Chestnut Growers of America
Promoting Chestnuts and Connecting Chestnut Growers

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The Chestnut Grower

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2021 Annual Chestnut Market Survey Report: Price Remains High and Imports Have Decreased

By Zhen Cai and Michael Gold, University of Missouri Center for Agroforestry

In This Issue

The Annual Chestnut Market Survey was initiated by Chestnut Growers of America and the Center for Agroforestry at the University of Missouri in 2010. The aim of this annual survey is to keep track of the growth of the chestnut industry over time and provide chestnut growers with information on the current and potential chestnut market. The 2021 Annual Chestnut Market Survey questionnaire was sent out to 181 current and past CGA members. In total, 62 useable surveys were collected with a response rate of 34%.

This report not only discusses the findings from the survey but also includes an overview of U.S. chestnut imports. All the import data are obtained from Tridge, which is an online platform that helps trade agricultural products across the world. The specific website link to retrieve chestnut import data is: www.tridge.com/intelligences/chestnut/import. To see the data, you will have to register on the website.

The 2021 Annual Chestnut Market Survey Findings

Production Operation

Survey respondents included: chestnut growers, sellers or value-added producers (91%), chestnut researchers/educators (3%), and future chestnut growers (6%). Nine respondents were chestnut cooperative members, including: Chestnut Growers, Inc. (5 respondents), RT 9 co-op (1 respondent), and Prairie Grove

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The Chestnut Grower

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About Chestnut Growers of America, Inc.

The purpose of Chestnut Growers of America 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.

CGA began as the Western Chestnut Growers in 1996 in Oregon where about 30 or so chestnut growers understood the need to join forces to promote chestnuts in the U.S. Eventually they realized that they needed to be a national organization and solicited memberships from every grower in the country, which took the membership to over 100. The name of the organization was changed to Chestnut Growers of America, Inc., and it was granted 501(c)(5) status. Annual meetings take place around the country in an effort to make it possible for a maximum number of people to attend. A newsletter, *The Chestnut Grower*, is published quarterly and distributed by mail and/or email. CGA maintains an extensive resource site available only to members containing information helpful in growing and marketing. Visit chestnutgrowers.org for more information.

Annual Membership Dues

Single membership, $45; Household membership, $55; Associate membership, $60. Members receive *The Chestnut Grower* quarterly. Emailed newsletters are included. Mailed newsletters are an additional $5 per year. A $10 late fee is applied to membership renewals submitted after April 1.

Advertising Rates

Full page	$20.00
Half page	$15.00
Quarter page	$10.00
Business card (4 issues)	$15.00
Classifieds	**FREE**

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Editorial Opinion

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Message from CGA President Roger Blackwell, Chestnut Grower

Thank you all for attending and having a great time at our 2021 Annual Chestnut Growers of America Meeting as a Zoom Meeting. I want to thank all the presenters and Sara Fitzsimmons for all the resources provided to make an informative chestnut Zoom meeting.

The following is a summary of the speakers and topics presented. It was exceptionally good to hear from Dr. Mike Gold presenting the 2020 marketing survey results. It would have been nice to see more growers respond to the survey. Also on Monday, we were able to hear from different growers around the country on how the chestnut orchards were looking for this year. On Tuesday we had two outstanding presentations. Dr. Ron Revord presented the Chestnut Breeding Program being established at the University of Missouri. We are constantly learning more about the chestnut trees that can thrive in our country. The second presentation was from Dr. Guido Bassi, Agronomist from Italy. I think we all wish we were a lot younger to benefit from the knowledge we have about growing and developing chestnut orchards.

In this issue we have Mike Gold's report on the updated annual survey of chestnut production and markets through the Center of Agroforestry at the University of Missouri. We also have an article from Dr. Jeanne Romero-Severson's grant research on Ancestry Informative DNA Markers for chestnut genetics and identification (AIMS), as well as an article from Erin Lizotte with Michigan State University Extension on how to estimate your crop load.

Please mark your calendars for next year as we plan to have our Annual CGA Meeting in Pennsylvania. The tentative dates for the meeting are **June 12, 13, and 14, 2022**.

Have a wonderful summer and many pounds of chestnuts in the coming harvest season.

Best regards,

Roger R. Blackwell

Roger

AIMs Project Outcomes: Aims Fulfilled and Next Steps

By Jeanne Romero-Severson, Professor, University of Notre Dame, Notre Dame, IN | jromeros@nd.edu

For background information on the AIMs project, see the cover article published in the January 2018 issue of The Chestnut Grower and the article starting on page 3 in the January 2019 Chestnut Grower. Past newsletters are available on the members-only page of the CGA website, chestnutgrowers.org.

Background

The AIMs project arose out of the realization that hybrid chestnuts occur in naturally regenerated forests and in the orchards of chestnut growers. The hybrids in forests may occur due to sympatry with the native chinquapin species in the southern region of the previous native range of American chestnut. Hybrids in forests may also occur due to the naturalization and subsequent introgression of "intentional" hybrids, those made by chestnut growers hoping to improve the germplasm, and those made by USDA, University, and nonprofit organization scientists to study the host range of chestnut blight and to introgress the naturally occurring resistance in most Chinese chestnuts in the American chestnut. The low species barriers in *Castanea* could also have resulted in "unintentional" hybrids, those resulting from outcrossing with species and hybrids in chestnut orchards to natural forest settings. These factors plus the loss or lack of records on the location of intentional hybrids could have resulted in admixed descendants in orchards and natural settings. An additional complication is the difficulty of recognizing admixed trees, hybrid trees, or even species atypical trees by morphology alone. In the context of this report, "hybrid" means admixture consistent with F_1 hybrid. All other admixtures are simply reported as "admixed".

