

## Chestnut Growers Urged to Implement Quarantine for Chestnut Gall Wasp

By Michelle Warmund, Ph.D., University of Missouri Center for Agroforestry; Tom Green, Ph.D., Professor Emeritus, Western Illinois University; Tom Wahl, Red Fern Farms; Kathy Dice, Red Fern Farms; and Jim Dallmeyer, Thistle Creek Orchard

The chestnut gall wasp, *Dryocosumus kuriphilus* Yasumatsu, is a tiny, gnat-sized, non-stinging insect that causes galls in chestnut trees. These galls retard plant growth and flowering and can kill branches. Severe infestations can kill trees. After the adult insects emerge, the dried, blackened galls become woody and can persist on older limbs for several years. Older, slower growing trees are more vulnerable.

First observed in the U.S. in 1974, the chestnut gall wasp is found in many of the states along the Eastern Seaboard, except possibly for Florida. It has been found as far west as Michigan and Kentucky. While expected to move west, there is currently no evidence of it being found in Indiana, Illinois, Missouri or further west.

### Biology

Chestnut gall wasps, or CGWs, lay eggs in buds in early summer. These are the buds that would normally become the twigs of new branches the following year. The female adult wasps, one-eighth-inch long, lay three to five eggs in a cluster. Multiple adults may oviposit in a single bud, with as many as 25 eggs per bud. Eggs hatch in

40 days and the larvae remain dormant until the following spring, when galls are formed. With bud break, larvae induce gall formation on developing plant tissues. Larvae feed on the inner gall tissue for 20 to 30 days before pupating. Adult wasps emerge from the galls in late May and early June. Beyond the gall clusters of dead leaves form. Called flags, these are easily visible, making location of galls quickly identifiable.

### Modes of Transport

The CGW can be dispersed by natural flight or transport of infested wood stock. Dispersal by wasp flight has been at a rate of about 23 km (15 mi) per year. This is augmented by prevailing winds. The primary mode of transport is through the sale of chestnut seedlings or scion wood.

Indeed, this pest was first introduced to the US on scion wood. Dispersal by flight is eclipsed by human transport. A serious source of propagation comes from home owners who plant chestnuts in their yards and hunters who plant them in woods to attract deer. While commercial orchards may be fairly far apart, these alternate growers provide additional “stepping stones” for the spread of the CGW.

### Economic Concern

There is not general agreement as to the seriousness of this infestation. In the Summer 2011 edition of *The Chestnut Grower*, Greg Miller, Empire Chestnut Company, said that “the gall wasp turned out to be less of a problem than he feared ... With more work and study, a grower

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Galls forming in early June 2017, in Ohio. Photo courtesy of Charles Novogradic, Chestnut Charlie's. Taken June 9, 2017, Ohio.



## PRESIDENT'S MESSAGE

When you receive this newsletter many of you will be very busy harvesting chestnuts or starting to sell chestnuts in the marketplace. We are growing a viable commercial chestnut industry here in the United States. More Americans are learning about chestnuts and their value as a food source. Many of you are planting new chestnuts trees in orchard settings across the country. Your customers are looking for more locally grown quality chestnuts to buy and eat. The customers are asking for your chestnuts over the imports from other countries first. We need to help each other in developing our chestnut orchards and strive for quality fresh chestnuts for the market.

In this newsletter, there are at least three great topics concerning how we need to protect and learn more about the chestnut industry we are growing.

Do you know about the Asian chestnut gall wasp infestation going on in certain areas of the country? One article has been co-authored by Michelle Warmund, Ph.D., University of Missouri Center for Agroforestry; Tom Green, Ph.D., Professor Emeritus, Western Illinois University; Tom Wahl, Red Fern Farms; Kathy Dice, Red Fern Farms; and Jim Dallmeyer, Thistle Creek Orchard. This article has excellent information on the Asian gall wasp and when it was first observed in the U.S. It will probably have an impact on chestnut orchards in many parts of this country, and we need to work with researchers to find the best options to control or eliminate this infestation.

Another article by Bernie Hilgart of Washington Chestnut Company reviews how severe winter conditions around the country have affected chestnut trees. He describes in detail the harsh winter of 2014/2015 causing winter dieback for many chestnut growers in Michigan. The severe conditions of the winter of 2016/2017 also caused a great deal of dieback on some cultivars in the Pacific Northwest. Because of extreme winter temperatures, winter dieback can bring on other problems with other pests that seek out the weakened trees. As chestnut growers, we need to monitor our orchards and the health of our trees.

Another article written by J. Michael Nave, California chestnut grower, provides us with a summary of the *Castanea mollissima* portion of the presentation he gave at our CGA Annual Meeting in Carrollton, Ohio on June 10, 2017. It gives descriptions of sizes of Chinese chestnuts, flavor, when the chestnuts drop, and the many positive attributes of *Castanea mollissima*.

CGA wants to thank the individuals who submitted articles for this newsletter. I encourage others in our organization to provide articles for future newsletters. We are all learning something new each year about growing chestnut trees in orchards, and we have a wonderful opportunity to learn from each other through this publication.

