

Horticulture Research Station Summary

RFR-A2001

Farm Staff

Superintendent Nick Howell
 Agricultural Specialist Brandon Carpenter
 Agricultural Specialist Chad Arnold
 Bee Extension Specialist..... Randall Cass
 Equipment Operator..... Jeff Braland
 Turfgrass Research Associate Ben Pease

Associate Dean for Operations Mark Honeyman
 Farms Manager Tim Goode
 103 Curtiss Hall, ISU

Horticulture Research Station
 55519 170th Street
 Ames, IA 50010
 515-232-4786 office and Fax
 nhowell@iastate.edu

Location: Three miles north of Ames on Highway 69,
 turn east on 170th Street about 1½ miles.

Farm and Weather Summary

Nick Howell, farm superintendent

Farm Comments

2020 was an exceptionally challenging year at the Horticulture Research Station. The pandemic forced reconsideration and alteration of all station management practices. This was done to keep the staff and users safe, and at the same time allow vital work to continue.

A second challenge came August 10, 2020. A derecho with sustained west winds in excess of 100 mph persisted for 45 minutes causing significant damage to the station research projects, landscape, and infrastructure. During the storm, 40 landscape trees, 30 trees from the shade tree trial, and 25 crabapples were downed. Also, 460 apple trees snapped off and half of the vineyard was laid flat. In addition, five high tunnels were destroyed and a sixth one was badly damaged. A large hay storage hoop was destroyed and two other hoop buildings were damaged.

Despite these challenges, the station had a safe and productive season and the rebuilding process is underway.

Staffing. Significant changes occurred in staffing in 2020. Long-time field lab technician Lynn Schroeder retired. The staff thanks him for his work and wishes him the best in his retirement years. Randall Cass, bee extension specialist, accepted a partial appointment at the station and manages the new apiary.

Graduate students. The station funded two new assistantships in 2020. Olivia Meyer tested sprayer technology in apples. She is co-advised by Mark Gleason and Gail Nonnecke, horticulture. Taylor Mauch worked on pepper

production using biochar. Taylor's advisor is Ajay Nair. Jean Yost completed her assistantship and graduated December 2020.

Students. Alice Paulson, senior in horticulture, completed the Food Crop Production Enterprise learning experience. This learning experience gives the student the opportunity to manage a food production enterprise from planting through harvest. This included choosing and growing crops and marketing them on the station's FoodLo.Cals website. Alice grew a diverse variety of vegetables including several pepper varieties, kale, eggplant, kohlrabi, cabbage, carrots, beets, and several other vegetable crops and herbs. This project had its best season because of Alice's hard work and increased interest and cooking with fresh produce by homebound consumers because of the pandemic.

Research. The Horticulture Station's main function continues to be research. Despite COVID-19, 80 projects with 20 investigators involved went as planned. The range of projects was diverse. Apples, grapes, peppers, garlic, cantaloupe, winter squash, and soybeans were grown for research. Ornamental crops, such as turfgrass, shade trees, and herbaceous perennials also were used for research purposes. Projects involving bees, wasps, tree swallows, and fish added more research diversity.

One notable project in 2020 under Christina Hill, World Languages and Cultures, is called the 3-sisters project. Working with Ajay Nair, horticulture, and indigenous American collaborators, Hill and graduate student Emma Herrigty are looking at the effects of the 3-sisters growing system on soil quality.

Another project in 2020 looked at the effectiveness of smart technology in airblast

sprayer applications for disease control in orchards. This project was led by Mark Gleason and graduate student Olivia Meyer using the new airblast sprayer and Smart Guided System. The first year's data looked promising. Despite significant damage from the August 10 derecho to the orchard, the project will continue in 2021.

New faculty member, Aude Watrelot, food science and human nutrition, looked at leaf removal as a system to improve grape quality for wine production. Unfortunately, the vineyard sustained significant damage from the derecho, limiting the usefulness of the data.

In turfgrass, Adam Thoms' research focused on products and practices for athletic field management.

