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## NATGA *truffle research updates* Research task force

Ann Scanlan, Mark Coleman, and Scott Oneto

# NATGA RESEARCH TASK FORCE

What we have been up to

# Items we are working on

Looking for laboratories to assume the functions previously performed by the Inga Meadows lab at North Carolina State:

- ITS sequencing of roots, soils, and fruiting bodies
- Mating-type analysis
- Soil metagenomics and microbial ecology analysis
- Contamination screening and colonization assessments
- Integration of soil chemistry with DNA-based analyses
- Spore amendment study

Webinar detailing various pH soil testing procedures for orchards

Grant Application and status:

- Spore Viability
- TRAPI
- Microscopy

# Optimizing truffle production efficiency and sustainability through technology development and transfer

*A grant proposal to the Southern Sustainable Agriculture Research and Education (SARE) program*

Principal Investigator: Dr. Jyotsna (Jyoti) Sharma (Texas Tech)

## Objectives:

- Developing spore viability testing protocols
- Testing impact of storage approaches on spore viability
- Educating truffle producers on use of tests

Submitted May 2026

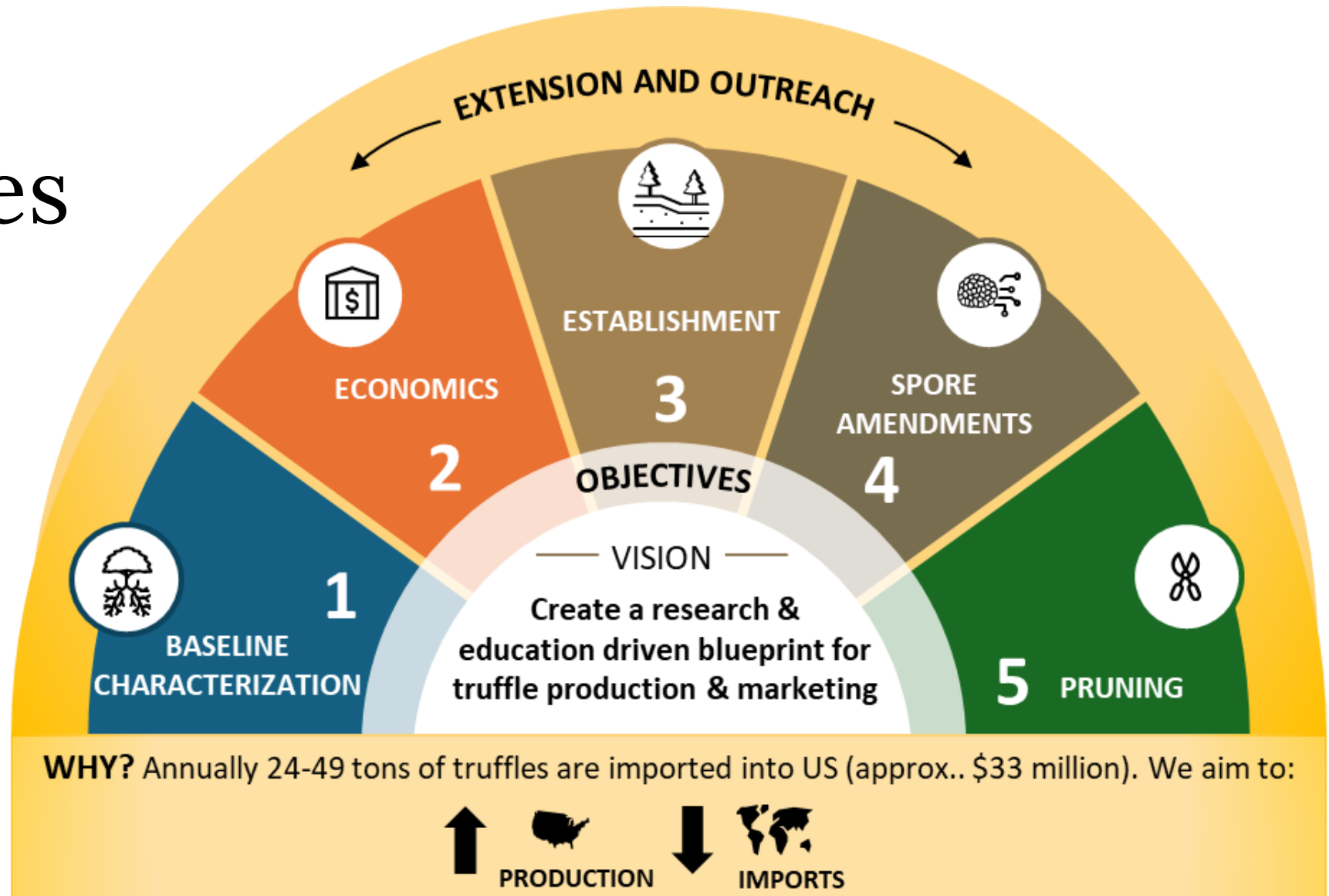
# TRAPI - Truffle Research and Production Initiative

