



Muscadine Diseases

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Muscadine Diseases

- Resistant to Pierce's Disease (*Xylella fastidiosa*) that kills many bunch grape types
- Often not sprayed for disease control when grown for wine production
- Muscadines in backyard plantings are usually not sprayed
- Sour rot rarely seen
- Muscadines are resistant to many fungal pathogens:
 - No Downy Mildew, Bunch Grape Anthracnose or Botrytis gray mold
 - Resistant to Phomopsis
 - Physically tough, thick-skinned
 - Sulfur can be used to control Powdery Mildew



A pathogen is destroying Italy's olive trees

CBS News March 10, 2019, 9:49 AM

Xylella fastidiosa

Pierce's Disease (PD)

- Bacteria (*Xylella fastidiosa*)
- Muscadines are fairly resistant to PD
- Causes marginal leaf burn on 'Carlos' and other susceptible muscadines, but does not kill vines



Leaf and fruit diseases of muscadine grape

- Mostly caused by fungi
- Spores are microscopic
- Spread by wind, splashing rain, or insects
- Most spores require moisture to germinate and infect



Fungal pathogens overwinter in old, infected plant parts, releasing spores that infect new emerging shoots in the spring





Cultures of a stem-infecting fungus (*Botryosphaeria* sp.) recovered from cold-damaged grape vines





Management and Control of Diseases

Tissue Culture for Muscadines

- Disease-causing organisms can carry over in cuttings used to start new plants
- Crops that are propagated vegetatively by cuttings can be kept clean by using tissue culture and virus testing to grow clean, sterile plants in the lab
- Lab-grown plants can then be used as a source of clean cuttings going forward



“Start Clean and Stay Clean”

Disease Resistance in Muscadines

- Resistant to Pierce's Disease
- No Downy Mildew
- No Botrytis Bunch Rot
- Resistant to Nematodes
- Not Grafted
- Few (if any) Viruses



cv. Noble



<http://www.superhorticulture.com>



<http://vtpv.ext.vt.edu>

Spray Timing – much simpler for muscadine (compared to Vinifera)

- Mid-May (Before disease is visible!!)
- Shoots 6-10 inches in length
- Flowers not yet open
- Continue every 2 wk until early August
- Early summer sprays provide more disease control than later sprays, because fungicides are mainly protectants
- Write it down



Nita, January 2016

Summary cont.

Vinifera

- Modes of action used
 - M1 (copper) x 2 times
 - M2 (sulfur) x 11 times
 - M3 (mancozeb) x 7 times
 - M4 (captan) x 4 times
 - 2 (Rovral) x 2 time
 - 3 (Rally) x 2 times
 - 9 (Scala) x 1 times
 - 13 (Quintec) x 1 time (+1)
 - 33 (Phosphite, Phostrol) x 2 times (+ 2-3 times)

Muscadine

Mancozeb 1-2X
Captan 3-6X
Rally 3-6X



2019 Southeast Regional Muscadine Grape Integrated Management Guide

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Recommendations are based on information from the manufacturer's label and performance data from research and extension field tests. Because environmental conditions and grower application methods vary widely, suggested use does not imply that performance of the pesticide will always conform to the safety and pest control standards indicated by experimental data.

This publication is intended for use only as a guide. Specific rates and application methods are on the pesticide label, and these are subject to change at any time. Always refer to and read the pesticide label before making any application! The pesticide label supersedes any information contained in this guide, and it is the legal document referenced for application standards.

2018 Nematode Survey (SRSFC Grant) Occurrence and Distribution of Plant-parasitic Nematodes on Muscadine Grapes in Georgia and North Carolina

NCSU – Bill Cline, Benny Bloodworth

UGA – Ganpati Jagdale, Paul Severns, Phil Brannen

- **Are nematodes present in muscadines?**
- **What species?**
- **How do populations compare NC vs GA?**



Photographs by Ganpat Jagdale

Survey of plant-parasitic nematodes in commercial vineyards in North Carolina, October 2018

Common name and Genus	Percent frequency ^a	Abundance ^b	Standard Deviation	Maximum density/ 100 cm ³ soil ^c
Dagger, <i>Xiphinema</i>	80	4	4	17
Lesion, <i>Pratylenchus</i>	13	2	1	4
Ring, <i>Mesocriconema</i>	76	93	139	844
Root-knot, <i>Meloidogyne</i>	13	2	1	5
Spiral, <i>Helicotylenchus</i>	89	22	32	190
Sting, <i>Belonolaimus</i>	9	1	1	1
Stubby-root, <i>Paratrichodorus</i>	18	2	2	10
Stunt, <i>Tylenchorhynchus</i>	40	9	11	66