Aims of the AIMs Project

1. Identify and develop a set of markers, each of which are polymorphic across all *Castanea* species, reproducible, accurate, scalable, and platform independent.
2. Collect and genotype enough samples from putative "pure species" to detect admixture of species in any *Castanea* individual, at 5% or higher, for any combination of possible species.
3. Collect and genotype samples of naturally occurring American chestnut, other American chestnuts of paramount importance (e.g., Ellis), and chestnuts of interest to growers.
4. Optimize the approach to maintain accuracy, precision, and scalability while at the same time lowering the fully loaded cost per sample.

Results

The final dataset consisted of genotypes of 42 sequenced EST-SSR markers on each of 192 samples. The sample set included, as identified by the contributors, 42 *C. mollissima* (Chinese chestnut), 6 *C. henryi*, 3 *C. sequinii*, 22 *C. crenata* (Japanese chestnut), 18 *C. sativa* (European chestnut), 55 *C. dentata* (American chestnut), 13 *C. pumila* (Allegheny chinquapin), 33 *C. ozarkensis* (Ozark chinquapin), the chestnut cultivar hybrid 'Paragon' (*C. dentata*/*C. sativa*) and complex hybrid 'Luvall's Monster', of unknown ancestry. The samples included

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If you missed the CGA Virtual Meeting…

The recordings from the 2021 Virtual Annual Meeting are available on the PSU website:

Day 1, Monday, June 7: bit.ly/cga-2021-day-1

- 0:00:00 – 0:57:00: CGA Business Meeting
- 0:57:00 – 1:48:00: Michael Gold – CGA Annual Market Survey

Day 2, Tuesday, June 8: bit.ly/cga-2021-day2

- 0:00:00 – 0:02:30: Welcome, Intros
- 0:02:30 – 0:06:00: Michael Gold – Overview of US Chestnut Imports, 2020
- 0:06:00 – 1:04:00: Ron Revord – Participatory Chestnut Breeding
- 1:04:00 – 2:48:29: Guido Bassi – Chestnut Growing in Cuneo, Italy
- 1:30:00 – 1:43:00: Technical difficulties as we lost Guido's connection; general conversation among the group

2021 CGA Member Directory

An updated Member Directory was sent to all CGA members via email. If you have any corrections to your listing, or if you would like to receive a printed copy, please send a request to the editor at chestnutgrowersofamerica@gmail.com.

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Chestnut Growers (3 respondents). Survey responses came from 22 different states (Table 1).

Approximately 42% of the chestnut orchards owned by our respondents are at least 10 years old. Respondents reported a total of 703 acres of land planted in chestnuts (this accounts for 17% of the total acres of U.S. chestnuts orchards) (Table 2). 274 acres are owned by co-op members.

In terms of chestnut orchard size, 64% of our respondents indicated that they have less than 10 acres of chestnuts planted (Figure 1). Approximately 43% of respondents had plans to expand their orchards in the future (Table 3).

The majority of our respondents (73%) grow chestnuts using conventional methods, while 27% use some form of organic production (but often not officially certified as USDA Organic). Of those respondents who used conventional methods, 65% used inorganic fertilizer, 62% used insecticide, and 78% used herbicide.

Harvest and Yield

A total of 123,595 pounds of chestnuts (41% from co-op members) were reported in the 2020 harvest (Note: These harvest figures only represent data reported from 25 individual producers and an additional 6 coop members. Without any doubt, the total pounds harvested by all CGA members would represent a larger number if all members responded to the survey). Almost the entire reported chestnut harvest, 97%, came from orchards that were at least 10 years old.

Table 1. *Locations of chestnut orchards owned by the 2021 survey respondents.*

State	# of orchards	State	# of orchards
IA	8	CA	1
IL	6	FL	1
MI	6	GA	1
NC	5	IN	1
MO	4	KS	1
SC	3	KY	1
MS	2	MA	1
NY	2	MN	1
OH	2	OK	1
OR	2	PA	1
WA	2	VA	1
		Total	53

Approximately 16% of the non-coop respondents harvested at least 10,000 pounds of chestnuts in 2020 (Figure 2). More than half of our respondents (55%) picked up their chestnuts by hand, and 35% of the respondents indicated they used nut wizards to harvest chestnuts. This shows there is almost no reported use of commercial harvesters and reflects the small-scale and low tonnage reported for most growers. Only 21% of respondents reported their yields were higher compared to the previous reporting year, 72% reported no change in yield, and 7% reported lower yields. Increased yields were reported due to maturation of orchards and/or good weather. Lower yields were attributed to bad weather conditions.

Marketing

Value-added chestnut products producers only accounted for 8% of the respondents. The majority of respondents (62%) produced and marketed chestnuts by themselves, and 18% marketed all their chestnuts through a grower co-op (Figure 3).

Income from Chestnuts

In 2020, annual gross sales income from chestnuts greater than $50,000 were reported by 8% of respondents, and annual gross sales exceeding $100,000 were reported by 5% of respondents (excluding shipping and delivery) (Figure 4). The majority of respondents, 68%, reported annual gross sales less than $5,000. Only 8% of the respondents reported earning income from the sale of value-added products.