*A grant proposal to the USDA Specialty Crops Research Initiative*

Project Collaborators:

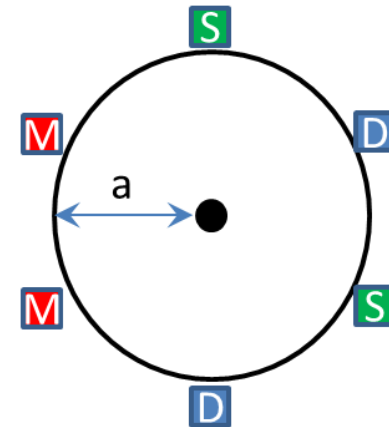
Mark Coleman, Stephen Cook, Gregory Bonito, Jeanine Davis, Patrick Hatzenbuehler, Robert Heinse, Christopher McIntosh, Jyotsna Sharma, Matthew Smith, Ellie Andrews, Gonzalo Guevara, Gavin Kernaghan, Charles Lefevre, Scott Oneto, Dan Strawn

# TRAPI Project Objectives



# GROWER SPORE AMENDMENT STUDY

- At least five orchards participating
- Truffle traps installed with and without spores
- Testing:
  - I. if spores are necessary
  - II. whether there is either a disturbance or a media effect



$a = 3$  ft or edge of brulé

● Tree

D Disturbed

M Media, No-Spores

S Spores, Media

# Stakeholder input and grower education are critical

- Surveys
- Interviews
- Blogs
- Webinars
- Field days
- Workshops

# How to participate in truffle research

- Respond to the Annual Truffle Grower Survey
- Volunteer to include your orchard in research projects
- Show a poster about interesting results at Congress
- Participate in the spore inoculation study
- Submit or collaborate on a SARE or SCBG proposal
- Suggested research topics, questions or discussion

# New Task Force LOGO



**EXCITING ANNOUNCEMENT: NEW GRANT AWARDED!**

## TRUFFLE MICROSCOPY WORKSHOP



*Coming in  
early 2027*

A new grant from the Western Sustainable Agriculture Research & Education Program (Western SARE) will offer this unique opportunity.

# Truffle Grower Survey 2024

Scott Oneto  
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# Purpose

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- Survey aimed to collect producer data to better understand the truffle industry in North America.
- Questions are intended to characterize important demographics like orchard types, truffle species grown, site conditions, management practices, and production status.
- Production data is combined to better characterize the industry.
- The results will guide future research needs and align growers with researchers.

## North America Truffle Survey Team



**Dr. Shannon Berch**

Retired Research Scientist, British Columbia



**Dr. Peter Oviatt**

Earned a PhD from MIT studying the interactions of fungi, plants and people in soils of high human impact



**Scott Oneto**

Farm Advisor, University of California



**Dr. Gregory Bonito**

Associate Professor, Michigan State University – Dept. of Plant, Soil and Microbial Sciences



**Brian Allen**

Geneticist, University of California



**Pat Long**

Truffle grower  
Corvallis, Oregon



**Davis Upchurch**

Truffle grower, Carolina  
Truffières, Fletcher NC



**Ann Scanlon**

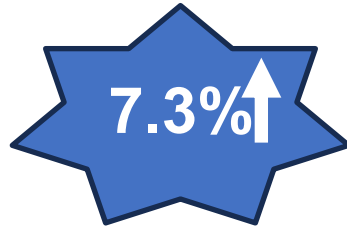
Truffle grower,  
Sugarloaf, California

## **Please note the following:**

1. Reporting period is November – October
2. Data reported is for Nov 2023 – Oct 2024
3. All identifying information has been anonymized and will never be publicly available.
4. Participants are asked to complete separate surveys for orchards in different locations and for orchards with different management strategies or ages at the same location.
5. Participants can skip questions, so the figures are based on the available responses.