Remember the purpose of CGA is to promote chestnuts, to disseminate information to growers of chestnuts, to improve communications between growers within the industry, to support research and breeding work, and generally to further the interests and knowledge of chestnut growers. CGA advocates the delivery of only high-quality chestnuts to the marketplace.

I hope you all have a plentiful harvest this fall and a wonderful holiday season.

Roger 

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### Deadlines

<i>Issue</i>	<i>Deadline</i>	<i>Mailed</i>
Winter	Dec. 10	Jan. 1
Spring	Mar. 10	April 1
Summer	June 10	July 1
Fall	Sept. 10	Oct. 1

### Editorial Opinion

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# Valuable Chestnut Germplasm Available in Connecticut

By Sandra L. Anagnostakis, Emeritus Agricultural Scientist, Connecticut Agricultural Experiment Station | [sandra.anagnostakis@ct.gov](mailto:sandra.anagnostakis@ct.gov)

The renewed interest in chestnut tree breeding has raised questions about the availability of valuable germplasm. There have been chestnut trees of several species in this country for a long time (*C. sativa*, 1773; *C. crenata*, 1876; *C. mollissima*, 1903; *C. Henryi*, 1908; *C. seguinii*, 1918). The Connecticut Agricultural Experiment Station and a few private land owners have many very fine trees. In the 1930's and 40's, Arthur Graves and Donald Jones planted many of the trees now used in the U.S. for breeding and molecular biology experiments. Additions of species and hybrids were made by Hans Nienstaedt and Richard Jaynes, who both did their PhD research on chestnut. I have added others over the last 40 years. Some of my favorites are listed here to illustrate the richness of the resource. Trees are in Experiment Station plantings (which include over 1000 trees) unless otherwise noted.

The hybrids include those from the (1960's) thesis project of R. A. Jaynes, which are reciprocal crosses of all the species in our collection.

We also have the ortets of the following cultivars: 'Sleeping Giant', 'Mahogany', 'Essate Jap', 'Toumey', 'Lockwood', 'Little Giant', 'Hope', 'King Arthur', and grafted trees of the following cultivars: 'Clapper', 'Colossal', 'Eaton', 'Orrin', 'Lenoir'.

Various important SPECIES trees in Connecticut:

Japanese chestnuts, *Castanea crenata*

1. Three trees planted in 1876, probably 'Parsons' Japan' all on private land (First Congregational Church, Cheshire; Bee and Thistle Inn, Old Lyme; P.T. Barnum house, Bridgeport)

## Chestnut count, CAES orchards, 2008

<i>Castanea dentata</i> (Marshall) Borkhausen	American chestnut	250
<i>Castanea crenata</i> von Siebold & Zuccarini	Japanese chestnut	15
<i>Castanea mollissima</i> Blume	Chinese chestnut	100
<i>Castanea sativa</i> Miller	European chestnut	38
<i>Castanea alnifolia</i> Nuttall	Florida chinquapin	2
( <i>Castanea Floridana</i> ?)	Florida chinquapin	4
<i>Castanea pumila</i> Miller	Allegheny chinquapin	4
<i>Castanea ozarkensis</i> Ashe	Ozark chinquapin	57
<i>Castanea Henryi</i> Rehder & Wilson	Chinese chinquapin	6
<i>Castanea Seguinii</i> Miller	Chinese dwarf chestnut	4
Hybrids		878

2. USDA-PI #78626, seed from wild trees in Oguriyama, Amori-ken, Japan, planted 1933 (orchard tree)
3. USDA-PI #104015, Nobeoka Eirinsho, Yokugomura, Higashi, Usuki-gun, Miyasaki-ken, Japan (32 deg. latitude, planted 1935 (orchard tree)
4. USDA-PI #104016, Numakunai Eirinsho, Ippoimura, Iwate-gun, Iwate-ken, Japan, planted 1935 (timber tree)
5. USDA-PI #113679, Iwate-ken, Japan, planted 1939 at the CT Arboretum in New London (orchard trees)

Seguine chestnuts, *Castanea seguinii*

1. One surviving tree of USDA-PI #70317, "Mo-lut-tsz" Chiuwashaan, Anhwei, China, planted 1929 (dwarf species) and one cross (1998)

Chinese Timber Chinquapins, *Castanea Henryi*

1. One tree of USDA-PI #104058, "Chu-Lee" or "Chun Lee" "pearl chestnut," Hsiaohsing, Anhwei, China, planted 1935

2. Five trees of GA 30 and two of GA 31 from seed produced at Callaway Gardens in Georgia, planted 2011

Chinese chestnuts, *Castanea mollissima*

1. Two trees of USDA-PI #70315, "hardy trees native to north-eastern China" planted 1929, one is Graves' 'Mahogany' (timber trees)
2. USDA-PI #78744, "Tiger Paw" from the Fa Hua Ssu Temple near Beijing, planted 1932 (orchard tree)
3. Two trees of USDA-PI #104061, 'Lui An' Chekiang Province, China (28-32 deg. latitude) planted 1935 (timber trees)
4. Four trees of USDA-PI #104063, 'Kuei Lee' "large chestnut," Hsinteng, Chekiang Province, China, planted 1935 (timber trees)

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## National Chestnut Week

National Chestnut Week is the second full week of October every year. This year, that will be October 8-14. See the Fall 2016 edition of *The Chestnut Grower* for background and event ideas. Past newsletters are available on the members-only page of [chestnutgrowers.org](http://chestnutgrowers.org).