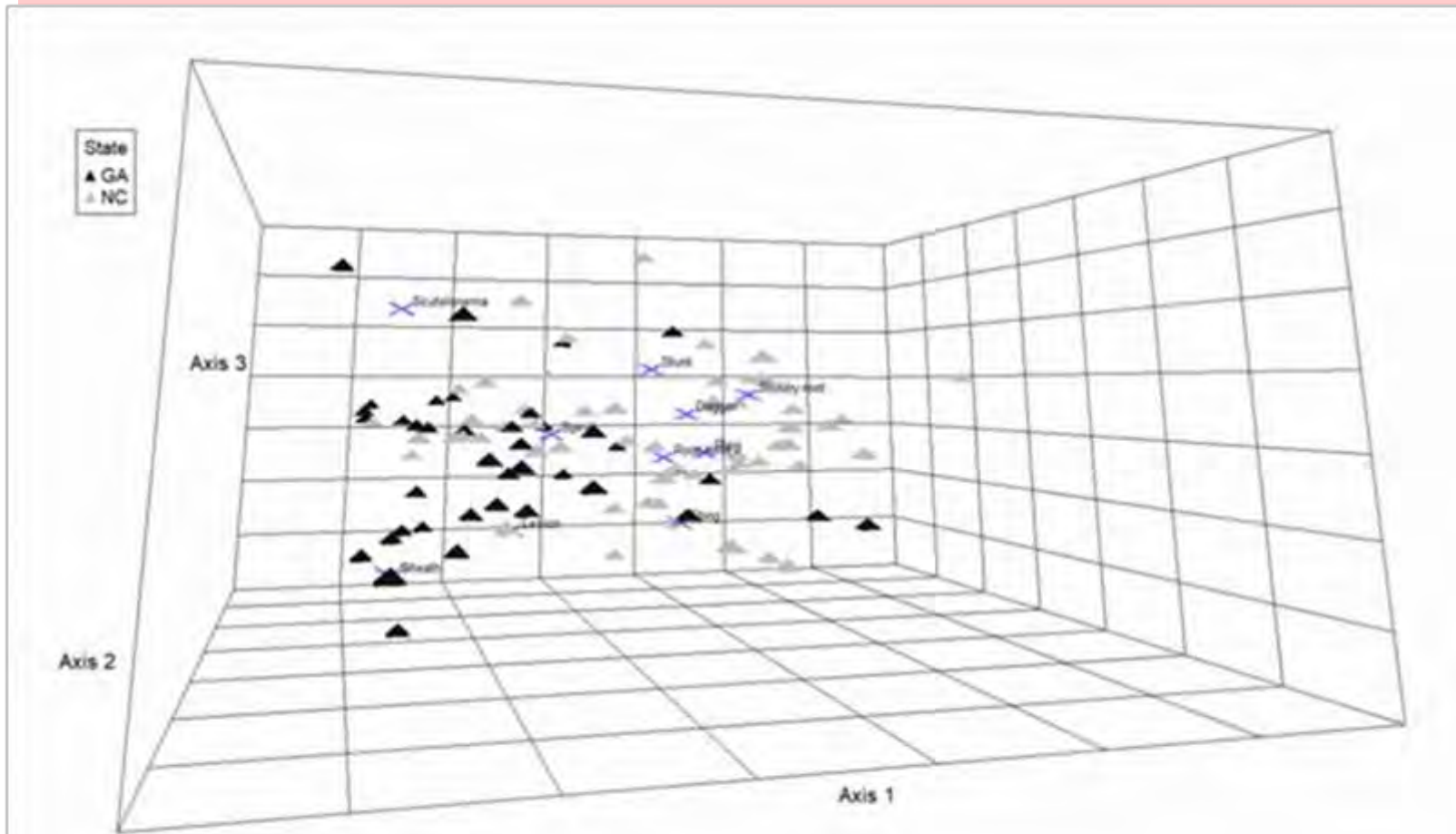
Jagdale, et al. 2019. Occurrence and Distribution of Plant-parasitic Nematodes on Muscadine Grapes in Georgia and North Carolina (in press).

Survey of plant-parasitic nematodes in commercial vineyards in Georgia, October 2018