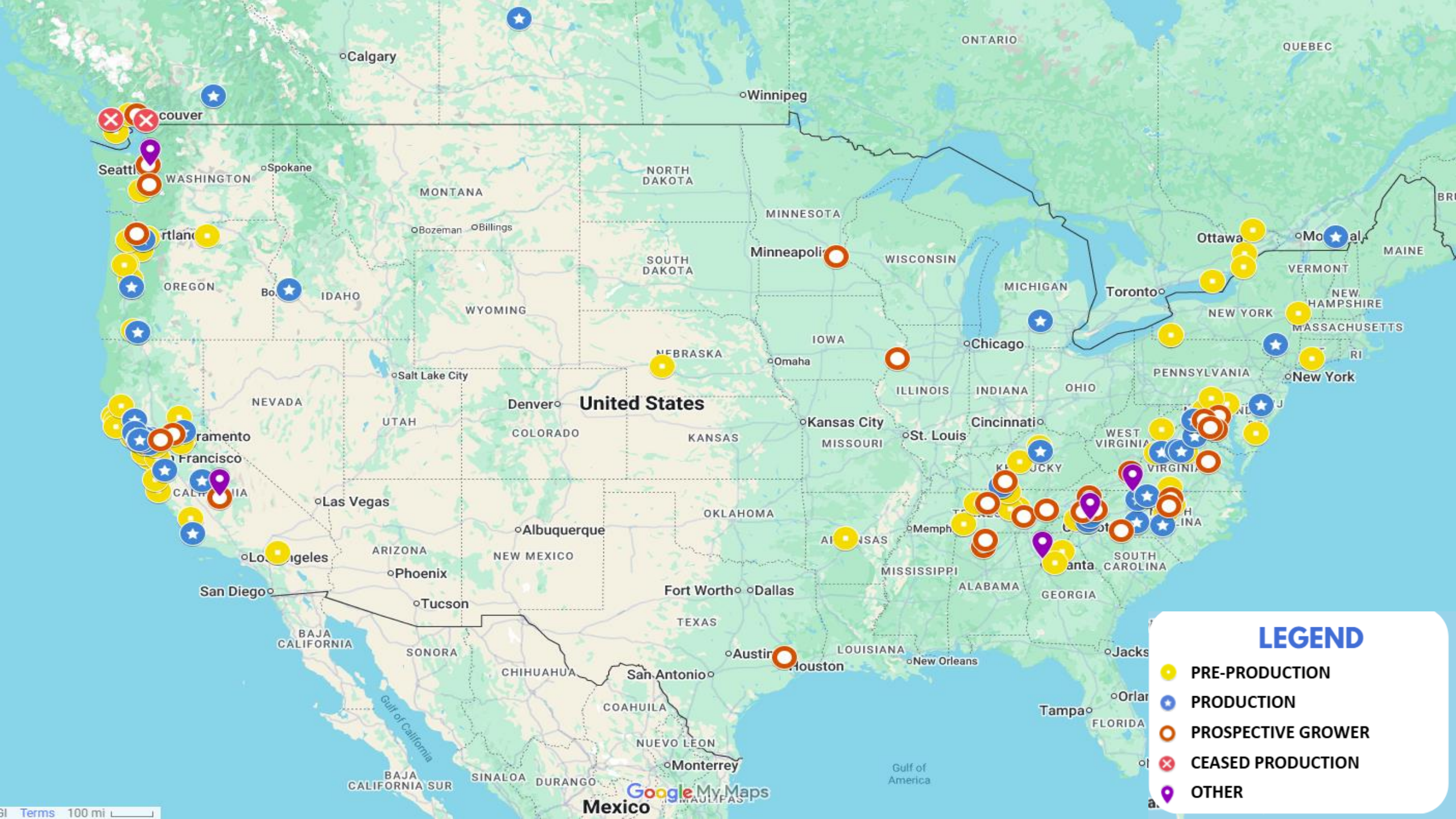
# Total Respondents: 176



Prospective grower	29
Pre-production	88
Production	53
Other	6

Prospective growers include individuals interested in growing truffles or looking to learn more about the industry. These respondents may also be looking for property or have property and are preparing to plant. Pre-production are orchards