be wonderful. And they were.

From tobacco to chestnuts

The day after we arrived James took us to Eurobin to visit his in-laws' orchard. Alf Pizzini and his wife Marie have an orchard of 2500 trees on 250 acres where they also run cattle. Alf originally came to Australia from Italy in the '50's to share crop tobacco. He earned enough in a year to buy a house and convinced his 2 brothers to come as well. Eventually he bought land and planted tobacco, which he said was extremely profitable until the government established production limits for all growers. One of his brothers turned to wine grapes and became famous for the Pizzini wines that are marketed today. Alf turned to chestnuts.

The Pizzini's orchard was planted between about 1965 and 1975. They grow only De Coppi Marone. Irrigation is accomplished with the use of two large ponds. He irrigates 3" at a time.

Harvesting is almost all done by hand, though an old Tonutti harvester has been modified with a huller that is sometimes used. Once the nuts are harvested they are washed and sorted and then stored in a 30' x 30' refrigerator at –3.75 deg. C. All nuts are sold through a broker who gets a 10-15% commission.

The marketing specialists at work

Our second visit was just down the road to the orchard of Brian and Jane Casey (www.cheznuts.com.au). The Casey's orchard sits on 10 acres and the oldest trees are about 10 years old. They've top-worked quite a number of them in the last year or so. They have De Coppi Marone, Bouche de Betizac, Layeroka, Purdons Pride and Colossal cultivars. The orchard is not fertilized, potassium is not added, and it is not irrigated. They have had a few problems with phytophthora and Brian pointed out a tree that is being treated successfully with Phospot 400, an Australian product containing 400 g/l phosphonic acid. It is injected into the base of the tree.

When we arrived home I contacted the manufacturer who told me that it is registered for only a small number of crops in Australia but there are temporary permits issued for crops not on the listed label. He said there is significant anecdotal evidence of **(next)**

fantastic results achieved by growers who have used the product on crops for which it is unregistered. It is registered for use on avocados and pineapples among others. It may be similar to Aliette, a fungicide that is marketed in the U.S.

The Casey's emphasis is on marketing and value-added products and they appear to be doing a superb job. They buy nuts from small growers in the area and have built a very successful business. Some of their nuts are sent to China to be peeled, packaged and frozen, and then sent on to a buyer in Japan. Some of the frozen nuts come back to Australia for sale to grocery outlets and high-end restaurants. The quality of the product was outstanding.

With the help of a grant they acquired a roaster, which is used to produce frozen roasted chestnuts. The nuts are packaged in 5 kg boxes and frozen at 18 deg C. Their "chestnut factory" is in a commercial building in downtown Myrtleford. They hire 5 or 6 women seasonally to score the nuts and tend to the roaster.

Jane participates in any festival that she can and while we were in Myrtleford some time after the visit to their orchard, ran into her at a wine festival where she and two other "nut ladies" were doing cooking demonstrations of their nuts. Her demonstration was for a marvelous chestnut soup the recipe for which was developed by a local restaurant. In addition to their fresh and frozen products they import chestnut flour from Italy and chestnut beer from Corsica.

Aha!

Orchard number 3 was an "Aha!" type visit. We were on our way from Adelaide back to the Ovens Valley to visit Joe and Mary Renaudo's orchard – a matter of scheduling rather than lack of efficiency on our part – and planned to attend a dog show west of Melbourne the day prior. Most of you know that we've been breeding basset hounds for over 25 years and you can't pass up a dog show or the opportunity to meet breeders. We were traveling along the Great Ocean Road and had originally planned on following it all the way to Melbourne and then going west to the show site. Then, looking at the time, we decided it would make more sense to find some road through the hills that would get us there more quickly. And so we did. After a short time we noticed a chestnut orchard off to the side and drove into the property looking for the owner.

What we found was a miniature Greek Orthodox Church, but no house, so we left. A bit further along the road there was a barn and we drove into the property to see if anyone knew anything about the trees. It was there that we met a gentleman who had come to Australia from Greece some years earlier. We noticed that the burs on the trees appeared to be quite small and asked him about it. He said that instead of fertilizing the trees he goes to the church and prays for them. When he had come to the area there was no Greek Orthodox Church within miles, so he built his own, small as it is. He has harvested in years passed but will sharecrop with a neighbor this year who is willing to prune, clean up and manage the orchard.