Market Outlets and Prices

Growers sell fresh chestnuts and value-added products through a variety of different outlets (Figure 5) including: marketing cooperative, farmers market, restaurants/chefs, distributor/broker, health and natural food store, grocery store, wholesaler, online, and on -farm sales. Compared to the 2018 harvest (reported in 2019), the percentage of respondents who marketed their chestnuts online (41%) and through wholesalers (30%) increased in 2020. The percentage of respondents who marketed their products through a marketing cooperative (19%) and health and natural food stores (4%) decreased.

Table 5 (next page) provides a year-to-year comparison of reported chestnut prices at different market outlets from 2016 to 2020. Overall, prices are holding steady or increasing from 2016-2020. An important and positive point to note is that in 2020, no sales were reported "below the cost of production" in an attempt to undercut the market.

Demand for Fresh Chestnuts and Value-added Products – A Healthy Trend

In 2020, increased demand for fresh chestnuts was reported by 74% of respondents compared to the previous year (51% reported increased demand in 2018). In terms of supply and demand in the current market, 49% of respondents indicated demand exceeded supply, compared to 12% reporting demand below supply.

Respondents were also asked to comment on the demand for value-added chestnut products. Only 11 responses were provided

Table 2. *Total acres planted in chestnuts.*

	2020-2021	2018-2019	2017-2018
Total acres planted in chestnuts	703 ac	824 ac	663 ac

Table 3. *Respondents' plans for orchard expansion.*

	2020-2021	2020-2021 (Co-op) N=10	2018-2019	2018-2019 (Co-op) N=9
Yes	43%	30%	40%	44%
No	57%	70%	60%	56%
New Acres	220	14	236	27
New Trees	4,728	1,740	10,740	3,050

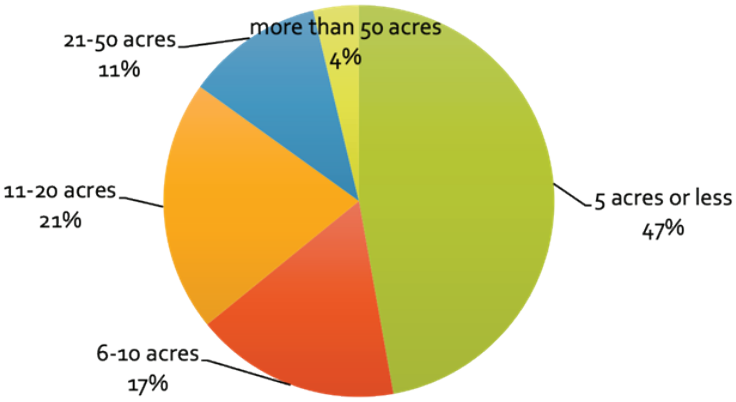

Figure 1. Sizes of chestnut orchards owned by the 2021 survey respondents (N=53).

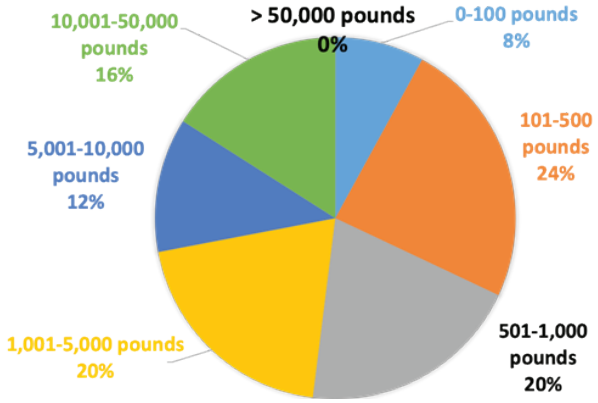

Figure 2. Number of pounds of chestnuts harvested by respondents in 2020 (N=25).

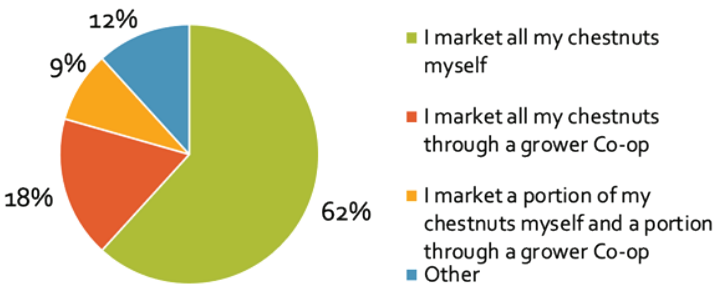

Figure 3. How respondents marketed their chestnuts in 2020 (N=35).

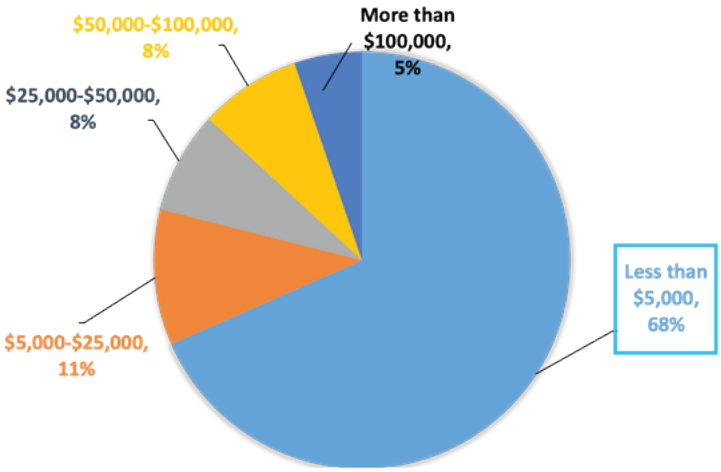

Figure 4. Approximate annual gross sales income from chestnuts in 2020 - excluding shipping and delivery (N=38).