Make plans now to attend the next Chestnut Growers of America annual meeting to be held at Luke Wilson's farm in Gridley, California.

*Save the date:*

**June 8-10, 2018**



can overcome and mitigate problems caused by the gall wasp.”

The University of Missouri Center for Agroforestry website says that “these galls greatly reduce nut production and suppress shoot growth. In cases of severe infestations, interior portions of the tree canopy die and trees are killed ... The purchase of seedling trees or scion wood from nurseries where the gall wasp has been identified should be avoided to limit the spread of this serious pest.”<sup>2</sup> In the Fall 2009 issue of *The Chestnut Grower*, Bob Stehli wrote about “A- ‘gall’-ing Behavior”, describing his experiences in fighting this insect. Tom Green, Ph.D., Professor Emeritus in Urban Forestry, Western Illinois University, says, “I am fearful that the promotion of planting trees by deer hunters will greatly accelerate the spread of this pest. I prefer to grow chestnuts as long as possible without the pest rather than welcome it. If a quarantine can delay introduction, I am for quarantine.”<sup>1</sup>

For growers in unaffected areas, this conflict makes it difficult to develop a strategy for dealing with this pest. There is a clear benefit to having access to the cultivars being developed in infested areas. Yet new infestations will certainly bring reduced yield and possible death to some trees in previously CGW-free areas. The Midwest will become infested sooner or later. Still it seems prudent to delay such infestation for as long as possible. This would require a quarantine.

## Possible Options

There are several possible ways to address the CGW. First, it should be noted that a treatment is available, specific to scion wood, that involves treating with hot water under controlled conditions.<sup>2</sup> While these conditions need to be very carefully controlled, it does seem to provide protection for the end user of the scion wood. Empire Chestnut has extended this treatment for use on their seedlings. Use of this process would allow treated wood into uninfested areas. This would make new, innovative cultivars available to those in uninfested areas.

Cultural practices may offer some protection. Chinquapins are known to be resistant to CGW infestation. Perhaps some new cultivar made combine the positive aspects of existing chestnut varieties with the CGW resistance of chinquapins. Empire Chestnut is currently working on such cultivars.

Certain as yet undefined bio-controls may be operational. Parasitoid wasps seem to be effective in limiting the extent of the damage from CGWs. *Torymus sinensi*<sup>3</sup> is one of several such wasps that have been investigated. These parasitoids overwinter in the vacated galls of the CGW. Hence, removing the galls is counterproductive.

Chemical control offers some possibilities, but has not yet proven itself. One approach might be to defoliate the tree immediately after bud break, like a late-spring frost. Assuming a healthy tree, this would force the tree to produce a

second budding, unaffected by CGW. Jerry Payne was working on this approach, and further research has been tried by Empire Chestnut. Results may be available in Spring 2018.<sup>4</sup> Another possibility might be to spray the adult wasps immediately after they emerge, before they deposit their eggs.

## Urgency

There is, of course, considerable urgency in implementing a quarantine. We are coming into the fall season. Orders are already being placed for spring planting. Ads are appearing for chestnut trees. Each of us should contact the appropriate State representative. The State of Michigan, a state where CGW have been identified, has established a quarantine.<sup>5</sup>

Section IV of this document would have to be re-written to accommodate heat treatment. Proposed changes are in *italics*. The following wording is proposed:

IV. RESTRICTIONS All regulated articles originating from regulated areas are prohibited entry into the State of Michigan, unless *all of the following requirements a, b and c* are met, or *requirement d*. The regulated articles originate from a pest free place of production where chestnut gall wasp is not known to occur; as determined by:

a) Inspection of all *Castanea* spp. plants at the place of production annually by an agricultural official during the period of time when chestnut gall wasp symptoms would be readily seen (i.e. when leaves are fully developed); and,

b) Inspection of all *Castanea* spp. plants in a buffer zone extending at least 1,000 meters from the place of production in all directions; and,

c) All *Castanea* spp. plants in the place of production and the buffer zone must have undergone an annual inspection during the previous two growing seasons at time of full leaf development; and, must have been found free of symptoms of chestnut gall wasp infestation during the inspections; or,

d) *All Castanea spp. plants*

*i. Originate from an area where the Chestnut Gall Wasp (CGW) is not known to occur, AND site of origin paperwork, demonstrating proof of COUNTY and STATE of origin, accompanies the material(s);*



Galls forming in early June 2017, London, England. Photo courtesy of Charles Novogradic, Chestnut Charlie's. Taken June 16, 2017, Kensington Gardens, London, UK.