A restaurant with no chestnuts

A few days later and back in the Ovens Valley, we spotted another chestnut orchard. There was no sign of a house in the area but there was a combination café and fruit and vegetable market. As it turned out, the owner of the café owned the orchard. He had no idea what cultivars he had and did not fertilize nor irrigate. The café had originally been a tobacco shed and he bought the property for the structure. The trees had been planted prior to his purchase. He sells them in his market but doesn't cook with them in the café. Like most orchards everything is hand harvested.

Highgrove highlight

Our last visit was to the Highgrove orchard of Joe and Mary Renaudo (www.higrove.com.au). It sits at an elevation of 800 m (2500') in Beechworth. Joe is the Export Director for Premium Chestnuts Australia, a co-op of seven growers. The Renaudo's orchard of 70 acres was planted beginning in 1979 and includes Purdon's Pride, Red Spanish, De Coppi Marone and another cultivar whose patent is owned by the co-op, Perfection. The Renaudo's are excited about Perfection. In its third year it appears to be a prolific producer of nuts that are very easy to peel. Until this year all harvesting has been done by hand and involves 28-30 pickers, but like the U.S., it's becoming more and more difficult to hire labor even though they pay $0.70/kg AUD or about $0.53 U.S. That sounds high but the pickers hull the nuts in the orchard and discard the bad ones, so in effect, they're performing much of the quality work that would otherwise be done on a processing line if mechanical means were used.

Because of their concern over labor availability, the Renaudo's imported a new Tonutti harvester, which they were having modified and expected to be ready for their March/April harvest.

There are advantages to using dual sorters. It allows the Renaudos to process about 2000 pounds an hour. With a large orchard and the cost of labor that's seen as very important.

Excellent system design

The orchard and processing line are an excellent example of good system design. This orchard didn't just evolve – it was well planned and well laid out with a good business plan behind it. Of course it helped that Joe's brother, Peter Renaudo, builds **(next)**

Australian Chestnut Industry (cont. from page 4)

nut-processing equipment – but that's another story.

It was originally laid out with the trees at 60' intervals, but they have interplanted since then. Irrigation is accomplished using aboveground drip every 24-36" down each row. The system delivers 3.8 l/hr. They have limited well capacity and this quantity is manageable.

The processing line is a work of art. It begins with a tote tipper operated easily by hand that dumps the nuts into a washer. Floaters are automatically swept off and the good nuts go up a tube using the venturi principle to a series of brush rollers for purposes of drying. From there they are conveyed to what I'd call a "bumpy" roller conveyor. It's a series of knobby rubber-covered rollers that tumble the nuts as they traverse it allowing an inspector to easily identify and discard any bad nuts. Next come the dual sorters, which can handle 1 ton per hour, sorting the nuts into 7 distinct sizes. Beneath the sorters are bins that hold the nuts until they are ready to be bagged. When that time comes a bin is opened and nuts fall onto a conveyor that takes them to the boxer/bagger station where bags or boxes are filled automatically. From there they go to the refrigerator where they are stored at –3 deg. C.

Premium chestnuts australia

Nuts are sold both domestically and internationally through the co-op, which has developed marketing materials for consumers. Like the U.S., one of the bigger problems they face is a marketplace where people don't know what a chestnut is. Many of their customers tend to be those whose cultural background has familiarity with the product. To increase sales they sell peeled, frozen chestnuts and frozen roasted chestnuts which are all processed on site under the name "Ready Chestnuts".

Nut processing equipment

Peter Renaudo, Joe's brother, is a mechanical engineer who designs and manufactures nut-processing equipment. His business, Mechanism, in Myrtleford, is thriving. We were impressed with his varied approaches. Typically you see someone look at a problem and come up with one solution. Renaudo may come up with several, all with different approaches. The quality of his work is outstanding. Take a look for yourself at his website, www.mechanism.com.au.

In spite of the 15 hour flight, we'd go back in a second. Beautiful country, gracious people, good bassets and lots of chestnuts! What more is there in life?

Left: Chestnuts in a Greek churchyard.

Owl Creek Ranch Asssumes New Ownership

People who know how to interpret jungle drums may know that this fall, Owl Creek Ranch will have new owners.

Polo Ramos, Foreman and master grafter, will continue the operation in partnership with Martellas, longtime friends and walnut processors.

All through this summer the new team has already tended this year's crops of walnuts and chestnuts. It is a sobering experience to see how well things are going without my constant input!