that have not produced truffle. Production includes orchards that have produced any quantity of truffle. Other category includes those that are integral to the truffle industry including dog handlers, trainers, consultants, etc.





## LEGEND

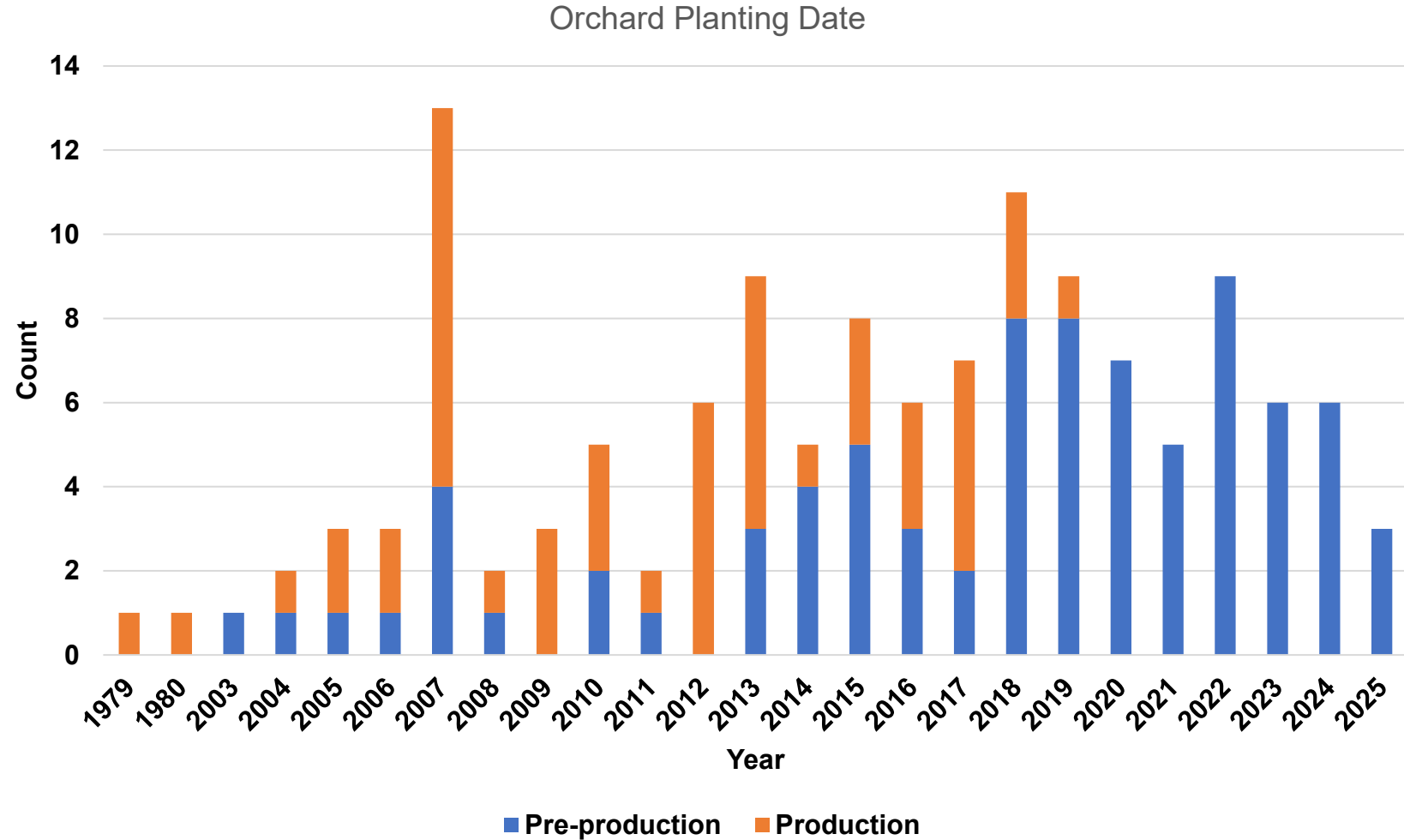
- PRE-PRODUCTION
- ★ PRODUCTION
- PROSPECTIVE GROWER
- ✕ CEASED PRODUCTION
- 📌 OTHER