Table 4. Top 6 chestnut import origins, market shares, and import value in 2020. Source: www.tridge.com/intelligences/chestnut/US.

Country	% of Market Share	$ Value
Italy	70.8%	8.23 million
South Korea	10.9%	1.27 million
China	9.8%	1.13 million
Portugal	6.8%	800,000
Chile	1.3%	156,000
Hong Kong	0.4%	40,500

with 9% (N=1) reporting a strong demand for value-added chestnut products, and 18% reporting a weak demand (N=2). These responses reflect the overall lack of value-added sales reported in 2020. In previous years, approximately 40% of responses indicated strong demand for value-added products with no previous reports of weak demand.

Information on Chestnut Cooperatives

This year's chestnut cooperative survey collected information from three chestnut cooperatives. On average, each cooperative has 34 members. Cooperatives reported on average of 45,667 pounds per cooperative were sold in 2020. Most chestnuts were sold in Illinois, Georgia, Texas, Michigan, Rhode Island, Massachusetts, and New Jersey. None of the chestnuts sold by cooperatives are organic. Chestnuts sold by cooperatives reported retail prices from $3.60 - $8.00/lb., and wholesale prices from $3.50 - $4.50/lb. Outlets for coop chestnuts included: restaurants/chefs ($4/lb.), distributor/broker ($3.50/lb.), grocery ($3.60 - $4.00/lb.), and online consumers ($4.00 - $8.00/lb.).

Overview of Chestnut Imports – 2020

U.S. chestnut imports have decreased over the past several years (2015 – 2020). In 2020, the import value was $11.6 million, a decrease of 21% since 2015 (Figure 6). The import volume in 2020 was 2.82 metric tons or 6.2 million pounds, a decrease of 49% since 2015 (Figure 7). The average chestnut import price was $1.88/lb. in 2020.

In terms of origins of chestnut imports to the U.S., Italy, South Korea, China, Portugal, Chile, and Hong Kong are the main regions (Table 4). Imports from Italy (70.78%), South Korea (10.89%), and China (9.76%) accounted for more than 90% of all the chestnut imports to the U.S. From 2015 – 2020, imports from South Korea and China have decreased by 40% and 55%, respectively. Imports from Chile, while small, have increased dramatically (Table 6, next page).

Conclusion

Due to a variety of weather issues, reported chestnut production in 2020 (~124,000 lbs.) was far below the peak in 2018 (~470,000 lbs). More than half of chestnut orchards are of pre-commercial age. Co-op members tend to have more mature orchards compared to non-co-op members. Commercial harvesters have not been widely used due to the small-scale of most chestnut orchards. The number of respondents marketing their products online direct

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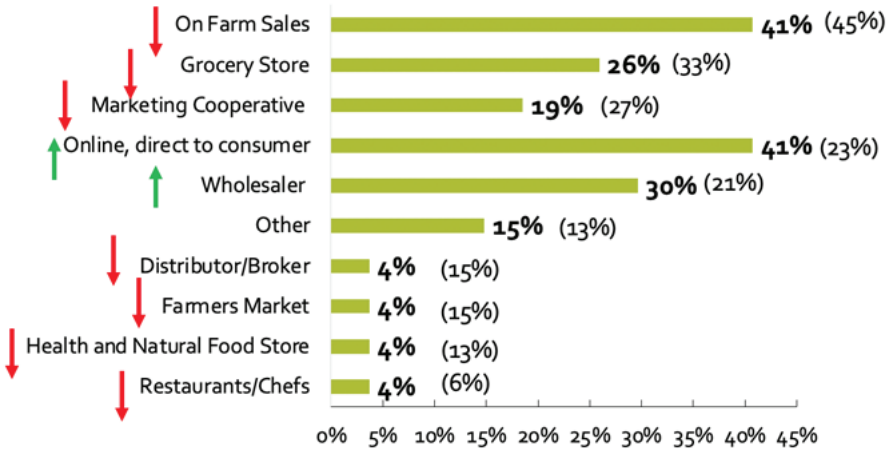

Figure 5. Market outlets for fresh chestnuts and value-added products (numbers in parentheses are data from the previous survey) (N=27).

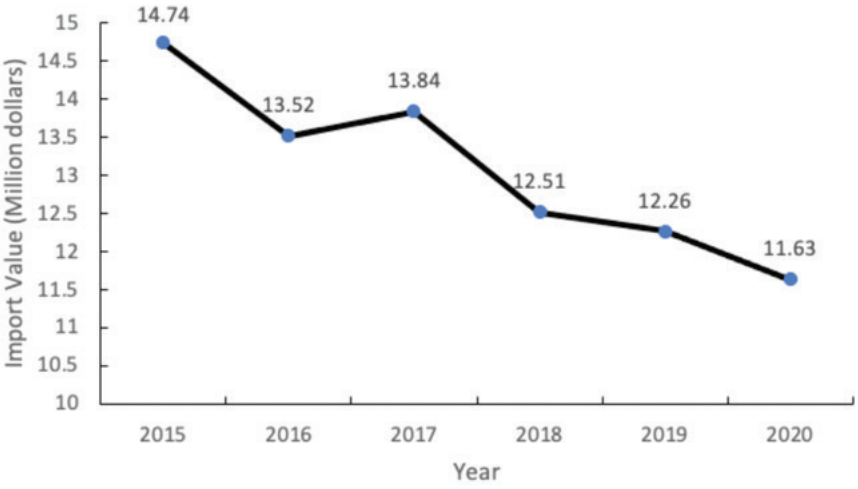

Figure 6. U.S. Chestnut Import Value (in million dollars) from 2015 – 2020. Source: www.tridge.com/intelligences/chestnut/US