Older galls persist on chestnut shoots after adult gall wasp emergence. Photo courtesy of University of Missouri Extension.

ii. The regulated articles originate from an area or transit through an area where the Chestnut Gall Wasp (CGW) is suspected/confirmed and has accompanying phytosanitary certification demonstrating the materials have been treated in accordance with *ActaHortic.* 1019, 243-247, by M.R. Warmund (2014) "Disinfestation of *Dryocosmus kuriphilus* Yasumatsu in *Castanea Scion Wood*"

iii. Prior to shipment, the <State>

Department of Agriculture will be notified of intended transport of any regulated materials into Illinois which originate from confirmed infested states, via an electronic version of the phytosanitary certificate;

iv. Any and all persons, businesses, or entities transferring possession of regulated articles shall inform the person, businesses, or entities taking possession of the regulated articles, either verbally or in writing, that said regulated articles are subject to State regulations;

v. The <State> Department of Agriculture shall be informed of any suspected CGW infested materials, and any suspected CGW infestations in standing trees.

Each of us should contact our appropriate State representative and initiate such a quarantine. For example, in Illinois, the responsible individual is: Mr. Scott Schirmer, Nursery and Northern Field Office Section Manager, State Plant Regulatory Official, Illinois Department of Agriculture, Bureau of Environmental

Programs, 2280 Bethany Rd. Ste. B, DeKalb, IL 60115. ●

## References

- <sup>1</sup>Tom Green, Ph.D., Urban Forestry, Professor Emeritus, Western Illinois University, email, September 13, 2017
- <sup>2</sup>Warmund, M.R. (2014). Disinfestation of *Dryocosmus kuriphilus* Yasumatsu in *Castanea Scion Wood*. *Acta Hortic.* 1019, 243-247
- <sup>3</sup>Yara, K., Matsuo, K., Sasawaki, T. et al. *Appl Entomol Zool* (2012) 47: 55. <https://doi.org/10.1007/s13355-011-0088-0>
- <sup>4</sup>Greg Miller, Ph.D., Empire Chestnuts, email, July 26, 2017
- <sup>5</sup>Chestnut Gall Wasp Quarantine. Michigan Department of Agriculture Pesticide and Plant Pest Management Division. Available at [https://www.michigan.gov/documents/mda/mda\\_Chestnut\\_Gall\\_Wasp\\_Quarantine\\_321905\\_7.pdf](https://www.michigan.gov/documents/mda/mda_Chestnut_Gall_Wasp_Quarantine_321905_7.pdf)

Continued from page 3...

5. Two trees of USDA-PI #39721, from Tientsin, China, planted 1916 at the Bartlett Arboretum in Stamford (timber trees)
6. One tree of Frank Meyer's import PI #36666, from the Pingchuan region N.E. of Beijing, planted 1917 at the Bartlett Arboretum in Stamford CT (this orchard tree is the cultivar 'Bartlett')
7. Grove of trees of USDA-PI #58602 from north eastern China, planted 1926 in Dayville. There are vigorously naturalizing seedlings in surrounding fields (1992).
8. 60 trees of 'Mahogany' x 'Nanking' (WL R1T15 PI #70315 and pollen from Greg Miller, PI #108552). These are from the Fagaceae Genetics Project and were planted in 2010.

European chestnuts, *Castanea sativa*

1. One tree from wild seed collected in the Black Forest in Germany, planted 1985
2. 15 trees from four areas with wild chestnut near Bursa, Turkey, planted 1991
3. 21 trees from six eastern areas along the Black Sea in Turkey planted 2008

4. One tree from seed collected by Fred Paillet in the Cavcas Biosphere Reserve in the Caucasus Mountains of southern Russia, planted 1994

American chestnuts, *Castanea dentata*

1. About 250 trees, seedlings from Michigan, Wisconsin, New York, and Connecticut, kept alive by hypovirulence in the blight fungus population
2. Two grafts of the tree "Scientist's Cliffs" from land of Flippo Gravett in Port Republic, Maryland; had measurable resistance to chestnut blight (see Anagnostakis, 1992) (Sandy doesn't think it is a *dentata*)
3. 8 trees on Painter Hill Road, near Painter Ridge Rd., in Roxbury, used in Experiment Station crosses almost yearly from 1948 to 1961, may have some resistance to blight

American Chinquapins

1. *pumila*, one tree from Empire Chestnut Co. planted 2000, three trees from MD planted 2014
2. *ozarkensis*, 57 trees from the Ozark Plateau in OK, planted 2004 and 2005
3. *alnifolia*, two trees from Lafayette County, FL planted 1995

4. *floridana*?, four trees from north FL planted 2011

Older hybrids of special interest:

- (*sativa* X *crenata*) X *dentata*: Two trees planted 1931, one called the "Smith hybrid" and one called "Hammond-86"
- *mollissima* X *dentata*: four trees planted 1960
- *dentata* X *mollissima*: two trees planted 1936
- (*mollissima* X *dentata*) X *dentata*: two grafts of the 'Clapper' tree and one tree from seed planted 1955, called 'Graves'

These trees have been used by Experiment Station Staff and by American Chestnut Foundation scientist Fred Hebard and others for crosses and experiments for many years. They are likely to be here for future use as well. A list of the inventory of Experiment Station plantings (with maps) is available from the author upon request. ●

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## References

Anagnostakis, S. L. 1992. Measuring resistance of chestnut trees to chestnut blight. *Can. J. For. Res.* 22:568-571.