Let me take this opportunity to summarize my Owl Creek Ranch story:

Almost 20 years ago the vision of an orchard began to replace my mental picture of beef cattle grazing the dry, golden hills and some irrigated pastures I was going to develop. This was the plan when the land was bought here on the eastern side of the California Central Valley in 1983.

It is good to remind myself that at the time the work of nurses and midwives had evolved a lot, not all to the better. Now I was looking forward to be self- employed. Taking care of critters, cows, horses, even trees, is actually not far from nursing. So I embarked on this Owl Creek Ranch project, for my own satisfaction and… as a challenge.

It turned out that there was plenty of groundwater. The cost to pump the water to irrigate pasture was too high, compared to the low prices obtained for beef cattle. Only if you inherited the land could you hope to make a sufficient income. Tree crops like almonds, walnuts or peaches penciled out more favorably. The soils could be broken up and mixed, using a 9-foot shank pulled by a gigantic D-10 tractor. Over a period of 6 years 4 100-acre orchards were started with California Black Walnuts planted in situ and later grafted or budded to English cultivars.

By 1998 some chestnut trees I had planted experimentally into my worst, but well draining soil, convinced me to take the plunge and diversify. 85 acres, 9000 trees, were planted, using bags of Italian chestnuts from the wholesale produce market. Over time all the seedlings were grafted; finding and producing scion wood being the limiting factor.

Now the trees are very much getting into production. Harvesting, de-burring, sorting, storage are still being perfected while more dependable buyers need to be found, coddled and screened.

It is good to stand back and see where we got and to speculate how the enterprise might develop. I am welcome to help with the marketing and possible processing of the chestnuts and imagine staying involved with "my babies" for as long as it remains a joy. Of course study trips to chestnut growing countries will continue to be mandatory and, thank God, there are many such countries!

AU REVOIR, MES AMIS !

– Lucienne Grunder

Chestnut handling and peeling (cont. from page 5)

Chinese cultivars. This tends to add difficulty to the removal of the pellicle. Additionally, 'Colossal' had a slightly greater percentage yield of total product but this could be a factor of the greater chestnut meat-weight to peel-weight ratio because of the larger size of the 'Colossal' nut, and/or the added weight due to more peel and pellicle in the final 'Colossal' peeled product.

One additional observation of the first year showed an approximate one-third loss of weight from tree to finished peeled product for Chinese chestnuts. In other words, moisture losses following harvest, removal of peel, plus any other losses during peeling, such as small unrecovered broken pieces, resulted in a final yield of approximately 67 percent of harvest weight.

As noted, the 2003 second season of peeling focused on a comparison of 22 cultivars. The amount of chestnut product recovered from the peeler is listed in **Table 2 (See insert)**. This would include any peeled or non-peeled chestnut. The loss would include shell, pellicle, and any chestnut or chestnut pieces that are lost in the machine. It appeared, during processing, that little chestnut material was lost with these cultivars so the real loss was due to the loss of shell and pellicle. There were some surprises here. For example, with the cultivar 'Qing', nearly 35 percent of the original weight was unaccounted for at the end of the machine indicating that considerable weight was tied up in its shell and pellicle. However, in comparison to 'Auburn Cropper' only 3.5 percent of the original starting material was lost. This could mean that most of 'Auburn Cropper' came out of the machine with it's peel attached. The results for these two varieties look to be outliers in the data and should be confirmed with further study. In general, for most cultivars, it appears that approximately 17 percent of the original weight is tied up in the shell and pellicle.

The chestnut material that came out of the peeler was separated into two piles. The first pile contained those totally peeled chestnuts 100 percent free of pellicle (no pellicle or any imbedded pellicle or any pellicle attached to the nut meat), and a second pile containing unpeeled chestnuts (chestnuts that did not peel or that contained any amount of attached pellicle to the nut meat regardless of how easy it was to remove). In Table 3, the weight of the totally peeled chestnuts based on the original weight into the machine is compared. For example, the cultivar 'Mossbarger' lost only 12 percent of its original weight as it came through the peeler (Table 2), however, less than half of the chestnut weight placed in the peeler gave rise to totally peeled chestnuts **(Table 3, See insert)** indicating that many of the chestnuts were not peeled. Peeled nuts representing the cultivar 'Qing' was 63 percent of the original weight, much better than 'Mossbarger' but worse than 'Auburn Cropper' where nearly 94 percent of the original weight was recovered in totally peeled chestnuts.

