



THE UNIVERSITY OF ARIZONA

**Cooperative Extension**

Yuma County



# **Hemp Diseases; diagnosis and management**

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# Yuma Plant Pathology

- Applied research
- Extension
- Plant Disease Diagnostic (field and clinical)

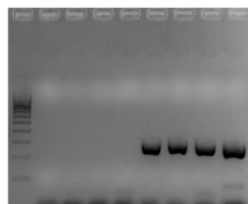


Arizona Plant Diagnostic Network



PLANT HEALTH

RESEARCH & EXTENSION



MOLECULAR DIAGNOSIS

OUTREACH

# Vascular Wilt (*Fusarium oxysporium*)

- Systemically infected
- Wilting and eventually death of plants
- Pathogen survives in soil and infected plant materials
- Can come from mother plants
- Eradicate disease, change soil or grow hemp in a different field



Photos by Shouhua Wang





# Vascular wilt of hemp caused by *Fusarium oxysporium*



Photos by Shouhua Wang









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# Stem Canker – Mainly Caused by *Phytophthora*

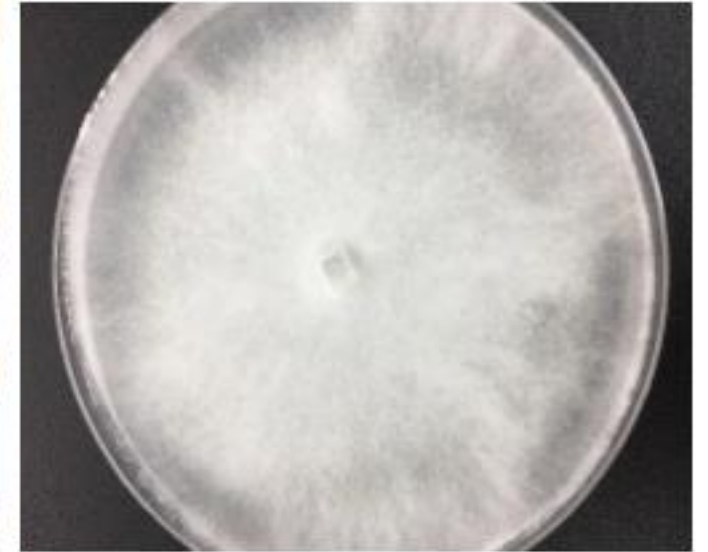


**Verbena stem canker**



**Hemp basal stem canker**

**Photos by Shouhua Wang**



***Pythium  
aphanidermatum***

**Photos by Shouhua Wang**



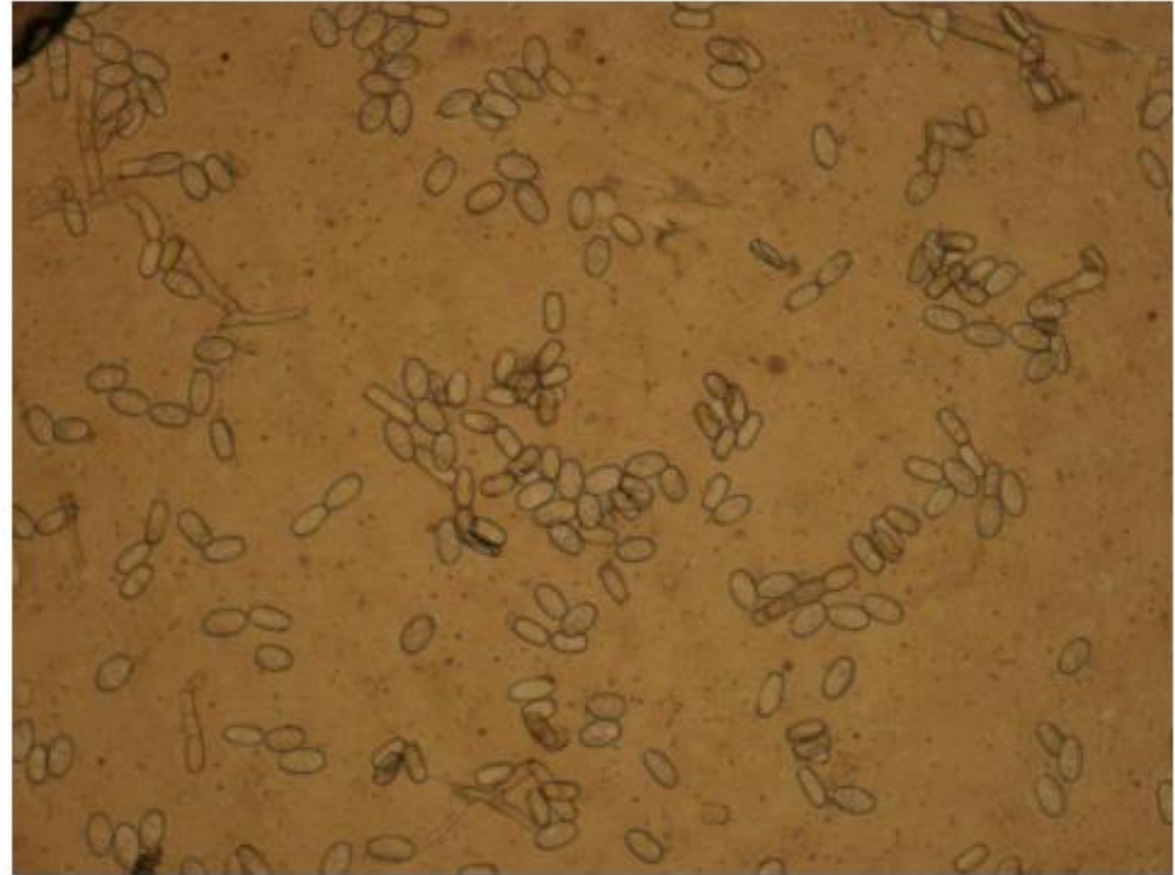
# Wet feet?!