# Coping with Winter Damage in Your Chestnut Orchard

By Bernie Hilgart, Washington Chestnut Company

Our chestnut trees are important to us, we wish them no harm. When winter comes around and the chestnut trees are bare of leaves, we know the trees are at rest in a deep sleep. Even in a deep sleep, chestnut trees are complex living organisms, vulnerable to the elements. If harm does come to the trees, we likely will not see the symptoms of that harm until the following growing season.

Winter can inflict damage to chestnut trees with excessive cold, broken limbs from heavy loads of ice, drowning in water-saturated soils, and by making them vulnerable to pests that attack weakened trees.

## Broken Limbs

Broken limbs are observable when they happen - not a pretty sight, but at least the damage does not lay hidden until the next growing season is upon us. The broken limbs can be cleaned up during the winter so that when the growing season starts the orchard is clear of debris. If your orchard is located where chestnut blight is present, open wounds should be given a coating of wood sealer.

## Severe Cold

What is too cold for a chestnut tree? Too cold could be -35°F for some Chinese and European chestnut trees and their hybrids.



Figure 1. A Bouche de Betizac cultivar has cambium layer failure on the west side of the tree, possibly due to prevailing wind.



Figure 2. A Yooma cultivar with new growth returning to a tree that looked like it had died completely.

Or -15°F might be too cold, depending on the cultivar. It also depends on when and how much nitrogen was applied to the chestnut trees during the past growing season. When the weather changes from well below freezing to well above freezing in just a few hours, it's almost like us saying, "It's too hot...It's too cold...I can never seem to be comfortable in the place."

## Recent Severe Winters

We now know the cold limits of a lot of chestnut cultivars because of the 2014/2015 winter in Michigan. The winter of 2014/2015 caused a lot of winter dieback for many Michigan growers. Some orchards lost most of their Colossal trees to the severe cold. These orchards that lost their Colossals experienced -35°F or colder temperatures. Some trees had dieback all the way to the ground. Some trees died completely, and some trees had dieback to the main branches, allowing the tree to regenerate growth in the following growing season.

The winter of 2016/2017 in the Pacific Northwest brought a lot of winter dieback to some cultivars, but not all. The cultivars presenting some winter damage were Bouche de Betizac, Colossal, Prococe Migoule, and Yooma. Figure 1 shows a Bouche de Betizac has cambium layer

failure on the west side of the tree possibly due to the prevailing wind. At the 49<sup>th</sup> parallel, the sun remains very low in the sky and remains in the southern sky. So the damage is not likely sun scald. Figure 2 shows a Yooma with new growth returning to a tree that looked like it had died completely.

These two winter events, the 2014/2015 winter in MI and the 2016/2017 winter in the Pacific Northwest helped isolate a few cultivars having very good cold tolerance. At the top of the cold tolerant list is Marigoule. Other cultivars showing similar cold tolerance to the Marigoule are Szego, Bisalta #2, Basalta #3, Eaton, Luvall's Monster, Marrisard, Belle Epine, Regina, and Regis Montis.

## Dealing with the Damage

The chestnut tree in Figure 1 has suffered cambium failure of about 120 degrees on the trunk of the tree. This tree has a sucker growing from the base of the tree. The sucker would normally be removed during regular orchard maintenance. This sucker is being allowed to grow and to eventually replace the tree. The tree will eventually have a full failure of the tree in and around the area of the cambium failure, likely during a high wind event several years later. Consider using 90 degrees of failure



to be the point of where a tree will be able to heal over the failure if it is blow the 90 degrees. If the failure is 90 degrees or more, the tree will have to be replaced or allowed to regenerate from suckers. If the suckers are below the graft union, then the tree will need to be re-grafted.

The tree in Figure 3 was about 6 years old. The tree budded out and formed leaves at the start of the growing season. Over the next 30 days the tree was observed in declining health. To try to save the tree the tree was cut back by about half its size. The tree continued to decline and all the leaves and branches died. The tree was left in place for the rest of the growing season. About 5 weeks after the tree was observed to have all dead branches, suckers were observed emerging from the soils at the base of the tree. These suckers will be allowed to grow for the remainder of the growing season. The following spring one of the suckers will be selected

for placement of a new graft. The other suckers will be cut off at the ground.

### Ambrosia Beetle

When chestnut trees experience severe damage from the environmental extremes, like extreme cold or excess water during the growing season, they become weakened to the point where they become susceptible to pests such as the ambrosia beetle, AKA the shothole borer (see more information at [jenny.tfrec.wsu.edu/opm/displaySpecies.php?pn=530](http://jenny.tfrec.wsu.edu/opm/displaySpecies.php?pn=530)). The range of the AB is the entire lower 48 states of the USA. The AB actually prefers stressed trees because the tree has a weakened infection response system. The ambrosia beetle (AB) does not kill chestnut trees. The fungus the beetles carry and infect the trees with is what kills the tree.

Chestnut trees were found to have signs of AB entry into the chestnuts under stress. The most easily observable sign of the



Figure 4. This tree had ambrosia beetle entry wounds about two feet above the ground. To save the tree, the tree was cut off below the entry wounds.