# Year Planted

Total Responses: 133

This chart displays two separate datasets:

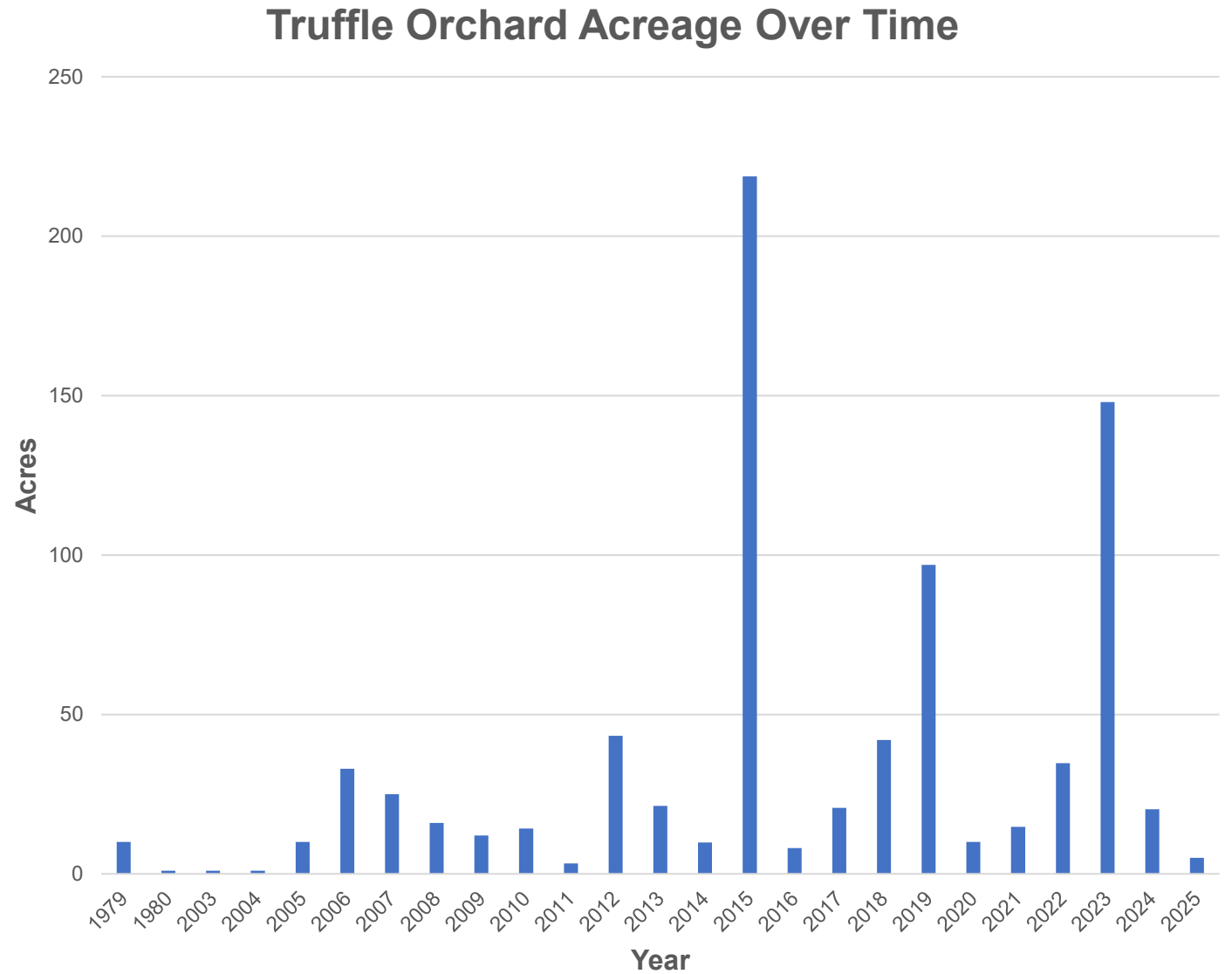
1. Number of orchards planted annually, and color differences can be ignored.
2. Color coding shows which orchards have come into production between the year they were planted and the time of the survey. There are two distinct clusters: 1) The majority of orchards planted between 1979 and 2017 (62%) have come into production sometime after planting. This does not indicate that age alone is necessary to achieve truffle production. 2) All orchards planted between 2020 and 2025 have yet to reach production.