## Powdery Mildew on Cannabis Plants



*Golovinomyces ambrosiae*

Photos by Shouhua Wang



# Gray Mold

- *Botrytis cinera*
- Wide host range
- Not much of a problem in desert southwest.. yet





## Hemp Leaf Mosaic and Distortion



**Photos by Shouhua Wang**





# Herbicide Damage



Photos by Shouhua Wang



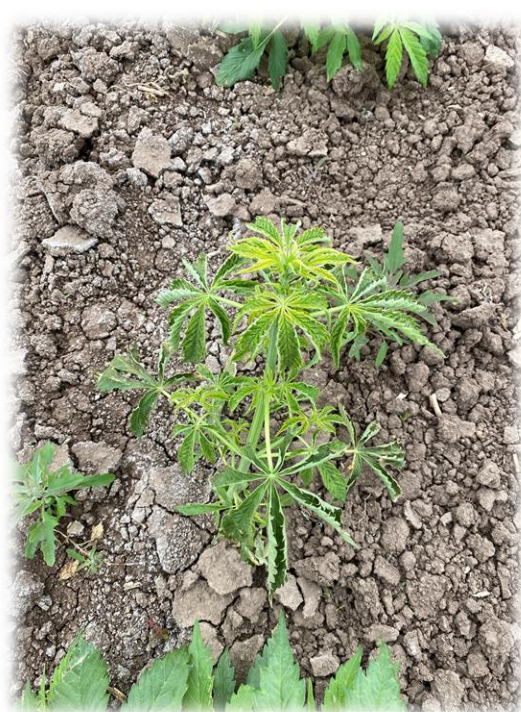


# Chemical Injury



Photos by Shouhua Wang









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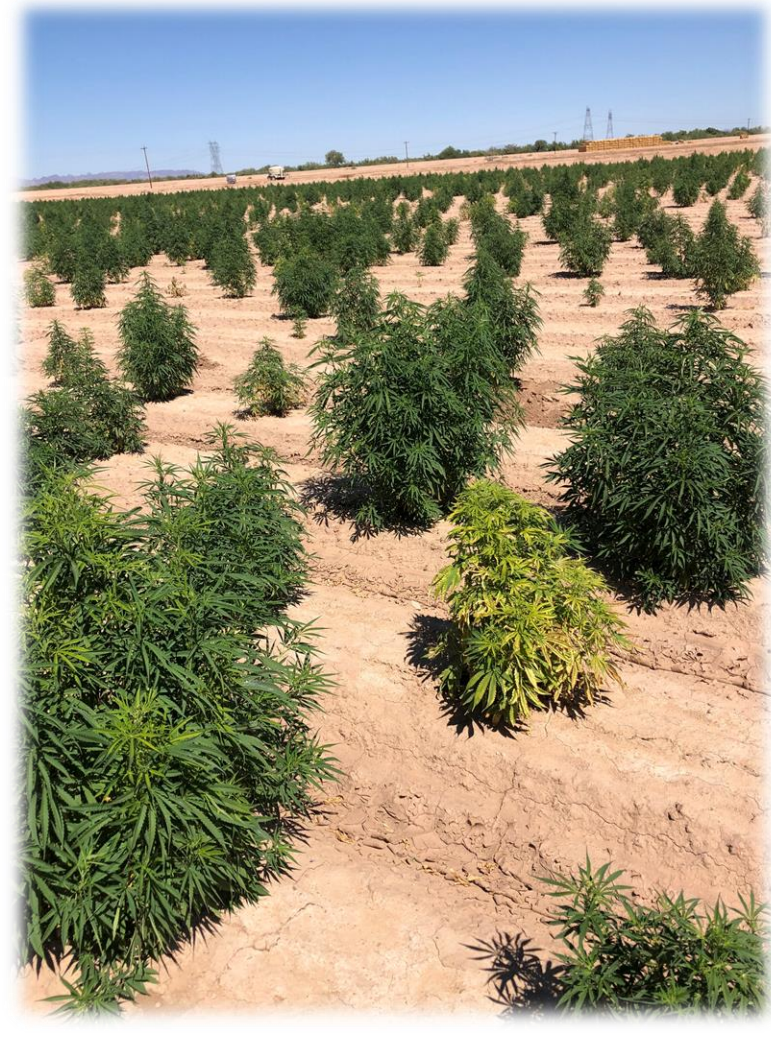
# Management

