

The WESTERN CHESTNUT

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\$4.9 Million CSREES Chestnut Research Grant is Possibility Growers Would Benefit Directly

by Dennis Fulbright, Ph.D.

A request for proposals was solicited by the United States Department of Agriculture Cooperative States Research, Education and Extension Service (CSREES). This is the branch of the USDA that supports, cooperatively with the states, the Agricultural Experiment Stations of land grant universities. The name of the grant program was "Initiative for Future Agriculture and Food Systems." This program was mandated to address critical and emerging agricultural issues related to (1) future food production, (2) environmental quality and natural resource management, or (3) farm income. The program has far reaching implications to all areas of agriculture including those areas associated with food safety and technology, genetics and biotechnology, human nutrition, new and alternative uses and production of agriculture commodities and products, natural resource management and precision agriculture, and farm efficiency and profitability, including the viability and competitiveness of small and medium sized dairy, livestock, crop and other commodity operations. Priority was to be given to projects that were multi-state, multi-institutional and multidisciplinary or projects that integrated agricultural research, extension and education.

See **\$4.9 Million**, p. 11

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Field Day at OSU Proves Educational for WCGA Members

Organized by members Chris Foster and Anthony Boutard, the June 17 Field Day at the Lewis-Brown Research Farm at OSU, was an experience that no member should have missed. If their purpose was to generate enthusiasm for the support of the chestnut plot and an interest in working with

ene gas at the site of the cut. This acts as an attractant to the beetle. It was also mentioned that the SHB can bring with it, ambrosia fungus, a difficult problem for trees to fight off.

Skookum was pointed out as a tree whose nut is of exceptionally good flavor. It



Anthony Boutard, left, and Christopher Foster, right, explain the advantages and disadvantages of each of the cultivars in the chestnut plot at OSU's Lewis-Brown Research Farm.

has some blight tolerance. The biggest negative seemed to be the brittle nature of the branches making it very susceptible to wind damage.

A Silverleaf was pointed out and it was mentioned that the nuts tend to split frequently.

Members were impressed by a Colossal tree planted in the original group in 1985. At 15 years of age the trunk appeared to be approximately 18 inches in diameter.

See **Field Day**, p. 12

some of the varieties contained there, then the day was definitely a success.

The chestnut plot was originally established by Hill Craddock with grant money in 1985. For the past two years it has been essentially abandoned, with no attention given to any of the trees, including watering. It was interesting to see how healthy some of the trees looked in spite of the lack of care. Chris was quick to point out that the farm lies on some of the finest soils in the Willamette Valley.

The Dunstan tree was full of shot hole borer and a comment was made that this variety does not do as well in the Northwest as it does in the Southeast United States. A Layeroka was observed to have similar SHB problems. Foster pointed out that early spring pruning may make any tree more susceptible to SHB due to the release of ethyl-



Chestnut planted in 1985 looks healthy in spite of the fact it has not been watered for the past two years.



Message from the President

It is now late spring or early summer and my farming operation is already behind. As of June 10, my chestnut trees have not bloomed but I anticipate bloom by the 15th. We have been cool this spring with few temperatures over 75°. I have seen my first case of Shot Hole Borer this year. It was present in some of the eight-year-old trees I transplanted two years ago. The trees were the larger of those we transplanted and probably suffered more from the transplant shock. I hope everyone applied their boron sprays as needed and fruit set

will be excellent.

If space permits, this newsletter will contain a short memo from Dr. Dennis Fulbright, Michigan State University, concerning a grant proposal for chestnut research. This is a fairly involved story, but in a nutshell, this will be a means of funding the chestnut plot at the Lewis-Brown Research Farm in Corvallis. The U.S. Congress authorized these grants two years ago, but did not allocate funding for them, which prompted a one-year hold on the grant program. These grants were automatically funded this year to the tune of \$113 million. The maximum grant is \$5 million and priority is given to multi-disciplinary, multi-state proposals. Bruce Smith with the budget department at Michigan State University is my counterpart in the upper Midwest. He was instrumental in writing the grant proposal for a total of \$4.9 million. It is good to know people in high places.

As indicated in Dr. Fulbright's memo, this would be a multi-state, multi-department project. The exciting part of this proposal is that grower groups like WCGA play an integral part in the planning of this program. Because the WCGA has members in WA, OR, ID and CA, we will have some impact on the approximately \$1 million, the west coast portion, that will be allocated to research in our area. At this time, UC Davis and Oregon State have been listed as part of this grant proposal. The grant proposal specifically asks for local grower participation and I have provided a letter on behalf of the WCGA in support of this grant. It will take a few months for these grants to be awarded, but the interest in chestnuts is good and we stand a good chance of seeing some funding. Keep your fingers crossed.

The chestnut grading committee is off to a slow start primarily due to my procrastination. We should be underway by the time this newsletter is received. Our goal has to be some type of suggested standards before this harvest season. I am finding many examples of grading standards for other fruits and nuts. Some are horribly complex and many are pretty basic. We need to start with the basics and then add to the list. I hope that we will have at least a rough draft prior to the next newsletter.

EDITOR'S NOTES

Michael Nave, a member from the Sacramento area, claims to be a hobbyist when it comes to chestnuts, but when you read his article about Colossals you'll find he is indeed, extremely knowledgeable about chestnuts in general. His article is thought-provoking, well-researched, a realistic approach. You'll enjoy this one for sure.

You'll be excited when you read the article on Durward Smith's thermal blast system which could open up the market for chestnuts by providing a relatively easy method of peeling. Imagine being able to go to the market and get a bag of chopped chestnuts from the freezer section. As a lazy cook, or one with time constraints, I'd certainly be more motivated to bake a chestnut cake. Sales could soar!

And if you're looking for something to do this weekend, Anthony Boutard's article about the French Chestnut museum might motivate you to blow the whole wad and take off for Europe.

Enjoy!

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EDITORIAL OPINION

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Scientist Offers Option for Peeling Produce

By Dan Hager

Durward Smith has developed a new way of removing skins from vegetables and fruits. He blasts them off.

Smith, who refers to his system as thermal blast processing, is a food scientist at the University of Nebraska -- Lincoln's Food Processing Center in the Institute of Agriculture and Natural Resources.

The system is virtually nondestructive to the produce and reduces the losses experienced in conventional methods such as abrasive peeling and caustic (lye) peeling, he said.

He said he believes that smaller operators developing new products and new markets could productively adopt thermal blasting.

Smith discussed his system at Michigan State University March 4, at a meeting of Michigan chestnut growers. The Michigan chestnut industry is about to take off and provide a sizeable domestic supply, said Dennis Fulbright MSU plant pathologist and educational adviser to the growers. The industry is looking for an efficient and inexpensive means of removing shells for value-added marketing of their product, he said.

Smith said his equipment can do the job -- it can even blast the shells off coconuts. It can also be fine-tuned to remove the thin outer coverings of fragile fruits and vegetables, he said.

He demonstrated his prototype thermal blaster through a video presentation and slides. "It's a cylinder enclosed in a furnace," he said.

The product to be peeled or shelled is placed within the cylinder. In the furnace the air is heated and regulated to an optimal pressure. When the cylinder is opened, instantaneous decompression occurs, and the contents are explosively expelled.

"It sounds a little like a cannon going off," Smith said. The skins or shells fly off in only a few large fragments, and the product is propelled into a cushioning water bath that protects it from damage.

The physics that makes the system work, he said, involves the thin layer of water that underlies a skin or shell.