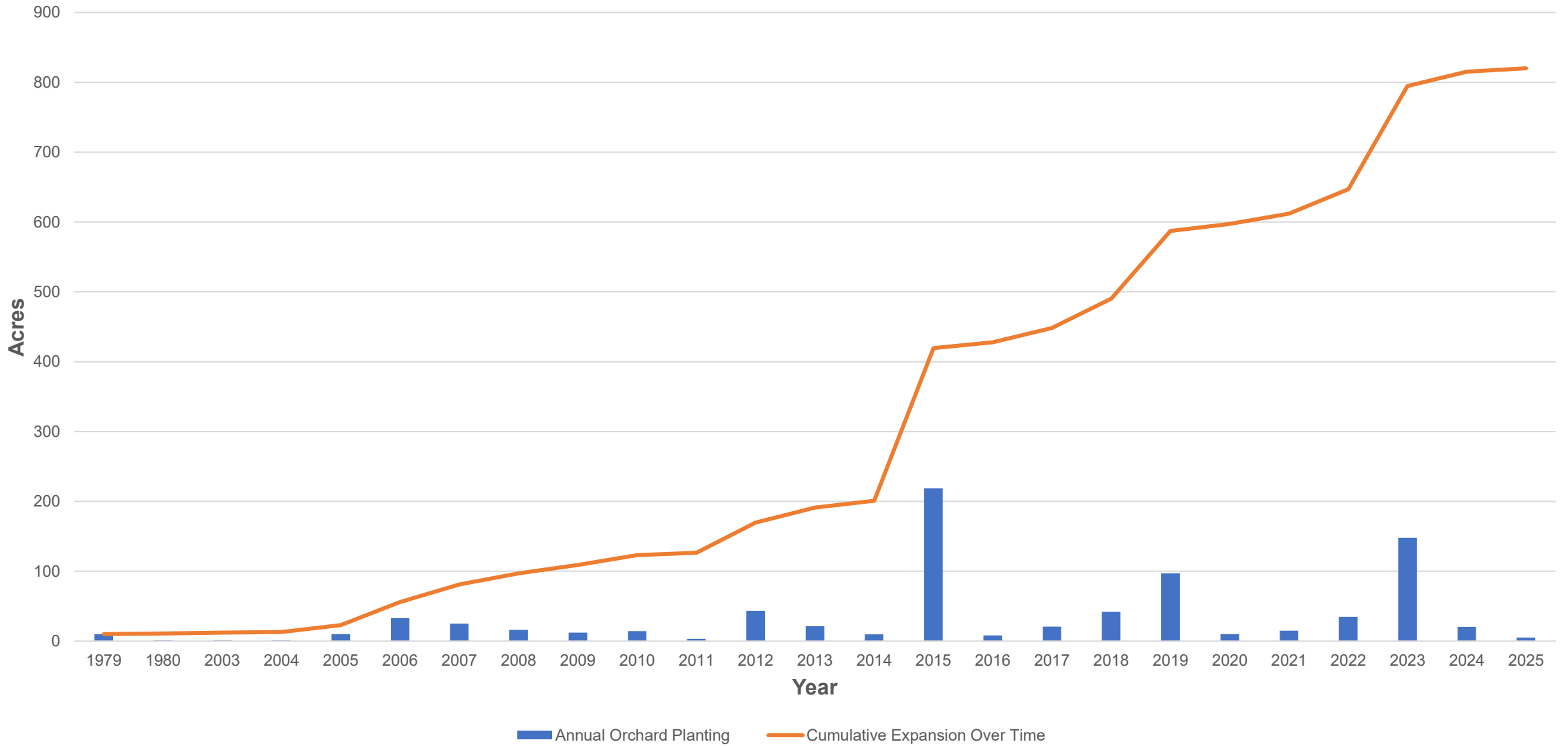
# Orchard Size

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- Total acreage: 829 ac
- Total Producing: 353 ac
- Total Pre-Production: 476 ac
- Avg. Orchard size: 6 ac