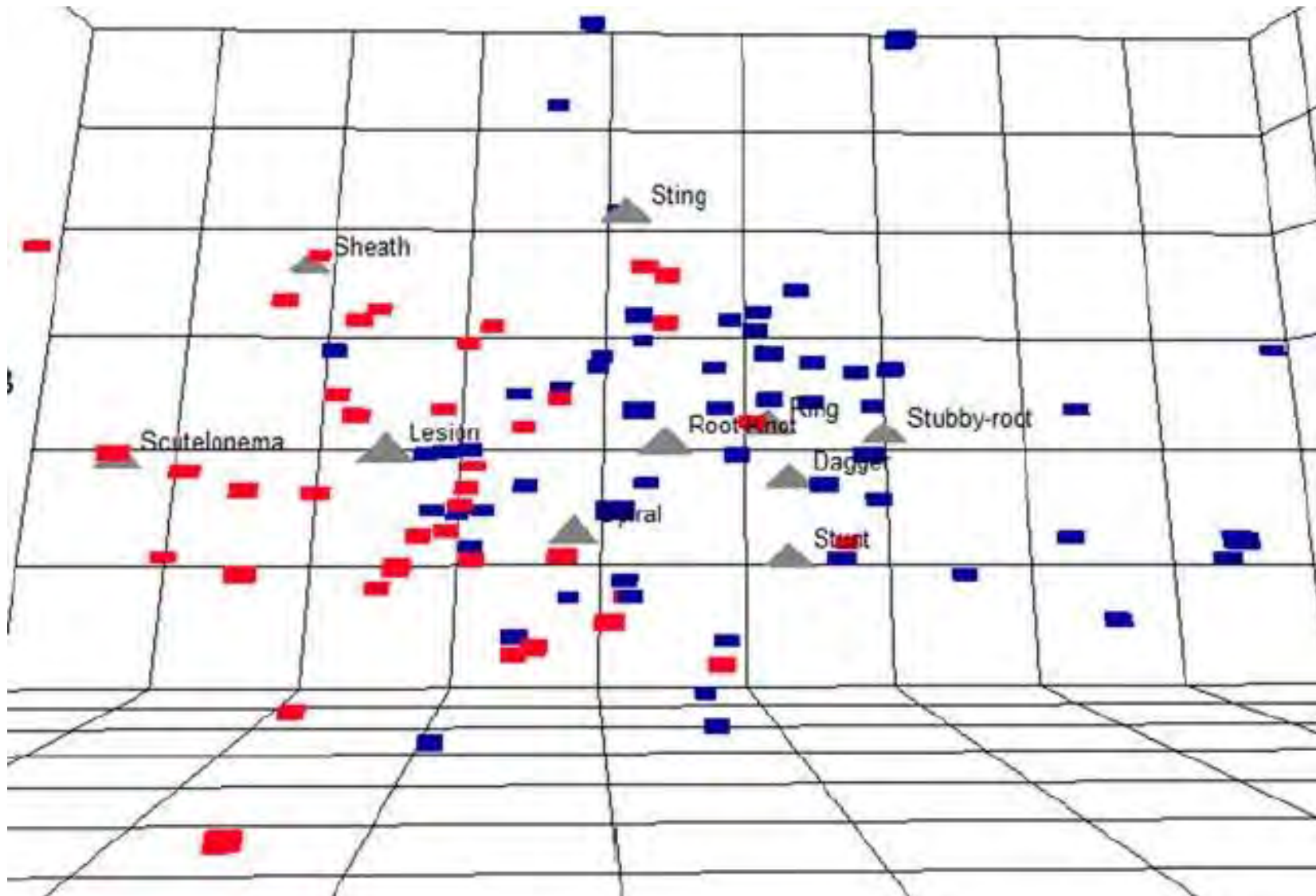
Common name and Genus	Percent frequency ^a	Abundance ^b	Standard Deviation	Maximum density/ 100cm ³ soil ^c
British spiral, <i>Scutellonema</i> spp.	8	351	123	710
Dagger, <i>Xiphenema</i> spp.	28	5	5	29
Lesion, <i>Pratylenchus</i> spp.	33	2	2	5
Ring, <i>Mesocriconema</i> spp.	65	38	67	295
Root-knot, <i>Meloidogyne</i> spp.	5	2	1	3
Sheath, <i>Hemicycliophora</i> spp.	3	5	1	5
Spiral, <i>Helicotylenchus</i> spp.	93	74	107	450
Stubby-root, <i>Paratrichodorus</i> spp.	5	1	1	1

Jagdale, et al. 2019. Occurrence and Distribution of Plant-parasitic Nematodes on Muscadine Grapes in Georgia and North Carolina (in press).

Multivariate analysis, GA vs NC



Jagdale, et al. 2019. Occurrence and Distribution of Plant-parasitic Nematodes on Muscadine Grapes in Georgia and North Carolina
Plant Health Progress (2019) 20:194–199



NC=Blue, GA=Red

What Did We Learn?

- Yes, nematodes are present
- We now know which species we have
- We know how NC and GA compare
- We now have a good idea of species prevalence in muscadines
- Ring and Spiral are most prevalent in both states, need to look more closely at these two species (esp. across cultivars)

What does this mean for growers?

- Sample for nematodes when replanting old vineyard or orchard sites.
- On replant sites with high populations, consider treating for nematodes, moving to an alternate site, crop rotation or using a fallow period.
- Likely that Ring, Spiral nematodes are the two types to watch