"The superheated steam and/or the elevated pressure highly engages this film of water," he said. "When the pressure is reduced, the superheated water flashes to vapor, exploding off the skins."

Each type of produce has its own requirements for temperature and pressure, Smith said. He has conducted tests on a wide variety and had positive results. The penetrating power of the steam is negligible, so the process has a minor effect on the tissue of the produce directly beneath the skin, he said.

"With a sweet potato, thermal blasting takes the transparent paper-thin skin off with a very minimal loss of product," he said, citing a 97 percent to 98 percent yield, contrasted to the 80 percent with caustic peeling.

Smith has achieved 60 percent recovery with pimiento peppers vs. the typical 85 percent with lye.

The process works equally well with green or ripe tomatoes, he said.

It also peels cucumbers effectively, but Smith expects limited use both for that product and for potatoes, even though thermal blasting even blows out areas around potato eyes. "There are high-pressure peelers out of Germany that already do a good job, so there is no need for a substitute," he said.

He has also had success with fruits. He experienced 95 percent to 98 percent yield with peaches, whereas the lye process yields about 80 percent to 85 percent. He said thermal blasting even cleans out the corky areas of golden delicious apples. It peels off only a single thin layer on firm fruit but removes more layers from softer fruit, he said.

He noted that another advantage with apples is that blanching under the skin alters enzyme activity and retards browning after the flesh is exposed to the air.

Mangoes, navel oranges, grapefruit, kiwifruit, persimmons and avocados have all been tested successfully, he said.

Smith said he has been working on the technology since he was at Auburn University, Auburn, Ala., before his move to Nebraska 12 years ago. Auburn University holds the patent but did not aggressively pursue development of the system.

It filed a patent for continuous-process thermal blasting but did not protect it, he said, adding, "That technology is out there for anybody to use."

Smith has been talking about manufacturing a commercial-scale thermal blaster with an engineering firm.

He said he believes the model would only need to be about twice the size of his laboratory prototype for economic utility.

The time in the cylinder for such commodities as tomatoes, Smith said, is only four to five seconds.

He calculated a production rate in a commercial-size blaster, based on load times permitting two peeling cycles per minute, at 1,200 pounds per hour or nearly 10,000 pounds per eight-hour shift.

Several machines could be used at once to increase production, he said.

His prototype is suitable for a high-value crop such as chestnuts, he said. He estimated its shelling capacity at 300 pounds per hour or 2,400 pounds per shift.

See Peeling, p. 11

Some More Thoughts on the Colossal

by J. Michael Nave

Recently I wrote an article for the Northern Nut Growers Association in which I expressed some thoughts on the chestnut cultivar ‘Colossal’ (89th Annual Report of the NNGA, p. 83). I have been asked to update this article for the WCGA and have been happy to do so. Those of you who do not know me should be aware that I am not a commercial chestnut grower. I am a true hobbyist which means that not only do I not make any money from chestnuts, but they invariably cost me money.

I wrote the original article on ‘Colossal’ because I was surprised that ‘Colossal’ was being heavily promoted despite the fact that many of its promoters knew little about it and many were spreading misinformation. This follow up article serves to update my original article and continue to educate new growers about the ‘Colossal’ variety.

One of the most common claims made by the supposed experts is that ‘Colossal’ is blight resistant because of its alleged *Castanea mollissima* bloodline, but in reality there is no evidence that ‘Colossal’ has any Chinese bloodline. The claim that ‘Colossal’ has Chinese breeding is often made by individuals who have never even seen a Chinese chestnut tree. In fact, it is common for many west coast chestnut experts to refer to Japanese or Chinese trees simply as “Asian” or “Oriental” trees, because they are unfamiliar with the two species. Some of these alleged experts are also unaware that ‘Colossal’ pollinizers often produce no nuts. This is because they are unaware that ‘Colossal’ itself is pollen sterile.

Over the last ten years I have had the opportunity to observe and evaluate thousands of ‘Colossal’ trees and seedlings. I have read everything I can find about the tree and its origins (which is not a great deal). I have been to visit the original tree. I have also observed and evaluated thousands of other chestnut trees (and their nuts) throughout the United States, Europe, China and Japan. I have reached the point where I am not interested in eating a chestnut unless it peels easily and has better than average flavor. By giving it every possible benefit of the doubt, ‘Colossal’ just barely falls into this category, with nuts that have “iffy” peeling and only slightly better than average flavor.

HISTORY OF THE TREE

The original ‘Colossal’ tree and its pollinizer, since named ‘Nevada’, were planted in approximately 1888-1890 by Benjamin Tonella in Nevada City, California. The current owners of the property have pictures of the trees from the 1920s and the trees were already very large at that time (Berkley). The most likely source for the trees was The Barren Hill Nursery of Felix Gillet, the French nurseryman who worked with many different nut trees. The original ‘Colossal’ tree is just a few miles from the site of the old nursery. Gillet imported some of the best French chestnut cultivars and also imported an assortment of Japanese chestnuts. Gillet’s life has been fairly well documented because he was a significant businessman in the annals

of Nevada County. Gillet died in 1908 and the nursery was bought by C. E. Parsons. Parsons introduced the ‘Colossal’ chestnut commercially in 1925.

PARENTAGE

The oft repeated assertion that ‘Colossal’ is a “complex hybrid” with Chinese (*Castanea mollissima*) breeding is simply incorrect. There is no evidence that ‘Colossal’ is a “complex” hybrid nor is there any evidence that it has any Chinese blood. It is probable that ‘Colossal’ was simply a seedling of one of Felix Gillet’s high quality French (*Castanea sativa*) cultivars, pollinized by a Japanese (*Castanea crenata*) tree. I’m not going to go into this point in detail in this article other than to say that there is no evidence that ‘Colossal’ has Chinese heritage nor that it is a complex hybrid along the lines of the Burbank or Etter hybrids. Those who are interested in this issue can read the longer explanation in my article in the NNGA Annual Report, but suffice to say that anyone who claims that ‘Colossal’ has Chinese heritage or that it is a complex hybrid bears the burden of proving those claims. This issue is of little importance to western chestnut growers, however, since the primary significance of the Chinese bloodline issue is its relationship to whether ‘Colossal’ is blight resistant. If ‘Colossal’ had any Chinese bloodline it would be more likely to be blight resistant.

THE ORIGINAL TREE TODAY

The original ‘Colossal’ tree is quite large. It is probably over 70 feet tall, with a spread of over 50 feet and a trunk circumference approaching 14 feet. The tree is still quite productive although in recent years it seems to have been in a slow decline for some unknown reason. This decline may have been due to simple neglect or lack of water, because after the long wet spring of 1998 the tree looked healthier than it has in years. On the other hand, this decline may also indicate a disease problem with ‘Colossal’, such as susceptibility to *Phytophthora* or to any of a multitude of other diseases that effect the *Fagaceae*. It also might indicate that ‘Colossal’ is simply a relatively short-lived tree. Eastern growers who try to escape the potential lack of cold hardiness and blight susceptibility inherent in some ‘Colossal’ rootstocks may be simply substituting a different set of problems if they plant ‘Colossal’ on its own roots. The point to be made, however, is simply that it is commercially risky to populate an orchard exclusively with a tree which has not been evaluated extensively and tested under a variety of conditions.

POLLINATION

California growers have persistent problems in fully pollinating their 'Colossal' trees. The problem is simple. 'Colossal' is receptive earlier than most pure European trees and later than most pure Japanese trees (and pure Japanese trees are relatively rare in California anyway). Since European trees predominate in California, it has proven difficult to find reliable pollinizers for Colossal. The tree which serves as pollinizer for the parent 'Colossal' tree has been named 'Nevada' and is now being widely promoted as a 'Colossal' pollinizer, but problems do exist with 'Nevada'.