# Truffle Orchard Expansion Over Time

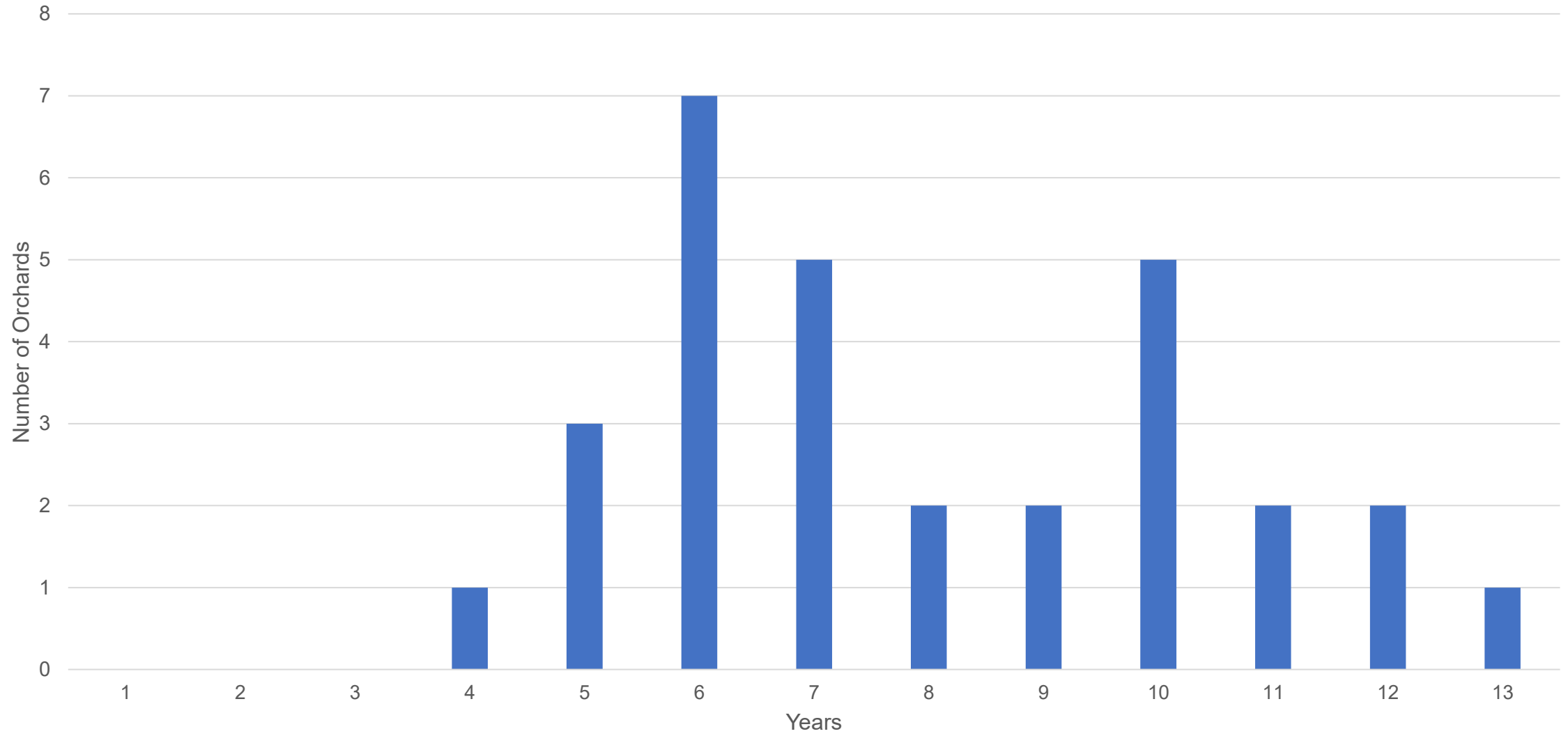


# Tree species used in orchards:

- 36 species in 7 plant families

Beech Family	Dunstan Chestnut	Castanea dentata x C. mollissima
	Chestnut Hybrid	Castanea sativa x C. crenata
	Chestnut	Castanea spp.
Birch Family	American Hazelnut	Corylus americana
	Hazelnut / Filbert	Corylus avellana
	Turkish Hazel	Corylus colurna
	Hazel	Corylus spp.
	European hornbeam	Carpinus betulus
Oak Family	White Oak	Quercus alba
	Bicolor Oak	Quercus bicolor
	Kermes Oak	Quercus coccifera
	Portuguese Oak	Quercus faginea
	Garry Oak	Quercus garryana
	Holly Oak	Quercus ilex
	Black Oak	Quercus kelloggii
	Valley Oak	Quercus lobata
	Bur Oak	Quercus macrocarpa
	Japanese Oak	Quercus mongolica
	Chinquapin Oak	Quercus muehlenbergii
	Downy Oak	Quercus pubescens
	English Oak	Quercus robur
	Holm Oak	Quercus rotundifolia
	Northern Red Oak	Quercus rubra
	Oak	Quercus spp.
	Cork Oak	Quercus suber
	Southern Live Oak	Quercus virginiana
Pine Family	Norway Spruce	Picea abies
	Spruce	Picea spp.
	Stone Pine	Pinus pinea
	Pine	Pinus spp.
	Eastern White Pine	Pinus strobus
	Loblolly Pine	Pinus taeda
Willow Family	Willow	Salix spp.
	Poplar	Populus spp.
Other	American Linden	Tilia americana
	Pecan	Carya illinoensis

# Orchard Age at First Truffle Production For All Species



**Reminder:  
158 lbs. reported in 2023**