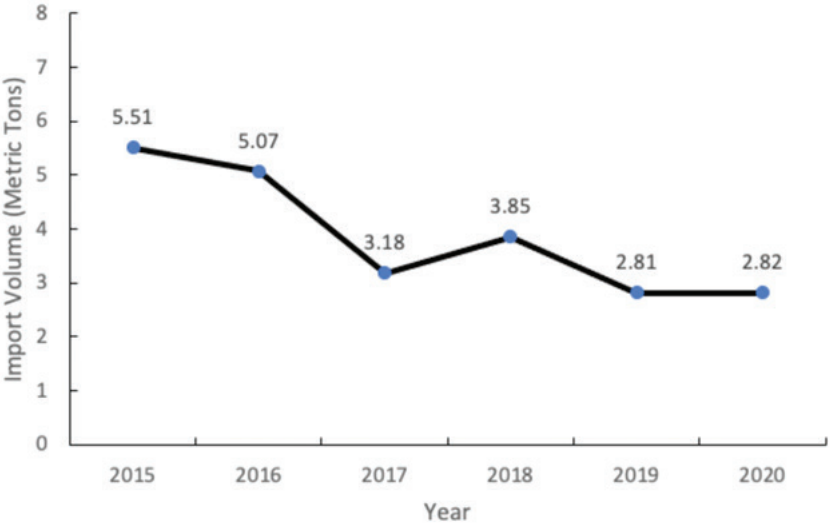

Figure 7. U.S. Chestnut Import Volume (in Metric Tons) from 2015 – 2020. Source: www.tridge.com/intelligences/chestnut/US

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to consumers almost doubled in 2020 compared to the 2019 survey result (likely a response to COVID).

The chestnut industry is still growing. Overall chestnut prices remain strong. Most growers are optimistic about the current chestnut market demand. Many growers are still planning to expand their chestnut orchards.

Table 5. Chestnut prices at different market outlets.

Outlet	Price Range			
	2020-2021	2018-2019	2017-2018	2016-2017
Marketing cooperative	$2.50-$3.50	$1.60-$2.80	$1.50-$4.50	$1.00-$3.75
Farmers market	$6.00-$7.00	$2.00-$6.75	$4.00-$6.00	$5.50-$7.00
Restaurants/chefs	No Info	$3.50-$5.50	$3.50	$5.50
Distributor/broker	No Info	$2.85-$5.50	$3.50-$4.10	$1.00
Health and natural food store	$4.60	$4.00-$4.60	$2.25-$5.75	$4.65
Grocery store	$3.00-$6.00	$3.10-$6.00	$3.25-$4.10	$1.00
Wholesaler	$2.50-$5.25	$2.00-$7.00	$3.50-$4.00	$1.82-$3.81
Online, direct to consumer	$4.25 - $10.00	$5.00-$6.75	$5.50-$8.00	$3.50 - $8.40
On-farm sales	$4.00-$8.00	$1.00-$6.50	$2.00-$8.00	$2.50-$8.40

Table 6. Top chestnut import origin trends (2015 – 2020). Source: www.tridge.com/intelligences/chestnut/US.

Country	1-Year Growth in Import Value 2019 - 2020	3-Year Growth in Import Value 2017 - 2020	5-Year Growth in Import Value 2015 - 2020	Import Quantity 2020	1 – Year Growth in Quantity	Unit Price of Import	1 – Year Growth in Price
Global	-5.14%	-15.98%	-21.13%	2.82K	+0.19%	4.13 K	- 5.32%
Italy	+6.3%	-5.02%	+2.91%	1.16K	+2.48%	7.10K	+ 3.73%
S. Korea	-18.78%	-1.74%	-39.84%	313.68	-38.45%	4.04K	+31.97%
China	+13.66%	-64.08%	-54.61%	1.15K	+27.36%	988.31K	-10.76%
Portugal	+11.82%	+38.71%	-12.98%	123.57	+13.06%	6.47K	-1.1%
Chile	-47.49%	+468%	+2584%	60.50	+62.57%	2.57K	-67.7%
Hong Kong	+28.56%	+84.55%	+69.16%	12.77	+119%	3.17K	-49.19%

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3 sets of technical replicates and 2 sets of biological replicates.

The analysis method employed was Prichard's STRUCTURE[1], a Bayesian approach that is agnostic to human-assigned species labels. The method is not sensitive to the order of the data. This method tests the likelihood of a series of possible priors. The prior is how many groups there are (1 group, 2 groups, etc.). The likelihood of each prior is tested, then compared with the others. The analysis detects the group composition of individual samples, given the prior. Thus, admixture estimates arise directly from the analysis without regard to what the humans think. The data were scored by repeatedly sequencing (~50x) through a simple sequence repeat (SSR) embedded in an expressed sequence to obtain accurate sequence and then counting the number of repeats.

The variation in technical and biological reps was due to missing data, not differences in allele calls. Missing data can generate "ghost admixture" estimates, the magnitude of which depend on the context of the entire dataset. In this dataset, based on the replicate data, any admixture below 3% is likely to be spooky (i.e., unlikely to reappear again).