'Nevada' tends to flower toward the latter half of 'Colossal's' receptive period, which means that the earlier 'Colossal' burs may not be fully pollinized. Even the later burs are often not fully pollinized which would suggest that 'Nevada' may not be an extremely fertile pollinizer. Assuming that a grower has planted some other pollinizer which has in turn pollinized 'Nevada' ('Colossal' is a-staminate and will not pollinize 'Nevada'), 'Nevada' produces medium size nuts that are not particularly sweet (although arguably with better flavor than 'Colossal') and often do not peel well. The primary advantage 'Nevada' has is that it ripens a few weeks later than 'Colossal' and thus the nuts are easier to store for the lucrative holiday season. 'Nevada' nuts are also a darker color than 'Colossal' and hold their appearance better as they age.

The cultivar 'Silverleaf' is also sometimes used as a 'Colossal' pollinizer in California. 'Silverleaf' is almost certainly a Japanese hybrid. Its origin is unclear but it was likely a seedling distributed by the Chico Plant Introduction Garden or one of numerous nurseries selling chestnut trees in California in the 1930s and 1940s. Although the predominant opinion seems to be that it is pure Japanese or a Japanese/European hybrid, it clearly is not pure Japanese. My personal opinion is that it is a *Castanea crenata* x *Castanea pumila* hybrid, possibly with some limited European heritage. Many Japanese/chinquapin hybrids were distributed in California in the 1930s and 1940s and 'Silverleaf' has many traits suggestive of chinquapin influence (one example is that the nuts tend to stick in the bur even after the bur has fully opened, a trait common to chinquapins and American chestnut trees but unusual in Japanese and European trees). Whatever its origin, it is a very interesting little tree but it does have problems as a commercial tree.

Although the 'Silverleaf' nut has good size, peels better than 'Colossal' and tastes better than 'Colossal', 'Silverleaf' has an unacceptably high percentage of split nuts and thus is not an ideal commercial cultivar. 'Silverleaf' drops its nuts about the same time as 'Colossal' and stores no better than 'Colossal'. And unfortunately, the highest percentage of splits occurs in the largest nuts. Since 'Silverleaf' is prone to a somewhat dwarfish growth pattern, this could lead to it being overgrown in a closely planted orchard with the larger 'Colossal' and 'Nevada' trees. These problems are not an obstacle to being a good backyard tree, but are definite obstacles to commercial production. 'Silverleaf' also tends to flower toward the beginning of 'Colossal's' receptivity and often does not overlap the latter part of 'Colossal's' flowering.

*“ . . . if apple
growers can make
money with ‘Red
Delicious’, chestnut
growers can
probably make
money with
‘Colossal’.”*

Some orchardists use both 'Silverleaf' and 'Nevada' to pollinate 'Colossal' and this is often an effective strategy. Unfortunately, 'Silverleaf' often flowers too early to effectively pollinize 'Nevada', and 'Nevada' commonly flowers too late to effectively pollinize 'Silverleaf'. (It should be noted however that individual grafts can vary significantly in flowering times and climatological variations can upset flowering patterns completely). If you wish to use both 'Nevada' and 'Silverleaf' as pollinizers for 'Colossal', you may need a third pollinizer if you expect nut production from the first two (I should note however that there is some evidence that 'Nevada' may be self-fertile to some extent). It should also be emphasized that, in a large orchard, individual variation in flowering times of grafted trees may be significant.

For example, in a large orchard of grafted 'Colossal' trees, the receptivity of the female flowers may easily vary by a week or two, and occasionally even by three or four weeks on different grafts. Similarly, the earliest tree may drop nuts in the last week of August while the latest tree may be dropping nuts during the last week in September. In 1995, my 'Silverleaf' trees flowered too early to pollinize any 'Colossal' trees, but in 1998 'Silverleaf's' flowering was perfect for pollinizing 'Colossal'.

To completely and adequately discuss the suitability of a particular pollinizer, you would need to observe dozens and perhaps hundreds of trees in different environments (as European growers are able to do) to give a conclusive opinion about suitability across a broad range of environments. In California that situation simply does not exist. For some pollinizers, I have evaluated only a few trees and it is always possible that a larger planting might reveal different average flowering times. Variations in climate and soil can have a large effect on flowering dates. It is clear, however, from the hundreds of trees that I have observed in many different orchards, that 'Nevada' is not the ideal pollinizer for 'Colossal'.

'Colossal' seedlings are also used in many orchards as pollinizers. The problem with this tactic is that very few 'Colossal' seedlings have nuts worth growing. My informal statistics through years of evaluating 'Colossal' seedlings have shown that less than five percent produce trees with viable pollen and quality nuts. Although a significant percentage of 'Colossal' seedlings do produce large nuts, most of those large nuts have pellicles that cannot be separated from the kernel. Many of the seedlings are also not good producers and, despite claims by some "experts" that seedlings will always pollinize each other and 'Colossal', many seedlings are also pollen sterile. Some seedlings that do produce pollen flower too late or too early to pollinize 'Colossal'. The primary reason for planting 'Colossal' seedlings is simply to provide rootstock for grafted 'Colossal' trees but that doesn't resolve the pollinizer problem. Starting a 'Colossal' orchard by planting a large number of seedlings can be a workable strategy, at least on the west coast, since seedlings which are good pollinizers and good nut producers can be kept while the remainder can be top-grafted to 'Colossal'. This strategy will not be as effective in areas with blight since many 'Colossal' seedlings may have little, if any, blight resistance, and may not be cold hardy.

The Gellatly cultivar 'Skioka' is a good early season pollen producer that is sometimes discussed as a possible pollinizer for 'Colossal'. Being a good pollen producer, 'Skioka' would be acceptable as a Colossal pollinizer except for four problems: (1.) 'Skioka' does not seem to thrive in California's central valley. (The reason is unknown but could be the heat or simply the lack of compatible root stock thus leading to poor grafts), (2.) 'Skioka' does not have sufficient blight resistance to be an acceptable commercial cultivar in the eastern U.S., (3.) the 'Skioka' nut does not have the size necessary for a commercial nut in California and (4.) 'Skioka' tends to flower toward the latter part of 'Colossal's' receptivity. It is possible however that in the Pacific Northwest 'Skioka' may make a better pollinizer than it does in California.

The cultivar 'Marki', a *Castanea crenata* selection from France, would also appear to be an excellent pollinizer for Colossal. My sole 'Marki' graft flowers in the mid-range of Colossal's receptivity. 'Marki' produces large nuts in the 22-25 per pound range in my orchard, although I have received anecdotal reports of larger nuts from more vigorous grafts. 'Marki's' nuts mature slightly later than 'Colossal'. The nuts are shiny and a pretty golden brown, with a shape somewhat similar to 'Colossal' but without 'Colossal's' white, pubescent tip. They are easily mistaken for 'Colossal' by untrained observers. Nuts have good flavor and peel well. The French claim that 'Marki' is blight resistant. It is also a smaller tree than 'Colossal' and would probably be overgrown in a closely planted 'Colossal' orchard. 'Marki' is available from Burnt Ridge Nursery.

The French cultivar 'Marsol', a Japanese/European hybrid from France, is also an acceptable pollinizer for 'Colossal', when used with other pollinizers. Although 'Marsol' flowers at the correct time to pollinize 'Colossal' and has long-stamen type male flowers, the pollen is reportedly not very fertile (Crawford). The nuts have good flavor. The tree is a very erect grower and is *Phytophthora* resistant on its own roots or on many of its seedlings. 'Marsol' is available from Burnt Ridge Nursery.

