Cultivar Testing of Pecans

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Facets of Pecan Production in the Southeast.

- A mix of large and small growers.
- Wide variation in cultural methods employed.
- A mix of very old and newer orchards.
- Growers tend to be very conservative.
- A rapid decline in pecan specialists in many states resulting in few cultivar trials remaining.

Cultivar makeup of Georgia Orchards 1997 Survey

28%	Stuart	1890
28%	Desirable	1945
13%	Schley	1900
5%	Cape Fear	1940
5%	Sumner	1932
2%	MoneyMaker	1896

Cultivar Makeup of Newly Planted Trees 1997 Survey

49%	Desirable	1945
19%	Sumner	1932
9%	Cape Fear	1940
9%	Pawnee	1984
6%	Stuart	1890

History of Pecan Testing at UGA

- Ongoing since 1921.
- 50 years of data for some varieties.
- Commercial level care.
- Data collected
  - Tree yield.
  - Nut quality.
    - Nut size
    - % kernel
    - % fill
    - specific gravity
    - kernel quality grades

Success and Failure

- Very conservative in making recommendations.
- Prevented the planting of many inferior cultivars.
- Have recommended a few cultivars (< 10) that are planted on a modest scale.
- Have recommended a few cultivars that were failures.

Current Program

- Breeding program started in 1999.
- Continued cultivar testing program
  - USDA cultivars and selections
  - Grower selections
  - Selections from other universities
- Also responsible for muscadine breeding program.

Changes in the testing program.

- Single test orchard located at station farm.
- Check cultivars included in all plantings.
- Reduced # years testing to 15-20.
  - If a cultivar hasn't shown anything by then it probably won't.
  - ¼ of test orchard replanted every 5 years.
- Pest susceptibility data is now taken (black aphids, sooty mold, leaf scab, nut scab).
- Alternate bearing index is reported.

Challenges to Pecan Testing and our Responses

Challenge: Four growing regions with widely differing environments.

Response: We only test and recommend for the Southeastern region. The USDA runs a more national testing program.

Challenge: Pecan scab is composed of multiple races. Pecan has differential and ephemeral resistance to these races.

Response:

- Test selections in high-pressure, no-spray situations.
- Select only cultivars that have acceptable nut quality so that the loss of resistance is not devastating.
- Remind growers that resistance is likely ephemeral.

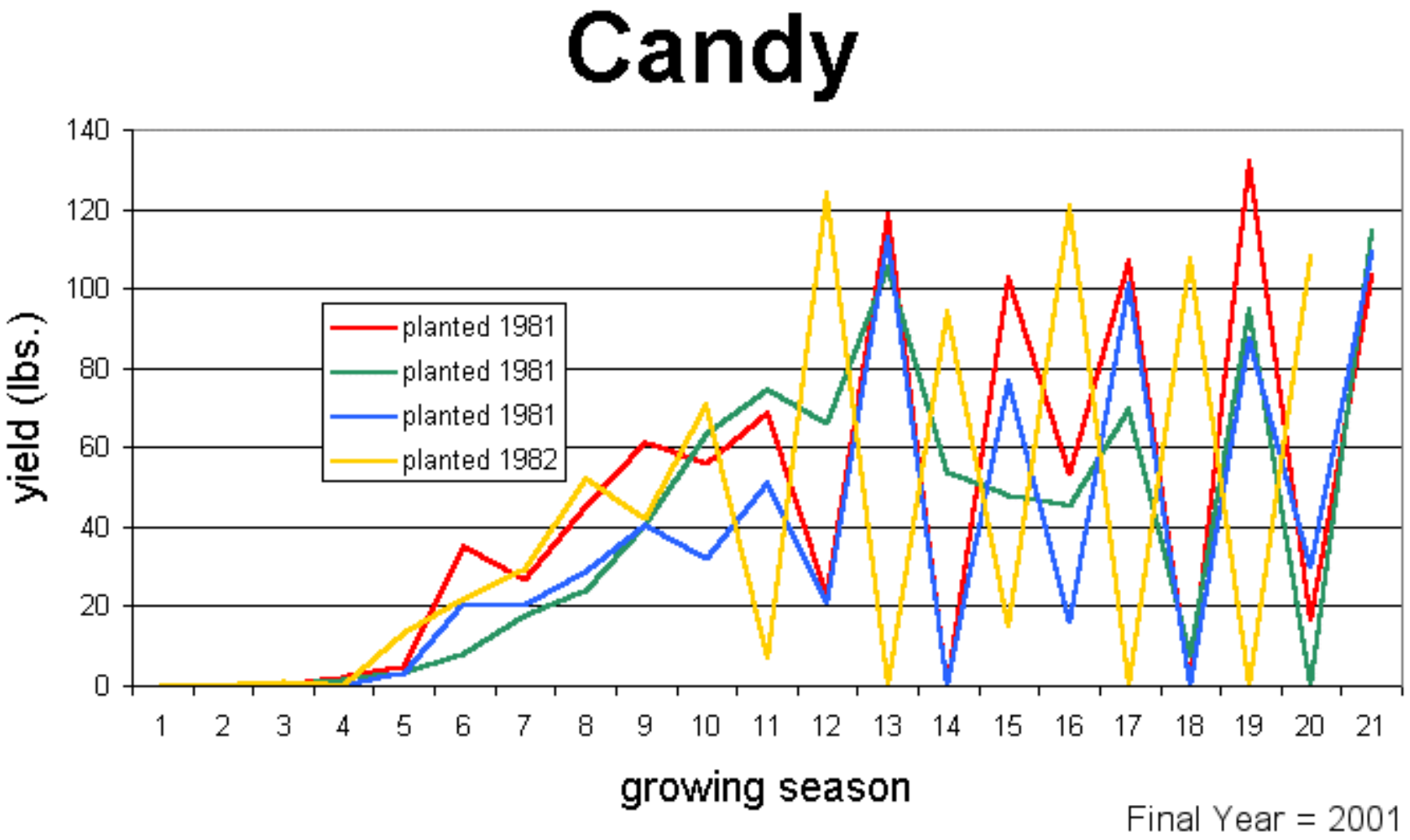
Challenge: Large sized trees take up much orchard space.