How the groups change as K goes from 8 to 6: Examining which grouping merges or splits at different values for the number of groups reveals how "robust" a group designation is. The groups shown (p1-6) are for K = 8, the current understanding of the number of putative species the data set includes. As K goes down (p7), the only groups to disappear are *C. seguinii*, which merges into the *C. henryi* group at K = 7, then both *C sequinii* and *C. henryi* merge into admixtures of *C. mollissima* with either *C. ozarkensis* or *C. crenata*, at K = 6. The Evanno method (a method of selecting at which K value the data are most likely) chooses K = 6.[2] This result is most likely driven by the small number of *C. henryi* and *C. sequinii* samples. Alternative interpretations are premature until the sample size of these two species is increased. Note that most of admixtures detected, including the Cape Elizabeth, Maine samples, do not change across these 3 groupings. *To see all figures associated with this report, visit the member page at chestnutgrowers.org. See table on next page for some notable admixtures.*

Aims Fulfillment

The first aim is fulfilled in all respects except the scalability. The method requires 100 samples to be cost-effective, given the next-gen sequencing approach. The second aim is fulfilled with respect to *C. mollissima* and *C. dentata*. The current collection of *C. crenata* and *C. sativa* are sufficient for the purpose of this analysis but require 10 to 20 more unrelated trees of each species for the accurate estimate of ancestry involving 3 or more species. This aim is not fulfilled with respect to *C. henryi* and *C. sequinii*. This aim is also inadequately fulfilled for *C. pumila* and *C. ozarkensis*. Ten to 15 more unrelated individuals of the Chinese chinquapins and *C. pumila* are needed. The third aim is not fulfilled in that not enough *C. dentata* could be included given the cost of the analysis. The fourth aim is unfulfilled.

Next Steps

Ron Revord at the University of Missouri and I at Notre Dame are funded to lead a participatory breeding program for chestnut growers in the central U.S. My part of this project will include the completion of aims two, three, and four above, followed by extensive genotyping of the germplasm available from growers. The latter activity will include generation of pedigrees as well as ascertainment of admixtures.

Conclusion

The results shown clearly show that unsuspected admixed *Castanea* occur in naturally regenerated forests, in the orchards of chestnut growers and in the orchards of breeding programs. Admixtures of American chestnuts and the native chinquapins are likely to be a long-standing natural result of range overlap. Some admixture with non-native *Castanea* may have preceded the appearance of ink disease and chestnut blight, at least in certain locations. Thus, consideration of what is "native", for the purpose of restoration, may be less important than consideration of ecological equivalence, at least under certain circumstances.

[1]Falush D, Stephens M, Pritchard J: Inference of population structure using multilocus genotype data: linked loci and correlated allele frequencies. Genetics 2003, 164:1567-1587.

[2]Earl DA, vonHoldt BM: STRUCTURE HARVESTER: a website and program for visualizing STRUCTURE output and implementing the Evanno method. Conservation Genetics Resources 2012, 4(2):359-361.

This report was originally submitted May 18, 2020.

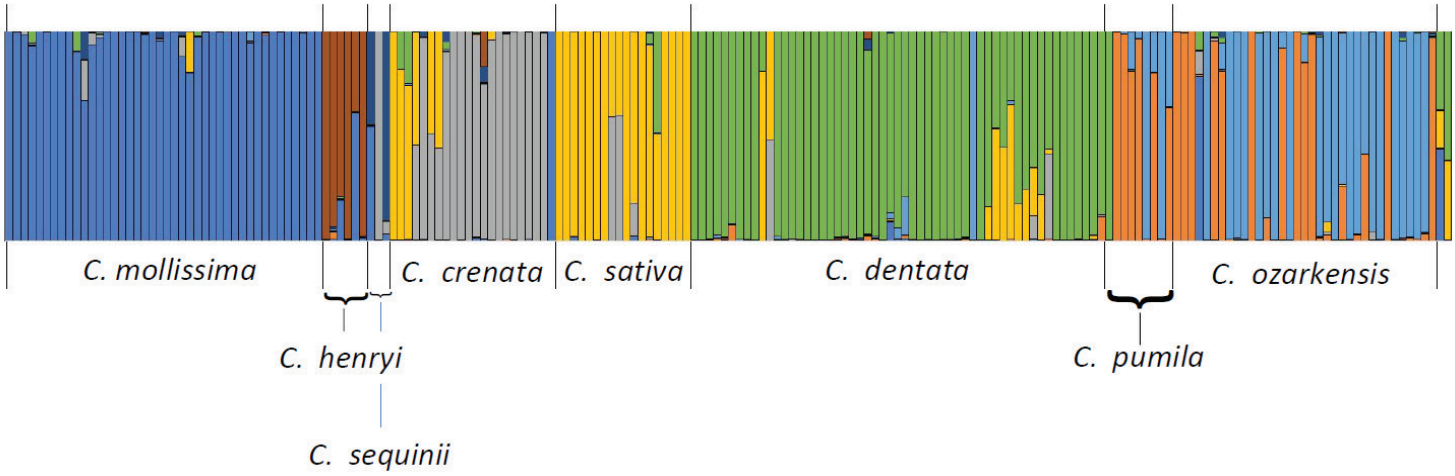

Figure 1. *192 individuals, 42 qualified and sequenced EST-SSR markers. The individuals are grouped by putative species. The species labels indicated are those the collectors designated. The colors indicate the groups STRUCTURE detected at K = 8. For the complete set of figures associated with this report, see the chestnutgrowers.org members only page under Research & Breeding.*

Meet the Board: 2021 - 2022 CGA Board of Directors

Roger Blackwell, President
New Era Chestnuts, LLC
Milford, Michigan

Vice President: Currently Vacant
If interested, contact Roger Blackwell, President.