Figure 3. After all the branches died on this tree, suckers were observed emerging from the soils at the base of the tree. These suckers will be allowed to grow for the remainder of the growing season. The following spring one of the suckers will be selected for placement of a new graft. The other suckers will be cut off at the ground.

AB is small holes in the bark of the tree. Usually there is more than one hole in each tree. If the AB has entered a tree, the tree will die if left without intervention. Once in the tree, insecticides are not effective to control the AB. ABs are active about the same time the chestnut trees come out of dormancy. The chestnut tree in Figure 4 had AB entry wounds about two feet above the ground. To save the tree, the tree was cut off below the entry wounds. This tree has regrowth above the graft, retaining the value of the grafted tree.

### Conclusion

Winters can be good times for chestnut producers allowing some quiet time and some rest from a very busy growing season. Winter can also be a deadly time for chestnut trees. If winter does turn ugly, the following growing season will be very demanding for time and resources. Chestnut trees have a very good ability to recover from winter damage, but some special care may be required. Good pruning equipment, constant monitoring for infections, and hoping winters like Michigan had in 2014/2015 and the Pacific Northwest had in 2016/2017 are very rare occasions, can help a chestnut producer stay determined to keep their orchard producing high quality chestnuts. ●



# Interesting New Chinese Chestnut Cultivars for 2017

By J. Michael Nave

This is a brief summary of the *Castanea mollissima* portion of the presentation I gave at the CGA annual meeting in Carrollton, Ohio on June 10, 2017. All of these trees are, as far as I know, pure *Castanea mollissima*.

## Jenny

*What's special about this cultivar: very large nuts, very flavorful nuts, nuts drop very early, very vigorous and erect tree growth.* 'Jenny' is an open pollinated seedling of the old Ohio cultivar 'Kintzel'. 'Kintzel' is discussed in detail in a 1962 NNGA Nutshell article by Frank Kintzel, who was impressed with the tree and the nuts. He stated that the tree was vigorous and exceptionally cold-hardy, and the nuts were very large and "delicious" (Figure 1). Like 'Kintzel', 'Jenny' is a vigorous tall tree with a very erect growth pattern and has large nuts with excellent flavor. Once the nuts start falling, they typically all fall very quickly. 'Jenny' does not have the orchard type growth pattern common in many Chinese chestnut trees. The tree has unusually large leaves.



Figure 1. 'Jenny'

## Emalyn's Purple

*What's special about this cultivar: very large, sweet nuts.* Nuts are very large and pubescent with an appearance that is very similar to 'Jenny' (Figure 2). Nuts drop early mid-season. Nuts have good flavor with a nice level of sweetness. The tree has a somewhat drooping growth habit.

## Nanjing Special 1 and 2

*What's special about these cultivars: extraordinary flavor.* Two trees grown

out from nuts obtained at the Nanjing Botanical Garden in 1993. Nuts from both trees have superb flavor, one of the best-tasting Chinese chestnuts I've eaten in the US. They are only mildly sweet but have a complexity of flavor that is very rare. Both trees are very similar with an erect growth pattern. Nuts are also very similar although tree number 1 may have slightly larger nuts with slightly better flavor. Nuts from tree number 1 drop early, continuing into mid-season. Nuts from tree number 2 start dropping about a week later than tree 1. The nut color is dull brown and fades quickly and unevenly, so these are not very pretty nuts.

## Kyoung

*What's special about this cultivar: large flavorful nuts on a vigorous tree.* 'Kyoung' is a true oddity, a sport from one branch of the Chinese variety 'Bess'. 'Bess' is not a very productive tree and produces irregularly shaped nuts of variable size. 'Kyoung', on the other hand, has regularly shaped nuts with consistent large size (Figure 3). 'Kyoung' nuts also have better flavor than 'Bess' nuts. When grafted, 'Kyoung' produces a vigorous and somewhat erect tree.

## Payne

*What's special about this cultivar: large nuts and good production.* The original tree at the USDA station in Byron, Georgia, where it was tree 3-3, produced the largest nuts out of hundreds of chestnut trees planted there. Those nuts were very large (~18/lb) and had good flavor. The original tree is now gone, and so far,



Figure 2. 'Emalyn's Purple' nuts, 28 grams, 33 grams, and 26 grams



Figure 3. 'Kyoung'

grafted trees have not reproduced the size of the nuts on the original tree. Those grafts have produced somewhat dwarfish trees that are heavy producers. This tree has been extensively trialed by Dr. Hill Craddock at the University of Tennessee Chattanooga. The nuts dropped mid-late season in Georgia. The tree is named for entomologist Dr. Jerry Payne who worked at the Byron research station for many years before retiring. He is responsible for the release of the gall wasp predators that eventually curbed the gall wasp infestations in Georgia and Alabama.

## Patterson

*What's special about this cultivar: very sweet nuts and heavy production on a very vigorous spreading orchard type tree.* A tree grown out from nuts from Yixian, China. Medium to large nuts fall mid-season. Tree has unusually fat, wide leaves.