In **Table 4 (See insert)**, the percentage of chestnut that came through the peeler was compared as to totally peeled and those that were not totally peeled. Also shown is the amount of breaking (pieces vs. wholes) that occurred.

Of the chestnuts put into the peeler, six cultivars came out 100 percent peeled (Table 4). This is probably based on the genetics or physiology of the nuts as they went into the peeler. The cultivar 'Qing' also peeled well (97 percent peeled), but a considerable amount of shell and pellicle makes up the weight of this cultivar. Conversely, the cultivar 'Mossbarger' did not peel well with nearly half the chestnuts not peeling. The cultivars 'Willamette', 'Miller 72–105' and 'Miller 72–76' all peeled well, but 'Willamette' appeared to survive the conditions of the peeler in whole pieces better than the two Miller cultivars.

Summary

Many variables would go into the selection of a nut cultivar based on the expected market. For a chestnut directed at the peeled/processing market the final economic would be based on the amount of product into the peeler and the amount of peeled product out (Table 5). One hundred percent peeling is good, but not if a large percentage of chestnut original weight is lost to the peel. Additionally, production considerations such as tree health and harvest yields, as well as other considerations, must accompany selection criteria and data such as the peeling information presented in this study.

In summary, while the peeling studies to date have been limited and difficult to control, the findings show a strong dependence of cultivar and post-harvest temperature and moisture management on peeling efficiency of chestnuts.

Acknowledgments

We thank Michael Gold and Ken Hunt of the University of Missouri Center for Agroforestry, Columbia, for supplying the chestnut cultivars used in this study.

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Chestnut sabbatical to Italy gives Michigan State professor new inspiration: A travel log, part 3

Dennis Fulbright, professor of Plant Pathology, Michigan State University, shares his experiences in this chestnut-oriented culture in this final edition of the"travel log" article.

The other way they manage the chestnut forest on the hillside—and these two management schemes can be adjacent to each other—is to cultivate the wild trees into an orchard. Turning a chestnut forest into an orchard is done by controlling weeds, thinning the forest and eliminating competing trees. However, the most important act that the grower performs is grafting the forest trees to cultivars of C. *sativa*. These cultivars are from selections made many decades or even centuries ago. The most common cultivar is a type of "Marroni." In the Cimini Mountains the growers grafted their trees to 'Marroni Fiorentina' and in another location they might graft 'Marroni de Acquasanta'. There are hundreds of Marroni selections and it would be hard for most of us to tell the wild chestnut from the cultivars, but these growers, and presumably the buyers, not only can tell the wild from the Marroni, but can tell the Marroni selections apart. It has everything to do with shell color, embryo, taste, size, peelability, and sugar content. The most important quality is consistency. With the wild ungrafted forest germplasm, variability is the key; and with the grafted cultivars, consistency is the key. Ironically, as you walk through the orchards, they seem more like forests, with large old grafted chestnut trees towering overhead filtering out the direct rays of the sun; and the forests seem more like scrubby areas, depending on the last time the stems were harvested, with wild chestnut sprouts rocketing out of cut over stumps in hodge podge patterns resembling chaos.

The main problem I was to work on with Andrea was attempting to determine the cause for a chestnut forest decline in the Marche region of Italy. If you aren't aware, the regions are equivalent to our states and within the region are provinces, which would be more equivalent to our counties. The Marche Region is home to Gran Sasso National Park. This is a wild area in Italy where wolves, boar and deer still run free. Italians use the national parks for many reasons; many people still go to the national parks to collect mushrooms, truffles, hazelnuts and chestnuts. Tourism is based on these interests. In Gran Sasso National Park, a problem had become increasingly more acute each year for the past four years. Yes, Phytophthora root rot was in the area and taking its toll on the large trees in the forests. But something else was happening. The large trees, 3 to 4 feet in diameter, were beginning to slowly decline. Leaves would turn chlorotic and thin, fruit would not set and within a two to three years the trees may die.