**TOTAL YEARLY TRUFFLE PRODUCTION: 156 pounds**

	Number of Producing Orchards	Total Weight lbs.	Total Truffles Harvested	Total Number of Bearing Trees
Black Truffle ( <i>Tuber melanosporum</i> )	23	137.9	365	244
Burgundy Truffle ( <i>Tuber aestivum</i> )	5	11.3	394	91
Bianchetto Truffle ( <i>Tuber borchii</i> )	0	0	0	0
Appalachian Truffle ( <i>Tuber canaliculatum</i> )	3	4	Not Reported	100
Pecan Truffle ( <i>Tuber lyonii</i> )	9	2.16	52	11
White Truffle ( <i>Tuber magnatum</i> )	0	0	0	0
Muscat Truffle ( <i>Tuber brumale</i> )	1	0	0	0
<i>Tuber cumberlandense</i>	0	0	0	0
Black truffle ( <i>Tuber macrosporum</i> )	1	0.75	7	6
<i>Tuber spp.</i>	0	0	0	10



# NORTH AMERICAN TRUFFLE GROWER ANNUAL REPORT 2024

Data to describe the industry  
and gain valuable insight on  
truffle production throughout  
North America.



We need your data!



<https://link.ucanr.edu/trufflesurvey>



# 2025 Reporting Period Still Open

- As of June 8<sup>th</sup>, we only have 56 respondents.
- Survey will stay open till end of June.
- If you have taken a survey, you received a unique link to update your data.
- If you reported multiple orchards, you received a link for each orchard.

If you are a new respondent, or have a new orchard to report:

<https://link.ucanr.edu/trufflesurvey>

**If you have questions, concerns, comments:**

Scott Oneto, [sroneto@ucdavis.edu](mailto:sroneto@ucdavis.edu) / 209-743-0189



**Questions?**