'Maraval' is a Japanese/European hybrid from France which flowers while 'Colossal' is receptive and although a bit early it may be a good pollinizer for 'Silverleaf' also. 'Maraval' has a large reddish-brown nut (18-23 per pound). Nut flavor is good although peeling is sometimes a problem. Available from Burnt Ridge Nursery.

'Precoce Migoule' is another E/J hybrid from France that flowers at the correct time to pollinize 'Colossal'. Produces a large nut (26 per pound) that has good to very good flavor. Nuts do have a significant percentage of multiple embryos, although probably fewer than 'Colossal'. The tree is vigorous and an erect grower. Available from Burnt Ridge Nursery.

'Marigoule' is another E/J hybrid from France that might be a good pollinizer for 'Colossal', although it tends to flower toward the beginning of 'Colossal's' receptivity. 'Marigoule' also produces large nuts (20-25 per pound.) that have "iffy" peeling but generally good flavor. Available from Burnt Ridge Nursery.

'Primato' is a European/Japanese hybrid from Italy that might be a good pollinizer for 'Colossal'. Nut size is 32-34 per pound. Occasionally, 'Primato' will flower a bit too early to be a completely reliable pollinizer for 'Colossal'. It would probably be a better pollinizer for 'Silverleaf'. Available from Burnt Ridge Nursery.

'Linden' is the chosen commercial pollinizer for 'Silverleaf'. It was found in the same California orchard as 'Silverleaf'. The few 'Linden' grafts I have observed flower a bit too late to be a consistently good pollinizer for 'Silverleaf'. The timing, however, would make 'Linden' a good pollinizer for 'Colossal'. It should be remembered that the original tree may be a perfect pollinizer for 'Silverleaf', and that flowering dates of grafts can vary. 'Linden' is also a comparatively smaller tree that might be overgrown by 'Colossal'. 'Linden' is available from Fowler Nursery in Newcastle, CA and Dave Wilson Nursery in Hickman, CA.

Hope is still alive for a native California pollinizer for 'Colossal'. The University of California at Davis has selected a 'Silverleaf' seedling that will soon be released as a 'Colossal' pollinizer. This tree is UCD 6-10, a tree which I originally called Big O, but which has recently been named 'Okei'. 'Okei' produces huge orange nuts, larger even than 'Colossal'. It appears to be a good pollen producer but testing in an isolated environment to determine the quality of its pollen has been very limited. A significant problem with 'Okei' is that the nuts it produces have a high percentage of splits, just like its parent 'Silverleaf'. The percentage of split nuts does seem to be smaller than in nuts produced by 'Silverleaf' itself. The other problem with the nuts is that the flavor is not very good. The flavor is acceptable when the nut is perfectly cured, but short of

that it is quite bland. Growers who think they might want to plant this tree should sample the nuts first. The nuts are definitely the least flavorful of any mentioned in this article. The nut does peel well. The tree may be available in the near future from Fowler Nursery.

California chestnut orchardist Harold Bingham has an orchard of first and second generation 'Colossal' seedlings, some of which are very good pollinizers. The four trees I have identified as E2-1, EDY, W1-2 and W3-1 (Mr. Bingham originally had his own numbering system for some of his better trees but has since misplaced it) all produce nuts as large as or larger than 'Colossal'. All are more attractive nuts than 'Colossal'. E2-1 is a good pollinizer, produces nuts that are larger than 'Colossal', peel better than 'Colossal', and taste better too. Unfortunately, Mr. Bingham refuses to make his trees available for commercial distribution. He has made scionwood available to individuals with the understanding that they not propagate his trees commercially. Sooner or later, of course, scionwood from Mr. Bingham's trees will make it to the commercial market and they will probably become the pollinizers of choice for 'Colossal' when they do.

For eastern and Midwestern growers of 'Colossal', this long-winded discussion of California pollinizers is somewhat irrelevant. For eastern growers, pollination of 'Colossal' is not likely to be a problem. 'Colossal's' period of peak receptivity, halfway between Japanese and European trees, is the period when most Chinese trees are at their peak flowering. This is not, however, the end of the problem, since care would still need to be taken not to allow 'Colossal' to crowd out the Chinese pollinizers (assuming blight does not eventually destroy the 'Colossal' trees) since the mature 'Colossal' tree could be almost twice as tall and twice as wide as many mature Chinese trees. This is a problem that may be overlooked by eastern and Midwestern growers who think of chestnut tree size only in terms of Chinese or Japanese chestnut trees. Growers in the Pacific Northwest also have available some Chinese and Chinese hybrid trees which might make good pollinizers for 'Colossal'.

BLIGHT RESISTANCE

Despite a general belief among many growers that 'Colossal' is fully resistant to chestnut blight (*Cryphonectria parasitica*), it is not. At least one 'Colossal' tree grown in New York state is reported to have con-

See *More on Colossal*, p. 8

France Honors Chestnut in Village Museum

by Anthony Boutard
Email: aboutard@orednet.org

In the village of Villefranche-du-Périgord (Dordogne) there is a specialized natural history museum called the *Maison du Châtaignier, Marrons et Champignons*. The museum has attractive and informative displays about the chestnut (*châtaignier*) tree, its mycorrhizal fungi and the nut itself.

Some of the mycorrhizal fungi associated with the chestnut have economic value of their own. The best known is *Boletus edulis*, the *cep* or *porcini*. In France and Italy, *B. edulis* is closely associated with the chestnut, though it also colonizes other deciduous tree species. In Germany, it is known as the *steinpilz* and is found in beech forests. Interestingly, in the Pacific Northwest, *B. edulis* jumps class and colonizes conifers.

Chestnut wood makes a strong timber, but can also be split and bent, even woven. The *Maison du Châtaignier* displays a wide variety of implements and furniture made from chestnut. In the Limousin, a province north of the Dordogne, craftsmen known as *feuillardiens* split and shave chestnut wood, so it can be woven into furniture, cooperage and lobster pots. Locally, you can see a massive old Italian grape press at the Erath tasting room which I believe is also made out of chestnut wood.

In France, the chestnut forests are regenerated by coppicing. The trees are cut and then stump shoots sprout forth. After a few



Within the museum is a display of marrons grown in the Dordogne. Varieties shown here include (front row left to right) *Dorée de Lyon*, *Bouriquette*, *Roussette*, *Bouche de Betizac*, (second row left to right) *Precoce Carmeille*, *Marron de Goujounac*, *Montagne*, (back row left to right) unknown, *Belle Epine*, *Marigoule*, unknown.

the *Maison de la Truffe* in Sorges is another interesting natural history museum.

The *Maison du Châtaignier* displays remind us that there is far more to the tree than its nut. Even in Oregon, Périgord's cultural attachment to the chestnut is evident in the small aged goat cheeses



Left: Interior of the museum showing furniture and farm implements fashioned from chestnut wood.

Below Right: Coppice chestnuts in the Dordogne showing the broad stool which develops over time.



years, the best shoots are selected, and the remainder are cut away. With progressive cuttings the stump heals over and the callosed wood creates what is called a coppice stool. The management of chestnut forests is well illustrated in a sequence of displays.

The museum also has a room devoted to the nut, and a bookstore. It is very interesting to see the wide variety of shapes, sizes and colors the nuts come in, as well as the many products derived from the nut.