Jack Kirk, Secretary/ Treasuer
Rocky Creek Chestnut Farm
Richmond, Virginia

Sara Fitzsimmons
Penn State University
University Park, Pennsylvania

Steve Jones
Colossal Orchards Inc.
Selah, Washington

Greg Miller
Empire Chestnut Company
Carrollton, Ohio

Tom Wahl
Red Fern Farm
Wapello, Iowa

Luke Wilson
Wil-Ker-Son Ranch
Gridley, California

Table 1. Some notable admixtures (by sample number; see page 7).

Under presumed *C. mollissima*		
11	Schmucki timber type	Admixed with *C. crenata* and *C. seguinii*/*C. henryi*
25	Chestnut cultivar Heritage	Admixed with *C. sativa*
Under presumed *C. sequinii*		
2	Tree possibly from Mo lut tsz, from China via S. Anagnostokis	Unadmixed *C. crenata*
Under presumed *C. crenata*		
22	Tree thought to be possible *C. crenata*/*C. sativa* hybrid	Unadmixed *C. mollissima*
Under presumed *C. sativa*		
8, 9	These are identical	*C. sativa*/*C. crenata* hybrid
14	Berlin sativa	*C. sativa*/*C. dentata* hybrid
Under presumed *C. dentata*		
10	Nursery stock tree	*C. sativa* admixed with *C. dentata*
11	Nursery stock tree	*C. sativa*/*C. crenata* hybrid
24	Naturally occurring tree	Evidence of admixture with *C. henryi*/*C. sequinii* (requires confirmation)
27	TACF breeding program tree	Slight admixture with *C. mollissima*
28	TACF breeding program tree	Evidence of admixture with *C. ozarkensis* (requires confirmation)
29	TACF breeding program tree	Admixed with *C. ozarkensis*
38	TACF chapter breeding program tree	Unadmixed *C. ozarkensis*
40	Cape Elizabeth, Maine	Admixed with *C. sativa*
41	Cape Elizabeth, Maine	*C. dentata*/*C. sativa* hybrid
42	Cape Elizabeth, Maine	*C. dentata*/*C. sativa* hybrid
43	Cape Elizabeth, Maine	*C. dentata*/*C. sativa* hybrid
44	Cape Elizabeth, Maine	Admixed with *C. sativa*
45	Cape Elizabeth, Maine	Admixed with *C. sativa*
46	Cape Elizabeth, Maine	Admixed with *C. sativa* and *C. crenata*
47	Cape Elizabeth, Maine	Admixed with *C. sativa*
48	Cape Elizabeth, Maine	Admixed with *C. crenata*
54	Naturally occurring progeny of native tree	Admixed with *C. pumila*
Under presumed *C. pumila* or *C. ozarkensis*		
1	Tree near Marshall, VA, presumed *C. pumila*	Unadmixed *C. dentata*
13	Progeny of *C. pumila*/Johnson *C. ozarkensis*	*C. mollissima* admixed with *C. sativa* and *C. crenata*

Resources for Chestnut Growers

TACF Chestnut Chat: Site Selection and Planting American Chestnuts, presented by Sara Fitzsimmons:
youtu.be/3tM-p8W-DBQ

Univeristy of Missouri Agroforestry in Action Technical Guides:
centerforagroforestry.org/landowners/resources/agroforestry-in-action-technical-guides

For more resources, check out CGA's extensive collection on our Members Only page on our website.
Found a resource you'd like to share? Email the editor at chestnutgrowersofamerica@gmail.com.

Estimating Crop Load in Edible Chestnuts

By Erin Lizotte, Michigan State University Extension, and Dennis Fulbright

Chestnut growers should accurately estimate their crop each year, as this is the start of the process of setting prices. Even though chestnut is a fall crop, market negotiations start as early as August, particularly in years with large crops. To estimate yield, consider tree age, type, and weather events when you evaluate how large the yield might be. For example, if there was a frost in spring or a harsh winter, we would expect to see reduced yields. Droughts, excessive rain, pollination weather, and excessive heat may also factor into the yield.

When considering tree types, we are primarily delineating based on whether the trees are seedlings or cultivars. Seedling trees are genetic individuals with high levels of variability, making the crop load of seedling trees much more difficult to estimate. Conversely, cultivars are genetically identical, making their performance more predictable and uniform.

That being said, each cultivar is different and requires we estimate them separately. For example, the cultivars Colossal and Labor Day would require separate crop load estimates and then be extrapolated proportionally based on their representation in a given orchard. For those of you with primarily Colossal and a couple other cultivars, the estimation is much simpler and should be more accurate. Experience and speed of crop load estimation improves quickly with practice.

Protocol

To estimate crop load, estimate the number of nuts per bur first and then estimate the number of burs per tree. These estimates should be performed for each cultivar and age group, as applicable.

To estimate the nuts, open five burs from five trees of each cultivar and age. Sample from all sides and reachable heights of the tree. Normally, there will be one or two nuts in a bur and sometimes three. Add up the total number of nuts you observed and divide it by the number of burs to estimate the number of nuts per bur.

For example, if you looked at five burs on five 8-year-old Colossal trees (25 burs total) and counted 45 nuts, you would divide 45 nuts by 25 burs = 1.8 nuts per bur on average. Perhaps your 12-year-old Colossal trees had more nuts and averaged 1.9 nuts per bur.

As chestnut burs develop, begin estimating crop load and planning for sales this fall. Photo by Erin Lizotte, MSU Extension.

To estimate burs, divide the tree into four quadrants (north, south, east, and west) to help improve accuracy. Count the number of burs on the end of each branch within each quadrant on five trees. Again, trees of differing age should be measured separately. Add the number of burs on five trees in each age and cultivar class and divide by five to determine the average bur count per tree.