Do you test more selections or do more reps?

Response:

- Generally decided we want to test more selections since so many fail quickly and in ways that don't require many reps to see.
- Plant 5-6 trees of each test selection.
  - Can see very poor productivity but hard to rank the rest.
  - Recommend those that look good on a trial basis.

Challenge: Cultivar quality production habits can change dramatically as a tree matures.



Response:

- Good selections are tested for a minimum of 15-20 years.
- Quality of young (years 1-10) and mature (10-20) trees is reported separately.
- Alternate bearing index of cultivars is reported.

Cultivar	% kernel years 1-10	% kernel years 11-20	Alt. Bearing Index
Kanza	51.3	51.5	0.73
Kiowa	53.1	52.2	0.65
Melrose	54.1	49.8	0.79
Pawnee	55.0	53.2	0.58
41-19-20	52.5	40.0	0.85
53-9-1	51.8	45.5	0.81

Challenge: Growers vary widely in the level of care they apply to trees.

Response:

- Apply UGA guidelines of good commercial quality care to test orchards.
  - These are your most valuable growers.
- Evaluate the pest susceptibility of the cultivars.
- Rank susceptibility of cultivars and try to get growers to match cultivars with their level of care.

Challenge: Pecan "personalities" are often responsible for pushing new untested cultivars.

- Resulted in planting poorly adapted western cultivars in the Southeast.
- Nursery owners sometimes push their proprietary cultivars.
- Knowledgeable testers are often less enthusiastic about their cultivars than are amateur testers.

Response:

- Test as many of these cultivars as possible with check cultivars.
- Remind growers that many cultivars look good at first.
- Try to coordinate with extension agents for a unified front.

Challenge: How do you bring growers into the mix?

Response:

- We have regular field days in the test orchard.
- Present talks at grower meetings.
- We regularly test selections presented to us by growers.
- Small scale tests at multiple growers are too much labor.
- Larger tests at big growers are more worthwhile.

What is the best way to replicate a grower test?

- Traditionally we have used single tree replicates with a random arrangement of trees in the orchard.
  - Allows easy statistical analysis.
  - Well accepted in literature.
  - Avoids soil variation.

- Problems
  - Difficult to manage.
  - Yields are harder to obtain due to harvest timings.
  - Differences in growth can result in unrealistic competition.
  - Pest pressures are minimized by variation.

A new test set up by a colleague uses single rows of 20 trees to test selections.

Orchard land "looks" uniform.

Growers find it easier to look at the varieties.

Rows can be harvested as a group and a composite yield obtained.

How comfortable would you be with this arrangement?