Andrea and his research associate Dr. Anna Maria Vettraino, took me to the park and showed me the trees and the problem. The most interesting aspect of the problem is that the symptoms—leaves with chlorotic spots or blotches turning necrotic and with abnormal morphology such as two leaf tips, incomplete leaf margins, cupping and double venation—only appeared on leaves on the grafted portions of the trees. Once a tree is grafted, the rootstock usually does not send out stems or leaves. But in these large, old grafted forest trees, the rootstock is always sending up sprouts, or epicormic shoots break bud on the trunk. So, it is easy to find leaves of the rootstock even though the tree is grafted to a Marroni selection. So, here are these large older trees looking like two completely different trees. The leaves in the top of the tree may be in peril and the leaves near ground level appear fine and normal.

In one series of experiments, Andrea grafted healthy Marroni scion wood taken from another part of Italy to the trunks of some trees showing the problem and once the scion wood broke bud, the leaves showed symptoms. This is one of the reasons it is so important to follow germplasm import rules. For chestnut, that means at least three years of observation before release in the USA. Anyway, once you start looking around you begin to the see the problem on most of the grafted trees, both large and small, in the forest—as long as they were grafted.

Chestnut is synonymous with autumn in Italy, much like we might use pumpkins and leaves to symbolize fall. Marrons glacés, the sugar infused and glazed form of a chestnut appeared in all bakery windows in every town. The boxed form sold by Agrimontana and Motta (Nestles brand), could be found in most gas stations, gift shops and grocery stores. Without doubt, this had to be the number one form of chestnut marketed in Italy. Those restaurants that served chestnuts put them primarily into appetizers, soup, desserts, or mixed with mushrooms in a sauce. Some restaurants served roasted chestnuts after the meal, whether you ordered them or not.

Chestnut festivals and their signage were prominent in October and early November throughout the province of Viterbo, a showcase of the chestnuts, wine and all other traditional foods of the region. At night the chestnut roasting begins, and the fires start in the roasters as they fill rotating baskets over the fires with scored chestnuts. Another festival in the Cimini Moutains was held in Canepina and we ate our dinner in a cave. These are the famous caves where chestnuts are stored while they cure.

I had the opportunity, thanks to arrangements made by Andrea to tour three chestnut processing plants. One was near Turin in northern Italy and the other two were in Montella just east of Naples. The northern processor had just made a huge investment in a puree line. I asked him where he sold the puree and he told me worldwide. A candy maker from Turkey was visiting the day I was there and he was thinking about purchasing the Italian puree since he could not make a puree as good from the Turkish chestnuts. The reason? Not as sweet. The Italian chestnut from the Piedmont region was much sweeter than the puree made from Turkish chestnuts. The Turkish chestnuts required sugar to be added which caramelized in the pureeing process make a dark colored puree. The Italian chestnuts did not need to have sugar added, so the puree stayed much lighter in color. All of the processors were modern or in the process of modernizing, but could only make chestnut products that were acceptable to the traditions of the people. ***(Images in issue insert).***

TABLE 4. Percentage of chestnuts at output of peeler being peeled vs not.

Cultivar	% With Pellicle	% Totally Peeled	% Totally peeled-Pieces	% Totally peeled-Whole
Amy	14	86	48	37
Auburn Cropper	3	97	33	65
Auburn Homestead	24	76	54	22
Auburn Leader	0	100	91	9
Crane	6	94	73	20
Douglas #1A	4	96	25	71
Eaton	18	82	55	27
Ford's Tall	3	97	32	66
Gideon	2	98	81	18
Jersey Gem	0	100	62	38
Layroca	8	92	21	71
Lindstrom 43	4	96	80	16
Lindstrom 93	4	97	68	29
Luvall's Monster	0	100	46	54
Miller 72-105	0	100	89	11
Miller 72-76	6	94	45	49
Mossbarger	48	52	24	28
Orrin	0	100	23	77
Qing	3	97	61	36
Simpson	6	94	18	76
Sleeping Giant	0	100	34	66
Willamette	1	99	18	82