Founded in 1231, the town of Villefranche with its ancient covered market place is worth a trip of its own. A short distance away, you can visit the Station de Douville, which an important research facility for chestnuts. The region is also famous for its truffles, and

which are imported from that region and are carefully wrapped in chestnut leaves. Alas, some of the "leaves" are now plastic, though real leaves still used and seen in Oregon markets.

Maison du Châtaignier, 24550 Villefranche-du-Périgord,
tel: 05 53 29 98 37

More on Colossal, from p. 6

tracted chestnut blight and is being treated by inoculation with hypovirulent strains (Anagnostakis 1997). Early growers of 'Colossal' certainly did not consider it to be blight resistant. In a 1926 article discussing chestnut growing in California, there was the following comment: "The 'Colossal', 'Large American Sweet' and the 'Parry' are other varieties of importance. All of these can be had from California nurseries. None of them is blight resistant." (Keiffer). The degree of resistance 'Colossal' may have to the blight, if any, is unknown. But thanks to the time, money and resources voluntarily expended by Michigan growers, we should know in the next five to ten years exactly how blight resistant 'Colossal' really is. Earlier in this century the cultivar 'Paragon' was being touted for its blight resistance and thousands of 'Paragon' trees were planted by growers. Unfortunately they were not blight resistant.

And to compound the potential problem with blight, unless 'Colossal' is grown on its own roots, the rootstock for grafted 'Colossal' trees will have considerable genetic variability, which means it is likely that some 'Colossal' rootstock will certainly have no blight resistance at all. Many European and Japanese hybrids, which of necessity must be used for 'Colossal' rootstock, have very little blight resistance. Since I have heard a few nurserymen who sell 'Colossal' claim that it is completely blight resistant, it may be prudent for eastern growers who buy 'Colossal' to insist on some type of guarantee. Nursery growers may be relying on the diminished levels of blight spores in the eastern U.S. to foster the impression that 'Colossal' is blight resistant. Future orchardists should keep in mind that even American chestnut trees in the east often escape the blight for ten or fifteen years. This is not a sign that the trees are blight resistant.

OTHER DISEASES AND PESTS

Although at least 30 diseases are known to attack the chestnut (Lowther), 'Colossal' does not seem to be any more susceptible to disease or pests than any other chestnut variety. Its resistance to gallwasp (*Dryocosmus kuriphilus*) is unknown, but with increased plantings in the Midwest, that question should be resolved in the not too far distant future.

'Colossal' and its seedlings are occasionally attacked by the larvae of what appears to be codling moth (*Laspeyresia pomonella*) in California. After the bur splits open in the fall, the larvae infest the bur where

it attaches to the nut but usually do little damage to the nut.

Some pest that acts exactly like chestnut weevil (*Curculio spp.*), and probably is chestnut weevil, has infested 'Colossal' seedling orchards in the Sierra Nevada foothills. Although chestnut weevil is not officially recognized in California it appears to be here nonetheless. So those Midwestern growers who were hoping that 'Colossal' might have some type of resistance to chestnut weevil will be disappointed.

One of the biggest problems I have had with all varieties of chestnut trees is flat headed apple borer (*Chrysobothris femorata*). In its larval stage, the borer attacks diseased or stressed trees. Unfortunately, heat stress is common in young trees in California's central valley, but vigorous trees have no problems with this pest. Younger 'Colossal' trees do seem to be considerably more susceptible to heat stress than pure European trees.

Some of my chestnut trees, including a grafted 'Colossal' and two 'Colossal' seedlings, have died due to a wilting type disease. I suspect the problem is verticillium wilt (Lowther). *Cryodiaporthe castanea* has also been identified as causing a type of chestnut wilt, although it seems to be implicated more often as the causative factor in twig dieback.

Phytophthora cinnamoni has been a problem in southern California avocado plantings and in some older almond plantings, and may be a problem throughout California on heavy soils. I have had at least two European hybrid trees die of what appeared to be *Phytophthora*, as well as two 'Colossal' seedlings and a grafted 'Colossal' (presumably grafted on 'Colossal' seedling rootstock) as well. It would therefore appear that at least some 'Colossal' rootstocks appear to be susceptible to *Phytophthora*.

I have also had one 'Colossal' seedling die of what appears to be "sour sap". The limited information I have on this problem is that it is not technically a disease, but a condition that develops when the soil around the roots is constantly wet and the tree is dormant. The sap in the roots actually seems to go sour and ferment. This condition can develop in California's heavy soils after a long wet winter. The tree tries to leaf out, small leaves develop but quickly wilt and die back. I've had this problem develop in a few other European hybrids also, but never in pure Chinese or Japanese trees.

Kernel rot or nut rot (*Phomopsis castanea*), a problem which is causing sig-

nificant and increasing damage to nuts in Australia, has not been formally identified in California, but it may be here. *Phomopsis* differs from many other kinds of nut rot in that the problem can appear on nuts that are fresh off the tree, whereas many other types of fungal infections develop with time and are more common in nuts that have been stored for lengthy periods. The problem I have observed a few times in 'Colossal' and a few other cultivars is a brown degradation of the nut kernel shortly after the nut falls free of the bur. I have seen what appears to be the same problem in nuts in North Carolina and South Carolina. I have also heard anecdotal reports of the same problem in eastern Canada and Ohio. Whether this North American nut rot is *Phomopsis* has not been determined, but at this point the problem seems to be very rare. In a personal communication, Jane Casey of Mountainview Chestnuts in Australia has informed me that 'Colossal' has been found to be susceptible to kernel rot in Australia.

COLD HARDINESS

'Colossal' seems to be quite cold hardy once it has hardened off for winter. It is susceptible to early winter or late spring frosts as are most other chestnuts. In Michigan and Ohio, 'Colossal' has been reported to tolerate -15 to -20 degrees Fahrenheit with no injury when fully dormant. A problem could exist, however, with 'Colossal' rootstocks. Rootstock for 'Colossal' must necessarily be European or E/J hybrids. 'Colossal' will overgrow pure Japanese rootstock and, if a successful graft could be made, it would also overgrow pure Chinese rootstock. But since many European trees and hybrids are not very cold hardy, eastern and Midwestern growers face the problem not only that 'Colossal' rootstock may be very blight susceptible, but that it may also lack cold hardiness.

NUT RIPENING

'Colossal' ripens early in the central valley of California, with nut fall starting in the first week of September, peaking in the second and third weeks of September and finishing in the last week of September. There is also occasionally a second crop, which usually matures in late October or November. The nuts in the second crop, however, are not as large as the early nuts and are thus largely a waste of the tree's resources. It is not expected, however, that the trees would set a second crop in the eastern United States and probably not in the Pacific Northwest. 'Colossal's' early ripen-