For example, if the five trees you evaluate contain 112, 126, 108, 100, and 145 burs, then the average burs per tree equals 591 burs divided by five trees = 118.2 burs per tree. Consider using a small, handheld click counter to assist you.

To extrapolate crop load from the nut and bur estimations, use the following formula:

(Nuts per bur x burs per tree x number of trees in class) ÷ nuts per pound* = crop load in pounds

To complete this formula, you need to know how many nuts per pound to expect. Generally, Colossal can have about 20-30 nuts per pound, so for our purposes we could average that out to 25 nuts per pound. Nuts per pound is part of the estimation that has the potential to cause errors. If the nuts are smaller (30 nuts per pound), you will have fewer pounds; if larger (18 nuts per pound), you will have more pounds. If trees have been shaded in some areas of the orchard, there will be fewer burs, and if you have full sun, you might have more burs in some areas.

For the examples we have created above, let's do the math:

(1.8 nuts per bur x 118 burs per tree x 50 trees) ÷ 25 nuts per pound = 424.8 pounds of nuts on the 8-year-old Colossal trees in this example

Again, this would have to be repeated for each cultivar and age class and then added together to get the farm total.

To get an accurate estimate on seedlings, estimate each tree separately. The pounds from a group of seedling trees may range from 0 to 60 pounds depending on the age, history, and weather.

Timing

The earlier you can make an estimate, the better. However, it is often difficult to determine how many nuts are actually developing in the bur. In most cases, there will always be three nuts, but some only have fibers, and some have a small amount of nut kernel or just a gelatinous embryo. The earlier burrs are opened, the harder it is to accurately count the number of nuts in a bur. Practice your estimate in mid-August and then recheck them for accuracy in early-mid September.

This article was originally published in 2017 by Michigan State University Extension, extension.msu.edu.


Interested in learning more about chestnuts and chestnut growing? You're invited to join Chestnut Growers of America.

Chestnut Growers of America

Join Today!

Promoting Chestnuts and Connecting Chestnut Growers

chestnutgrowers.org

What is Chestnut Growers of America?

Chestnut Growers of America is a collective of over 100 chestnut growers from all over the U.S. and beyond who work together to share information with each other on growing and selling chestnuts and to promote chestnuts in the marketplace.

CGA strives to promote chestnuts, disseminate information to chestnut growers, improve communications between growers within the industry, support research and breeding work, and generally to further the interests and knowledge of chestnut growers.

Benefits of Membership

Membership in CGA connects you to a network of growers who are all interested in learning from each other's ideas and experiences.

Members receive the CGA newsletter quarterly, which contains helpful articles with the most current information on growing and selling chestnuts, chestnut event announcements, chestnut recipes, and a classifieds section, which is free to members.

Annual membership meetings take place in a different location around the country every year to make it possible for a maximum number of people to attend.

CGA also maintains an extensive resource website available exclusively to members which contains information helpful in growing and marketing chestnuts.

How to Join

Complete the application on the back or download a fillable PDF from chestnutgrowers.org. Follow the instructions at the top of the form to submit your application and member dues. CGA membership is very affordable, only $45 for individuals and $55 for households per year.

Questions?

Contact CGA President Roger Blackwell at rblackwel@comcast.net or (810) 923-2954.

Chestnut Growers of America Flyers Available Upon Request

CGA has developed a flyer for our organization that nursery owners can hand out to customers or include with orders. All members are welcome and encouraged to use the flyer as well.

The flyer can be downloaded and printed from the members-only page of the CGA website. CGA will also print flyers and ship them to you at no cost.

To request flyers, email Rita at chestnutgrowersofamerica@gmail.com and include the number of flyers you are requesting and confirm your mailing address.

Upcoming Chestnut Events

Northern Nut Growers Association 2021 Virtual Annual Conference

August 1-4, 2021 | Online

The Northern Nut Growers Association will be holding their 2021 Virtual Annual Conference August 1-4, 2021. There will be a session on chestnuts Monday, August 2 from 10:00-12:00 CDT (Sandy Anagnostakis, Moderator); presentations include: Amy Miller - Blossom End Rot (Report on NNGA Grant), Marcus Schaufele - Hypocotyl Grafting Chestnuts, Carol Mapes - Asian chestnut gall wasps, Ron Revord - Chestnut Improvement Network. There will also be a breakout room session for chestnuts on the morning of August 4.

More information and registration at nutgrowing.org/annual-conference

The American Chestnut Foundation Chestnut Chat Series

Next Session: August 20, 2021, 11:30 AM EDT | Online

TACF's live Chestnut Chat Series takes place every third Friday of the month to keep you updated on their work, share experiences, and offer participants the opportunity to ask questions. All sessions are recorded and available for those who aren't able to join the live sessions. Join on Friday, August 20, at 11:30 AM EDT for the next LIVE Chestnut Chat, Participatory Chestnut Breeding. Ron Revord, PhD, Assistant Research Professor, University of Missouri Center for Agroforestry, and Dr. Greg Miller, owner of Empire Chestnut Company, founder of Route 9 Cooperative, and prior board member of TACF, tackle what is involved in establishing a network to characterize genetic diversity and ancestry of on-farm germplasm.

More information and how to join at acf.org/resources/chestnut-chat-series

Do you know of an event you would like to see included here?
Email the editor at chestnutgrowersofamerica@gmail.com.

Chestnut Growers of America
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The Chestnut Grower

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