Chestnuts in the Press

- ***The Temperate Agroforester***, an online newsletter produced by the Association for Temperate Agroforestry (AFTA), available at www.aftaweb.org, featured *"The Chestnut Marketplace: A "New" Agroforestry Crop for Midwestern Producers"* in Vol. 13 No. 3 - July 2005. Article briefly highlights the nationwide chestnut market research efforts and outreach initiatives of the University of Missouri Center for Agroforestry.
- ***The Practical Farmer:*** the newsletter of The Practical Farmers of Iowa (PFI), a non-profit organization to research, develop and promote profitable, ecologically sound and community-enhancing approaches to agriculture, included Tom Wahl, CGA member from Wapello, Iowa, in the last section of the article titled: *"Taste of Place: Iowa's Food Culture and Heritage."* Go to www.practicalfarmers.org and select the News link.
- ***Associated Press:*** Article titled *"MSU research farm focuses on chestnut"* distributed July 22, 2005. Highlights chestnut equipment and research conducted in Jackson County, Mich., by Michigan State University. Email mccoyr@missouri.edu for article copy.
- ***Rural Missouri:*** A Missouri-based magazine reaching 500,000 readers featured "*The Un-Nut*," an article about the Midwestern chestnut industry and chestnut research work at the University of Missouri Center for Agroforestry. Available online at www.ruralmissouri.org/rmfeatures.html
- ***HortTechnology:*** University of Missouri Center for Agroforestry researchers published the article "Update on consumer's preferences for chestnuts." HortTechnology 2005. 15(4):904-906. (Authors: Gold, M.A., M.M. Cernusca and L.D. Godsey.)
- Jane and Brian Casey, CGA members from Australia, are producing a new email newsletter called "***Cheznuts News."*** Visit the Caseys' home page at www.cheznuts.com.au to subscribe to the newsletter. You will receive an email, then click on the link to formally subscribe.

From the Travel Log, Italian Sabbatical, p. 12: Left: Chestnuts appear everywhere during fall in Italy, even alongside cellular phones at this in-store display window. **Right:** Nighttime roasting during a chestnut festival in the Cimini Mountains near Viterbo.

Tables to accompany "A Perspective on Chestnut Handling and Peeling," pages 5 and 9. See Table 4, back of page.

TABLE 1. Percentage of peeler output being cleanly peeled for Chinese and European-type chestnuts under different pre-peeling conditions.

Test Number	Variety	Range	Average
1	Chinese	81-86	84
2	Colossal	22-57	44
3	Colossal	20-80	54
4	Colossal	61-96	83

TABLE 2. Percent of product recovered after putting through peeler (includes peeled and unpeeled).

Cultivar	Wt. at Input	Wt. recovered	Output as a percent of input
Amy	5.05	4.19	83.0
Auburn Cropper	5.15	4.97	96.5
Auburn Homestead	5.55	4.37	78.7
Auburn Leader	5.05	4.17	82.6
Crane	3.35	2.59	77.3
Douglas #1A	4.60	3.87	84.1
Eaton	5.85	4.84	82.7
Ford's Tall	5.10	4.20	82.4
Gideon	3.55	2.98	83.9
Jersey Gem	4.25	3.50	82.4
Layroca	4.65	3.29	70.8
Lindstrom 43	5.45	4.42	81.1
Lindstrom 93	2.30	2.00	87.0
Luvall's Monster	5.70	4.76	83.5
Miller 72-105	5.60	4.65	83.0
Miller 72-76	5.05	4.29	85.0
Mossbarger	4.75	4.20	88.4
Orrin	4.25	3.43	80.7
Qing	5.00	3.26	65.2
Simpson	5.25	4.18	79.6
Sleeping Giant	5.60	4.36	77.9
Willamette	6.10	5.00	82.0

TABLE 3. Total amount of cleanly peeled chestnuts based on input.

Cultivar	Total Wt at Input	Total Wt Peeled	% of Total Peeled Of Input
Amy	5.05	3.59	71.09
Auburn Cropper	5.15	4.84	93.98
Au. Homestead	5.55	3.33	60.00
Auburn Leader	5.05	4.17	82.57
Crane	3.35	2.43	72.54
Douglas #1A	4.60	3.73	81.09
Eaton	5.85	3.97	67.86
Ford's Tall	5.10	4.09	80.20
Gideon	3.55	2.93	82.54
Jersey Gem	4.25	3.5	82.35
Layroca	4.65	3.02	64.95
Lindstrom 43	5.45	4.23	77.61
Lindstrom 93	2.30	1.93	83.91
Luvall's Monster	5.70	4.76	83.51
Miller 72-105	5.60	4.65	83.04
Miller 72-76	5.05	4.02	79.60
Mossbarger	4.75	2.18	45.89
Orrin	4.25	3.43	80.71
Qing	5.00	3.16	63.20
Simpson	5.25	3.93	74.86
Sleeping Giant	5.60	4.36	77.86
Willamette	6.10	4.96	81.31