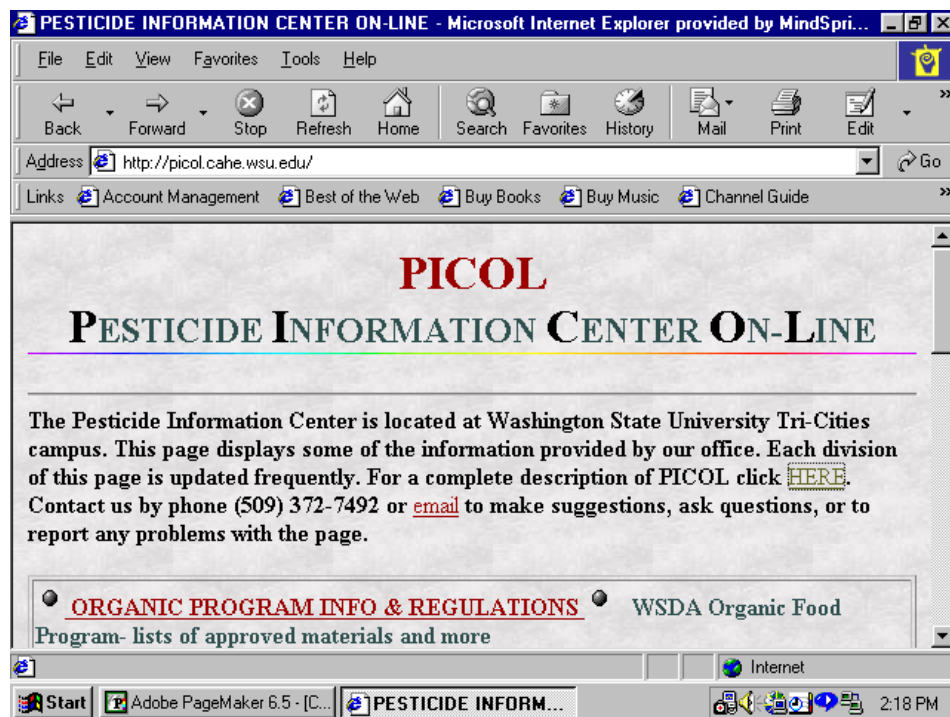
The Pesticide Information Center Online Provides Pesticide Information for the Northwest

Go to <http://picol.cahe.wsu.edu/> and you will find the Pesticide Information Center On Line (PICOL) database. It contains current label information from the Washington and Oregon State Departments of Agriculture about products registered in those two states. It is designed to identify labels registered for use on given crops, sites or pests. It is designed to be used as a guide and not as a recommendation.

Included in the system are both Federally registered and Special Local Needs labels.

An unusual aspect of the system is that a user can extract, a list of currently registered insecticides, herbicides, fungicides, rodenticides, etc. on almost any given pest for any given crop in the Pacific Northwest.

The topics accessible within the database include Organic Program Information and Regulations for the state of Washington, information on pesticide labels and tolerances, the Agrichemical and Environmental News, the Pesticide Notification Network (PNN), the Pesticide Impact Assessment Program, information on the Food Quality Protection



Act, a list of publications related to registration from WSDA, a link to the Washington state Pesticide page, and a link to the Washington State Commission on Pesticide Registration.

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".

ing is generally considered to be a poor feature since demand for chestnuts in September and October does not match demand in November and December, which brings us to the next problem with 'Colossal'.

NUT APPEARANCE

'Colossal' nuts are average in appearance fresh off the tree. They are triangular with a white downy tip and a light brown coloration elsewhere. This color fades quickly and results in a somewhat unattractive dull finish. The nut is not particularly shiny or otherwise remarkable in appearance. The French cultivar 'Marki' has a shape similar to 'Colossal' but has a golden brown coloration and a shiny quality that makes it a more attractive nut fresh off the tree. 'Marki' lacks the downy white tip. The shell of the 'Colossal' nut is thinner than in many other chestnuts, which may or may not be a factor in its relatively poor storage characteristics. This thinness, however, is definitely a nega-

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tive quality with respect to appearance. As the nut dries out, the shell tends to shrink around the nut kernel, and since many 'Colossal' kernels have irregularly shaped multiple embryos the nut appears bumpy and irregularly shaped where the kernels show through the thin shell.

NUT STORAGE

'Colossal' nuts do not store particularly well compared to pure European nuts and Chinese nuts. This is not to say that it is impossible to store 'Colossal' from September to November or December. When kept a degree or two above freezing in a high humidity environment, a large percentage of 'Colossal' nuts will make it to November and December. However, tolerances are quite tight and a day or two of low humidity or high temperatures can result in significant nut loss. 'Colossal' stores better than most pure Japanese nuts but not as well as most pure European nuts.

NUT PEELING

'Colossal' does not consistently peel well, despite the claims of some "experts". It is unclear why ease of peeling varies so much from one nut to another. For every 'Colossal' nut that peels well, you will eventually encounter another nut that does not peel easily, if at all. Additionally, a number of 'Colossal' nuts have irregularly shaped multiple embryos which tend to make peeling an annoying chore even when the pellicle separates readily.

NUT SIZE

Which brings us to the size of the 'Colossal' nut. I have seen individual nuts that are immense-in the 8 or 9 per pound range-but these nuts are invariably singles with multiple embryos. While a chestnut novice may pay a large sum for these nuts, an educated chestnut buyer probably would not. Because of the multiple embryos, these large

nuts are more difficult to peel. Because of their size, they are also more difficult to cook. They taste exactly the same as a smaller Colossal nut. In a Colossal orchard which is well pollinized single nuts are kept to a minimum and average nut size is smaller. Thus, an orchard which has a high percentage of single nuts may average 13-15 nuts per pound in California, while an orchard with good pollination may average 18-22 nuts per pound (which is still a respectable size, of course). Trees in the Pacific Northwest might be expected to produce smaller nuts, although 'Colossal' might also benefit from the cooler temperatures.

In Australia 'Colossal' has not lived up to its American reputation for size. Jane Casey of Mountainview Chestnuts produces 'Colossal' nuts that average in the 35 per pound range, or less. I suspect that the problem is graft incompatibility, but no formal study of the problem has yet been undertaken. Since the Australian cultivar 'Red Spanish' produces nuts as large or larger than American grown 'Colossals', and since 'Colossal' is susceptible to kernal rot, I suspect Australian growers are not spending too much time worrying about 'Colossal'.

European growers are starting to show some interest in 'Colossal'. Trials in Northwestern Italy were reported on at the Second International Symposium on Chestnut in Bordeaux, France in 1998 (Bassi). Initial results were positive with respect to vigorous growth and production of large nuts (38/kg or just under 18/lb). Quality was considered "acceptable" which in European terms is certainly not a glowing recommendation. It was also noted that only rarely did the nuts have multiple embryos, which is quite inconsistent with the American experience.

Growers in the East, Midwest and even the Pacific Northwest should also keep in mind that their 'Colossal' nuts probably will not reach the sizes obtained in California's central valley where there are normally nine or ten sunny, frost free months from February through November.

NUT FLAVOR

Flavor is a very subjective quality, yet despite its subjective nature, flavor is a subject on which consensus can often be reached. Pomologists who don't want to discuss flavor are missing the single most important quality of a fruit or nut. While individuals may differ in specific flavor preferences, there is often widespread agreement on what tastes good and what tastes bad. In chestnut taste tests, 'Skookum', 'Sleep-

ing Giant' and 'Eaton', as well as many American chestnuts, consistently rate high for flavor. Simply because flavor cannot be effectively measured objectively does not mean that it does not exist.

I personally have many different chestnut trees that produce nuts with far better flavor than 'Colossal' and therefore I seldom bother to eat 'Colossal' chestnuts. This is not to say that 'Colossal' has poor flavor. When raw and perfectly cured, 'Colossal' does taste good because it has a nice level of sweetness. It is not as sweet, however, as most Chinese nuts. When roasted the nut also has good flavor, but the flavor is not very complex and there are many better tasting cultivars. For the chestnut consumer in the average commercial grocery, however, 'Colossal' is about as good as it gets, since it is usually superior to the poor quality European nuts that make it to the U.S. market.

PRODUCTIVITY

One of 'Colossal's' strongest points as a commercial cultivar is its heavy productivity. Even in poor years, most grafted Colossal trees are heavily productive. In California this may occasionally result in a second flowering and a second smaller crop. This should not be a problem in shorter season climates.