Grace Wilkinson, ecology, evolution, and organismal biology, and Mike Weber, natural resource, ecology, and management, researched the effects of nutrient loads on aquatic life. This project took place in the newly renovated ponds at the Aquatic Research Facility.

Bulk production. Several production projects occurred in 2020, the most notable being honey production. Extension bee specialist Randall Cass developed a 20-hive apiary. In the first season, the Horticulture Research Station Apiary, produced 500 lb of honey. It was sold to customers through the Food.LoCals website, the University Bookstore, the ISU Creamery, and the ISU Student Innovation Center. To enhance honey production, the station moved away from corn and soybean production and grew oats as a nurse crop for clover. The oats and straw were harvested and sold as a bulk crop and the remaining clover supplied a fall pollen source for honey production.

Other bulk crops including peppers, onions, pumpkins, apples, and grapes were grown for intramural use. With the exception of the pumpkins, these crops were lost in the August derecho.

Landscape and infrastructure. Repairs, replanting, and reconstruction from the derecho is ongoing and will take several years to accomplish.

Industry and the public. All tours, industry and public events were canceled because of COVID-19 concerns.

Weather Comments

Winter 2019-2020. Relatively normal temperatures and slightly above normal precipitation prevented potential winter damage in the apples and grapes. Apple and grape pruning was completed in a timely manner.

Spring 2020. A slow warm-up brought the apples and grapes out of dormancy about one week later than normal. Precipitation was below normal in April and June and normal in May. Planting of vegetable and bulk oat crops was uninterrupted. Cooler than normal highs and lows in April and May were experienced.

Summer 2020. Below normal precipitation allowed late-spring planting projects to be completed in June. Dry conditions continued into August resulting in heavy crop irrigation. Lake water levels dropped 24 in. during this period. On August 10, the station was hit by a derecho and experienced sustained winds in excess of 100 mph and hail for 45 minutes. Almost 95 percent of annual and perennial crops were lost.

Fall 2019. Below normal precipitation and above normal high and low temperatures resulted in a normal pumpkin and root crop harvest. Below normal precipitation required irrigation of turf research to persist longer in the fall. At the end of the season, the lake water level was 3 ft below normal.

Acknowledgements

We thank the station crew Brandon Carpenter, Chad Arnold, Randall Cass, Jeff Braland, Ben Pease, and graduate students Jean Yost,

Taylor Mauch, and Olivia Meyer for their hard work. Thanks also to Alice Paulson and Cody McKune and all other workers for the excellent job they did this past season.

Horticulture Research Station staff would like to thank Troy Heeren (NREM), Steve Jonas (Research Farms Compost Facility), and the over 30 faculty, staff, and students who volunteered to help cleanup and repair damage after the derecho.

Table 1. Horticulture Research Station, Ames, monthly rainfall and average temperatures for 2020.

Month	Rainfall (in.)		High 2020	Temperature (°F)		Days 90° or above	
	2020	Deviation from normal		Deviation from normal	Low 2020		Deviation from normal
March	2.42	+0.42	51.7	+3.5	31.4	+3.0	0
April	1.47	-2.33	60.8	-2.5	35.3	-4.4	0
May	5.04	+0.14	68.7	-5.5	48.8	-3.5	0
June	2.97	-1.57	84.7	+1.3	63.7	+1.2	4
July	2.96	-0.84	87.2	+0.9	65.1	-0.9	10
August	2.32	-2.48	85.1	+1.0	60.0	-3.8	7
September	3.25	+0.08	74.6	+4.4	50.4	-4.6	2
October	<u>1.03</u>	<u>-1.10</u>	57.7	-7.3	35.6	-6.6	<u>0</u>
Total	21.46	-7.68					23