## Ness

*What's special about this cultivar: large nuts with excellent flavor (Figure 4).* Tree is small and spreading, but productivity is not known yet since it is surrounded closely by other trees, and it has not been widely trialed.

## Yixian Large

*What's special about this cultivar: produces very large nuts (13-16/lb) with good flavor on a vigorous tree.* This tree is from a 1994 grow-out of very large nuts from Yixian, China, in Anhui Province. This tree is possibly a sibling of 'Shing'. A grafted tree at the University of Missouri chestnut orchard in New Franklin produced the second largest nuts growing there in 2009 with 25.5 grams mean nut weight (18/lb), beating 'Bouche de Betizac' (22.8 grams), 'Marsol' (22.6 grams), 'Marigoule' (20.8 grams), 'Luvall's Monster' (19.4 grams), 'Peach' (18.1 grams), and 'Colossal' (15.2 grams). Only 'Maraval' produced larger nuts that year (26.2 grams each or 17/lb).



### YGF (Yixian Good Flavor)

*What's special about this cultivar: produces a very flavorful, medium-large sized nut. The nuts drop over an extended period of time, from early in the season to late in the season. The tree is an erect grower. This tree originated from a grow-out of nuts from the chestnut growing region of Yixian, China, in the southern tip of Anhui Province. 'YGF' has produced some of the larger Chinese nuts grown at the University of Missouri chestnut planting in New Franklin (Figure 5).*

### Hong Kong

*What's special about this cultivar: large nuts have good flavor with nice sweetness. The best seedling grown out from a group of nuts from Hong Kong. A favorite of Dr. Ken Hunt when he worked with chestnuts at the University of Missouri. Grafted trees at the University of Missouri show vigorous growth and good productivity of medium to large nuts with no signs of blight. Nut fall is mid-season. Nuts from the original tree are consistently large (~20-22/lb).*

### YuYu

*What's special about this cultivar: large nuts with good flavor. A seedling of the Chinese cultivar 'Yu'. Productivity has not yet been evaluated because the tree is surrounded closely by other trees, and has not been extensively trialed elsewhere.*



Figure 4. 'Ness'

### Yixian Orange

*What's special about this cultivar: striking, almost fluorescent orange nuts with good flavor. Seedling grown out from nuts from Yixian, China.*

### Brown Sugar

*What's special about this cultivar: very flavorful and sweet nuts on a very vigorous tree. A seedling of 'Dunstan Revival'. Pollen parent was probably 'Qing'. Nuts are*



Figure 5. 'Yixian Good Flavor'. Photo courtesy of Dr. Hill Craddock.

medium to large in size and fall mid to late season.

### Shing

*What's special about this cultivar: very vigorous tree with good production of very tasty nuts. A seedling grown out from nuts from Yixian, China. May be a sibling of 'Yixian Large'. This tree has been extensively trialed at the University of Tennessee Chattanooga.*

### Red ABC

*What's special about this cultivar: tree has very flavorful nuts; new growth and burs have a reddish tint. Seedling of Nanjing Botanical Garden's 'Honglizi' (Red chestnut). A very vigorous tree with small nuts.*

### Musella (Byron 40)

*What's special about this cultivar: heavily productive tree, with medium size very dense nuts that store well. From the west orchard at the USDA Southeastern Fruit and Tree Nut Research Laboratory in Byron, Georgia. One of the two most productive trees out of hundreds planted at Byron.*

### LaGrange (Byron 43)

*What's special about this cultivar: heavily productive tree, with medium size very dense nuts that store well. From the west orchard at the USDA Southeastern Fruit and Tree Nut Research Laboratory in Byron, Georgia. One of the two most productive trees out of hundreds planted at Byron.*

### W.C.

*What's special about this cultivar: exceptionally sweet nuts, very similar to 'Qing', on a more vigorous tree. Not a new cultivar but a cultivar that has been widely overlooked. Named for W.C. Donoho of Louisville, KY, a member of the Kentucky Nut Growers Association. Large dark nuts are very sweet and store well. Tree may be a sibling of 'Qing' which was grown out in Kentucky also. Nuts look very similar to 'Qing', have similar size and similar sweetness, but may be even sweeter. Nuts drop one to two weeks later than 'Qing'. Both trees were apparently obtained by their Kentucky owners from the Tennessee Valley Authority. 'W.C.' is more vigorous than 'Qing' and for me grafts more easily.*



## For Sale / Seeking

CGA members can post equipment or other items they want to buy or have for sale, free. Send your submissions to [chestnutgrowersofamerica@gmail.com](mailto:chestnutgrowersofamerica@gmail.com).

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## CORNER

COOK'S

## For Chinese Chestnuts, “Low & Slow” is the Way to Go

After visiting China numerous times, I have been impressed by how thoroughly chestnuts have been incorporated into Chinese cuisine. While usage of chestnuts in the US has pretty much been limited to Thanksgiving stuffing and roasting, the Chinese have used chestnuts in dozens of ways. Even the way they roast chestnuts has many different variations.