PROPAGATION

'Colossal' grafts and buds well onto its own rootstock, onto seedlings of 'Silverleaf' and onto some other European hybrid rootstocks. It does graft onto some Japanese rootstocks also, but this is usually not a workable solution because of the differences in vigor. 'Colossal' will usually overgrow any pure Japanese rootstock very quickly. The same problem would exist with pure Chinese rootstock if a graft were successful. As 'Colossal' becomes more popular and more grafts are attempted onto a wider variety of rootstock, I am hearing more stories of graft union failures. As noted above, Australian growers seem to have some incompatibility problems with 'Colossal'. Growers who wish to plant a 'Colossal' orchard would probably be advised to graft onto 'Colossal' seedling rootstock to insure the highest percentage of successful takes. Unfortunately, Eastern U.S. growers are likely to be faced with some problems concerning the blight susceptibility to their rootstock.

CONCLUSIONS

'Colossal' is a popular orchard tree for four reasons: 1. It produces large nuts, 2. It is a vigorous and productive tree, 3. It propa-

gates easily onto its own rootstock and 4. It has been heavily promoted. On the other hand, the nuts drop too early, the flavor is inferior to numerous other cultivars, the nuts have too many multiple embryos, peeling is very inconsistent, and the tree is not immune to blight. It produces a nut that has commercial potential only when consumers lack education about quality in chestnuts and/or when it has little or no competition. In California, where we have the ability to grow the better European cultivars, sooner or later some growers will start producing those better cultivars. On the other hand, educated consumers are a rare breed, if not quite an oxymoron, and if apple growers can make money with 'Red Delicious', chestnut growers can probably make money with 'Colossal'.

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Charlie Chestnut invites you to take a look at a website designed exclusively

for YOU, the grower. You'll find information on establishing an orchard, a world-wide list of grower associations, a list of related farming organizations, an extensive list of resources and coming soon, an interactive discussion forum where you can pose questions and offer information. Check it out at:
<http://ChestnutsOnLine.com/growers.htm>

\$4.9 Million, from p. 1

Once the program was announced, the president of the Midwest Nut Producers Council, Bruce Smith, contacted Steve Jones of the Western Chestnut Growers about the possibility of developing a project that could benefit both organizations and all chestnut growers in the United States. Soon after that conversation, Professor Dennis Fulbright at Michigan State University assembled a team of researchers from six universities made up of academic/extension specialists in marketing, economics, agricultural engineering, pathology, entomology, horticulture, packaging, and food processing. With less than two months to pull the grant proposal together, members of the team met weekly in person or by phone and some investigators were flown in for special consultations. It was not long after the team started meeting together when it discovered that an agricultural economist at the University of Kentucky was studying the on-farm economics of growing chestnuts. Building from this project, a proposal was submitted to the Farm Efficiency and Profitability Program. The proposal's title is "Identifying and solving critical issues for sustained chestnut farm profits: A model interdisciplinary project." The proposal's long-term objective is to create a new product/industry development paradigm for agricultural supply based on teams of experts from the biological, biophysical and economic sciences. If the strategy is successful, the United States Chestnut Coalition will be established. It will be an organization of producers, extension personnel and academics working together as a team. The hypothesis tested in the grant is whether profits can be realized when establishing new agricultural commodities if growers, working with interdisciplinary teams of experts, can identify diverse markets for their products and adjust production practices to deliver products to the identified markets.

To accomplish the objective, six areas of expertise were established and members of each area are to serve on more than one area of expertise so that all areas have the ability to communicate with other areas of expertise. The areas of expertise are: (1) germplasm, (2) growing conditions, (3) harvest and post harvest handling, (4) processing of the harvested nut, (5) packaging of the products, and (5) marketing. A special role for the Cooperative Extension Service is laid out in the proposal to help with communication and transfer of information. The rationale for the interdisciplinary approach was given: Studies on germplasm may find that one tree variety grows exceedingly well in a certain area of the country, but packaging engineers may find that variety of chestnut has a poor shelf life. Economists may determine that high density plantings will give a better return on investment, but the horticulturalists may find high density plantings will cause rapid shading of limbs and ultimately reduce shade and plant health. Marketers may find that small chestnuts have little consumer value, but the food processors may find unique markets in chestnut flour made from these small nuts.

The investigators believed that they had an exciting opportunity to intervene in the production of an emerging agricultural product. At the university, there is expertise to study the production system, the processing system and the marketing parameters to determine if chestnuts can be profitable in today's farming environment. The universities have the ability to determine the types of value added products consumers might consider and they have the ability to create these products.

If the grant is successful and funded for the \$4.9 million that was requested, many chestnut growers should plan to sell their crops to the researchers so that they can carry out their three-year studies.



Peeling, from p. 3

Chestnuts require about 30 seconds of time and 290° Celsius (554° F) before expulsion, he said.

Pecans can be shelled after 15 seconds but need higher heat, he said. Times for almonds, filberts and Brazil nuts are 40, 45 and 50 seconds respectively. Coconuts must spend two minutes in the cylinder under 370 degrees Celsius (698° F) heat for optimal shelling results, he said.

Smith views his equipment as potentially useful for small businesses pursu-

ing niche markets. "There are a lot of innovative people out there coming up with new product ideas," he said.

"Thermal blast processing gives them rapid peeling. Chestnuts are a wonderful place to start. There are so many chestnut products that could be developed."

Edith Garrett, president of the International Fresh-cut Produce Association, Alexandria, Va., said he is not familiar with Smith's technology but is receptive to new ideas.

"We're always interested in new developments that could help increase (mem-

WCGA Makes Its Presence Known on the World Wide Web

Communication is the name of the game in today's world and non-profit organizations around the world are taking advantage of the opportunity to reach out by having a presence on the internet. It shouldn't come as a surprise then, that WCGA has joined the ranks.

The site is easy to find at <http://www.ChestnutsOnLine.com/wcga> and is



hosted for non-commercial use courtesy of your Editor and hubby.

Currently the site is pretty basic with only a listing of the association officers, a calendar of events, a copy of the bylaws, a membership application and a partial sample copy of a newsletter. In the future it could be a location where the Quality Standards committee has its working copy available for input from other committee members.

We have seen the association's membership double since we started publishing the newsletter. A website should give us even more exposure.



bers') production capacity and improve the quality of the finished product," she said.

For more information, call (800) 639-1615; or e-mail to info@agrasmart.com.

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Field Day, from p. 1

A Fowler tree was pointed out. The nut is small but good. However, it is not a good producer.

A discussion on pollinization ensued and one participant mentioned that he had had better pollinization from his Nevada seedlings than from Nevada grafted trees. Boutard remarked that there is a cyclical trait of production in the fagaceae family of trees to which the chestnut belongs.

A Japanese cultivar, Tsubaka, was pointed out in a row of seedling trees, non of which have commercial value. There is a lot of splitting of the nuts, it has a poor taste and multiple embryos.

A Bouche de Betizac tree was pointed out in the final row of the orchard. Scion wood came from France in 1989 and spent its first 3 years at the germplasm laboratory next door to the farm. It has a bigger nut than the colossal. It has excellent keeping qualities. It is considered the number two "pick" in France.

Three young Maraval trees were pointed out. Their rootstock is considered *Phytophthora* resistant. Next to them was a Margoul, the number one orchard tree in France. It is now micropropagated. It has good large nuts and peels well.