<u>Project</u>	<u>Project Leader</u>
Soybean disease study	M. Bhattacharyya
Garlic mulch study	B. Carpenter
Gourd production project	B. Carpenter
Mini tunnel lettuce production project	B. Carpenter
Onion production project	B. Carpenter
Pepper production project	B. Carpenter
Pumpkin production project	B. Carpenter
Student high tunnel tomato production	B. Carpenter
Sweet potato production	B. Carpenter
Honey production project	R. Cass
2016 national turfgrass evaluation program perennial ryegrass	N. Christians
2017 national turfgrass evaluation program Kentucky bluegrass sun	N. Christians
Creeping bentgrass fairway height trial	N. Christians
Creeping bentgrass green height trial	N. Christians
Organic mulch evaluation study cantaloupe	M. Gleason
Organic mulch evaluation study winter squash	M. Gleason
Organic pollination study cantaloupe	M. Gleason
Organic pollination study winter squash	M. Gleason
Precision airblast sprayer project	M. Gleason
Redbud breeding trial	B. Graves
Palmer amaranth weed study	B. Hartzler
Home demonstration garden	C. Haynes
Three sisters project	C. Hill
Food production internship project	N. Howell
Ash pollination study	J. Iles
Flowering crab trial	J. Iles
Grape weather station project	J. Iles
Shade tree trial	J. Iles
Tree Swallow nesting	B. Klaver
Biochar pepper study	A. Nair
Biodegradable plastic mulch study	A. Nair
High tunnel lettuce project	A. Nair
Organic cover crop study	A. Nair

Project (continued)**Project Leader**

Vegetable/chicken production project

A. Nair

NC 140 apple study

G. Nonnecke

NE1020 grape study

G. Nonnecke

Evaluation of compost properties and soil mix ratios for turfgrass
establishment

B. Pease

Harrell's spring aeration recovery trial

B. Pease

Christmas bird count

T. Stewart

Containerized tree study

G. Thompson

Perennial CRF study

G. Thompson

2017 national turfgrass evaluation program: Kentucky bluegrass
shade

A. Thoms

2018 national turfgrass evaluation program: tall fescue non-traffic

A. Thoms

2018 national turfgrass evaluation program: tall fescue shade

A. Thoms

2018 national turfgrass evaluation program: tall fescue traffic

A. Thoms

2020 national turfgrass evaluation program fine: fescue full sun

A. Thoms

2020 national turfgrass evaluation program fine: fescue shade

A. Thoms

2020 national turfgrass evaluation program: creeping bentgrass
fairway height

A. Thoms

Brown patch control on green height turf field trial evaluation
for BASF

A. Thoms

Comparison of GameOn at 3.5 and 4 pt./A vs. SurePower
for efficacy and tolerance

A. Thoms

Dollar spot control field trial evaluation for Sipcam Agro USA

A. Thoms

Dollar spot control on green height turf field trial evaluation
for BASF

A. Thoms

Evaluating the curing of athletic field paint on various plant species
commonly found on football fields

A. Thoms

Evaluating the release of nitrogen for various turfgrass fertilizers

A. Thoms

Evaluating the use of algae produced from revolving algae biofilms
for turfgrass growth and maintenance

A. Thoms

Evaluating turfgrass mowing height and lower leg forces

A. Thoms

Evaluation of 1Solution wetting agents on golf course fairways

A. Thoms

Evaluation of 1Solution wetting agents on golf course putting
greens

A. Thoms

Evaluation of humic containing fertilizers under simulated athletic
field traffic

A. Thoms

Evaluation of Kentucky bluegrass (*Poa pratensis*L.) responses to
applications of Verdesoil for recovery from simulated athletic
field traffic

A. Thoms

GameOn, Relzar, and Crew weed control trial

A. Thoms

Project (continued)

Monitoring various soil health parameters subjected to various fertilizers on golf course putting greens

Monitoring various soil health parameters subjected to various fertilizers on home lawns

Proprietary turf grass research project (5)

Sports field recovery trial from an unplanned maintenance interruption

Summer stress putting green field trial evaluation for Sipcam Agro USA

Bee stock hives

Wasp study

Grape leaf removal study

Fish overwintering study

Aquatic nutrient load study

Project Leader

A. Thoms

A. Thoms

A. Thoms

A. Thoms

A. Thoms

A. Toth

A. Toth

A. Watrelot

M. Weber

G. Wilkinson