The most interesting, and most common, feature of their roasting technique is to roast chestnuts at low temperatures (240°F or less) for extended periods of time (60 minutes or more). Roasting at lower temperatures for longer periods of time breaks down the dense Chinese nut and fully releases the flavors in the nut. It also gives the nut a softer texture, more like an American or European chestnut. A Chinese chestnut that is cooked at 350°F or above for short periods of time (30 minutes or less), will normally have a burnt or hard exterior and an almost uncooked interior. The flavor will not be well developed.

Cooking Chinese chestnuts in this manner has led to a popular belief in the US that they are inferior for fresh eating to American or European chestnuts. American and European chestnuts that are cooked at high temperatures for short periods or time will be mostly cooked and falling apart, and the flavors will be well developed. Because Chinese chestnuts are much denser than American and European chestnuts, they benefit from slower, more thorough cooking at lower temperatures. Their density also gives Chinese nuts greater versatility in cooking. For example, Chinese chestnuts can be used in many dishes such as soups and stews without falling apart.

To fully understand how the density of the nut impacts cooking, it may be helpful to compare cooking chestnuts to cooking beef. Different cuts of beef have different textures and densities. Tenderloin (so named because of the soft texture of the meat) is

quite different than brisket. Tenderloin may be cooked at high temperatures for short periods of time. The result is beef that is soft and full of flavor. Brisket on the other hand is a much denser cut of meat. Cooking it at high temperatures for short periods of time will result in a burnt exterior and an uncooked interior. The meat will also be tough and difficult to chew. To properly cook brisket requires cooking for longer periods of time at lower temperatures to allow the heat to penetrate to the interior of the meat. This results in a much more flavorful brisket with a softer texture. Chinese chestnuts are the brisket of the chestnut world. They are exceptionally good eating when properly cooked.

Another benefit to cooking Chinese chestnuts at lower temperatures is that the shells do not need to be cut. In the US, chestnut shells are normally cut when nuts are to be roasted to allow heated water vapor to escape. If the shell is not cut, the expanding water vapor will cause the shell to explode. But when a Chinese chestnut is cooked at 240°F or below, it will not normally explode because the buildup of water vapor is very slow and can escape without exploding the shell. This also results in another benefit. When the shell is not cut, the cooked nut retains more moisture which results in a better texture for the nut. To some extent, not cutting the shell also results in a partial steaming of the nut. It's simply a better way to cook Chinese chestnuts. Which brings up the point that Chinese chestnuts can also be cooked by boiling for at least 60 minutes. Boiling is not optimal for American or European chestnuts because the nuts tend to get very soggy and fall apart, which also makes it difficult to peel them. Because Chinese nuts are denser, they don't absorb as much water and tend not to fall apart after boiling, which also makes them easier to peel after boiling. -- J. Michael Nave



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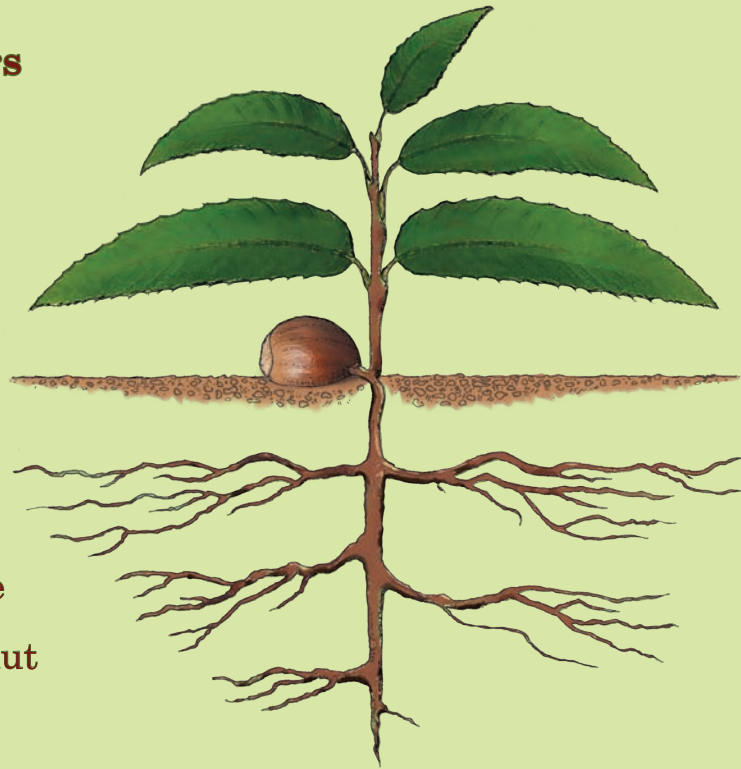


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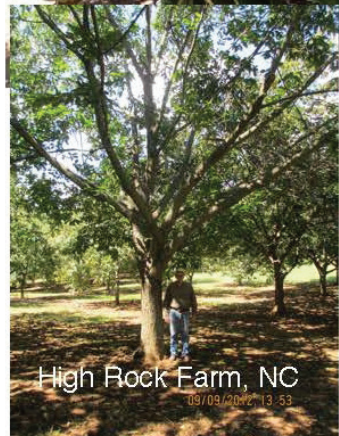
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