The last French variety at the farm is the Marsol. It is claimed to have the best rootstock in France and has resistance to *Phytophthora*. The nut is good, but reportedly does not keep well, and it is a scant bearer. The tree also has commercial value for its lumber.

The final trees, an Italian variety and a Chinese were pointed out.

The conclusion of the tour of the plot was a discussion about how interested members might be in organizing a scion-collecting day at the farm in the fall. Members were encouraged to try grafting some of these varieties in their orchards, and they were in agreement that it would be of interest. A scion-collecting day will be scheduled in the fall.

ON PRUNING

Following lunch there was a discussion of pruning. The Young's shared what they are doing in their orchard now in its second year. A comparison of the surface area of a tree left on its own vs. a tree pruned to an ellipse using the Japanese pruning methods was made. It was explained how one could nearly double the production of nuts on the same acreage by increasing the surface area of the trees exposed to the sun. According to Dr. Araki, who has been responsible for introducing the elliptical method in Japan, the chestnut has the greatest need for light of any of the fruit or nut trees.

One member commented that instead of thinning out trees when they get too large, one might be better off reworking the trees into the shape and size used by the Japanese.

Discussion followed about the best approach to take with a tree in the orchard, and pruning followed.

ON GRAFTING

The final presentation for the day was a demonstration of grafting techniques by Chris Foster. Chris came prepared with all his grafting tools including his ever-present can of Lysol. He strongly advised that tools should be sanitized between trees, that doing otherwise was inviting disease to spread.

The first type of graft demonstrated was a bark graft, illustrated by the three photographs included. Growers were cautioned that if they intended to top work the entire tree it should be done in stages, possibly over a three year period to prevent sunburn and to assure that there will still be leaves to support the



Fig. 1



Fig. 2



Fig. 3

tree. In the Willamette Valley grafting should take place after the weather warms up to 65 degrees or better, and probably some time after April 1. It should be at a time when the bark peels off easily and the cambium layer is slippery to the touch.

Prior to preparing the graft a branch should be selected that is less than 4 inches in diameter. Cut it off. Then make a second clean cut that is perpendicular to the branch. At this point the branch is prepared for grafting.

Members Agree to Support Foliar Analysis Project

During the June 17 field day the issue of foliar analysis was discussed. Anthony Boutard pointed out that we don't know the base levels of trace elements required for a good producing tree. Without standards we can be applying too much or too little fertilizer and will not know it. Too much fertilizer may cause too much vegetative growth at the expense of nut production, and too little fertilizer may cause lower production levels of lower quality nuts.

There was consensus agreement that we should all participate in a leaf analysis in August this year on a voluntary basis. Anthony Boutard agreed to compile the data and provide results to us.

Leaf analysis has been used for many years as a means of determining nutrient deficiencies and as a way to establish fertilizer requirements.

Leaf sample kits can be obtained from the OSU Central Analytical Laboratory at 541-737-2187, or by writing to them at:

Central Analytical Laboratory
Dept. of Crop and Soil Science
Oregon State University
Corvallis, OR 97331-2911

Leaves should be collected in mid-August and sent immediately to OSU. A single sample should represent an area no larger than 5 acres and should be from a single tree. Mark or map each tree that you sample.

It was agreed that we want to sample trees that are producing well, and avoid those trees that show visible signs of stress or disease, or those which for whatever reason just don't produce

well. The goal here is to identify the element levels that contribute to the healthy tree.

Collect 10 leaves per tree, but only one per branch. Collect leaves that are free of any disease or other damage. Remove the leaves so that the petiole (leaf stem) remains on the leaf. All leaves should be picked from the middle of the current season's terminal shoots of about average vigor.

If your samples are contaminated with soil, spray, or other visible residues, wash them in a detergent solution and rinse with soft water. Wash them quickly (one minute or less) while leaves are still fresh, to avoid loss of nutrient elements. Remove excess moisture by blotting with a paper towel. Then allow the leaves to air dry.

Fill out the sample kit's information sheet completely -- all this information may be useful. Put the sheet, along with the dried leaves, into the paper bag furnished in the kit.

Seal the bag securely and mail it to the lab at the address given previously. No other container is necessary.

If you are submitting more than one sample at a time

make sure to code them in some way that they can be identified by you when the results are returned.

Samples will be analyzed for nitrogen, phosphorus, potassium, sulfur, calcium, magnesium, boron, iron, manganese, zinc, and copper.

The lab will send a computer-printout to you with the results.

Mark Your Calendar Now

- Call OSU for your leaf sample kit in July
- Collect your leaves in mid-August and send kit to OSU
- Send a copy of your results to Anthony Boutard for compiling. Results will be published in the newsletter and on the WCGA website.

Pick a spot on the cut edge where the branch is close to flat. Starting at the cut edge and using a grafting knife, cut a 1 inch slit down the branch. Gently lift up the bark from the slit.

Next, cut the scion wood at a sharp angle. You want a bud opposite the flat cut. Stick the scion wood into the opening you've made between the bark and the cambium layer. You want only a small portion of the cut on scion wood to be above the end of the branch. (See Fig. 1)

Tape over the graft with masking tape (Fig. 2). It should be as tight as you can get it.

Cover the surface with grafting seal compound (Fig. 3) to form a moistureproof seal. Dab the top of the scion wood as well.

It is recommended that three grafts be done on the branch to assure success.

If the grafting is done properly there should be growth within three weeks. Foster says that using this method he has 90% success.

If there is a possibility of cold weather cover the graft with a plastic bag, but make sure it is not left on if the weather becomes warm or the graft will cook.

A demonstration of cleft grafts followed, but Foster said he has had less success with this type. The final demonstration was of a whip graft.

Members who have questions about the grafting methods can contact Chris at foster@europa.com.



Colossal on Colossal -- Rethinking a Decision

Randy Coleman, of RC Farms, McMinnville, OR, reports some disturbing results with his Colossal trees. When the WCGA visited his orchard during the September Field Day, he pointed out the problems he was having with phytophthora. Typical symptoms were observed -- yellowing of the leaves, wilt, die-back, in general a very unthrifty appearance.

By the end of the year he reported a loss of approximately 40% of his Colossal trees on Colossal rootstocks. They were 4 to 5 years of age and from a major nursery.

A survey of the orchard in late June this year revealed another 40% of the Colossal on Colossal had died. He felt it was interesting to note that the Nevada on Nevada rootstock which had been slow to start, had sustained only a 10% loss over the two years in comparison, leading him to believe that there was more natural resistance in the latter group of trees.

Four years ago Coleman had grafted some Colossals on Colossal seedlings. He reported that for the first two years they were weak and slow to take hold. Today, he says, they look great. The only conclusion he can draw is that the seed came from trees that had survived disease and carried a certain amount of resistance.

Classified Section



**England's
Orchard & Nursery**

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

WANTED: I'm looking for the cultivars Sleeping Giant and Luvall's Monster somewhere on the west coast. I would appreciate any help in locating them.
Michael Nave, 916-992-9206
Email: jmnave@jps.net

LATE BREAKING NEWS: Member, Harvey Correia just reported that we can now order *the Australian Chestnut Resource Manual* with a credit card. It can be done through their Information Centre in Melbourne. You can purchase on line through <http://www.nre.vic.gov.au>, then go to **customer service**, then **publications**, then **books**. From the list select **Nuts**. You'll see the growers' manual listed. At the bottom of the page select **order form**. Print it out and fax or mail. You will have to use the email link in the order form to get the postage rates for international mail. I would **strongly recommend AirMail**.

Membership Application Western Chestnut Growers Assn., Inc.

☐ New Member ☐ Renewal

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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.