- No fungicides or insecticides registered in Arizona
- Biologicals
- Preventative





# When in doubt , Scout!





# Viruses

- *Tobacco ringspot virus*
- *Tobacco mosaic virus*
- *Hop latent virus*
- *Hop latent viroid*-the smallest big problem



# Viruses- what do we know about them?

- Obligatory pathogens: does not include *Tobacco ringspot virus*
- Molecules: we cannot see them
- A lot of them have vectors
- A lot of them are mechanically/graft transmissible
- Can be latent in infection: not showing symptoms



# Virus Management for Nurseries

- *Tobacco ringspot virus*: persistent virus, do not use tobacco products in the greenhouse, wash your hands
- Vectors: Insect proof facility, positive pressure greenhouse because meristem culture alone is not enough
- Mechanically/graft transmissible: sanitize tools between plants (bleach, alcohol, soap, heat)
- Can be latent in infection: test your mother plants at least every 14 days
- Build a robust SOP (standard operating procedure) and implement it rigorously



# Clone buyers/growers


- Ask questions: lots of them/protect yourself
- Vectors: Insect proof facility? positive pressure greenhouse?
- Sanitize tools between plants? What do you use? (bleach, alcohol, soap, heat)
- Ask for a copy of their SOP (Standard operating procedure)
- Do you know about latent infection of viruses/viroids? How often do you test your mother plants? Can I get a copy of last report?
- Get the information on email. Consult with University personnel about the test.





# Plant Diagnosis

- Yuma Ag Centre/ Yuma County Cooperative Extension Office
- Yuma Plant Pathology:  
<https://extension.arizona.edu/yuma-plant-health-clinic>
- Arizona Plant Diagnostic Network
- Read instructions, fill out information
- Molecular Diagnosis available starting September, 2020



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**MAIL SAMPLES TO**  
Dr. Bindu Poudel  
Plant Diagnostic Clinic  
6425 W 8<sup>th</sup> Street  
Yuma, AZ 85364  
Email: [bpoudel@email.arizona.edu](mailto:bpoudel@email.arizona.edu)  
Cell: 928-920-1110  
Office: 928-782-5879  
Fax: 928-782-1940

**FOR LAB USE ONLY**  
**Sample No:**  
**Collection date:**  
**Received:**  
**Paid: \$**

**PLANT PATHOLOGY DIAGNOSTIC CLINIC SUBMISSION FORM**  
*Please fill out all the information in three easy steps. Samples without adequate information will not be processed.*

**STEP 1: YOUR CONTACT INFORMATION**

<b>Submitted by:</b>	<b>Check one:</b>	<b>Submitted for:</b>
Company:	Pest Control Advisor	Company:
Address:	Extension Agent	Address:
City/Zip:	Commercial Grower	City/Zip:
County:	Home Owner	County:
E-mail:	Research/Faculty	E-mail:
Phone:	Master Gardener	Phone:

**STEP 2: HOST PLANT & SYMPTOM INFORMATION**

Host Plant:		Cultivar:		Location	
Overall plant	Root	Stem/branch	Leaf	Flower/Fruit	
stunted	galls/swelling	Galls/swelling	spotted/mosaic/mottle	spotted/mosaic	
elongated	cankers	girdled	wilt/blight	discolor/blight	
gnarled	rot	discolored	yellowing	rot	
spotted/mosaic	wilted	dieback	chlorotic/necrotic spots	distorted/scabby	
wilted/blighted	dieback	wilted	deformed	uneven ripening	
yellowing	discolored	dark lesions	premature leaf fall	necrotic/chlorotic spots	
other	other	other	other	other	

**STEP 3: PLANT PRODUCTION & PRACTICES**

Type of Planting	Symptom Prevalence	Symptom appearance	Recent sprays	Additional information
commercial field/orchard	entire planting	days	fertilizer	
garden/home	localized area	weeks	pesticides	
nursery/greenhouse	scattered area	months	herbicides	
other	other	other	other	





# Diagnosis Resources

- Trical Diagnostics (<https://www.tricaldiagnostics.com/>)
- Viruses  
Dr. Ioannis Tzanetakis  
University of Arkansas  
[itzaneta@uark.edu](mailto:itzaneta@uark.edu)  
\$75 per sample, \$25 for  
each additional virus testing





# Insect Diagnosis & Management

Dr. John Palumbo

[jpalambo@ag.arizona.edu](mailto:jpalambo@ag.arizona.edu)

928-782-3836

Cell: 928-920-3387

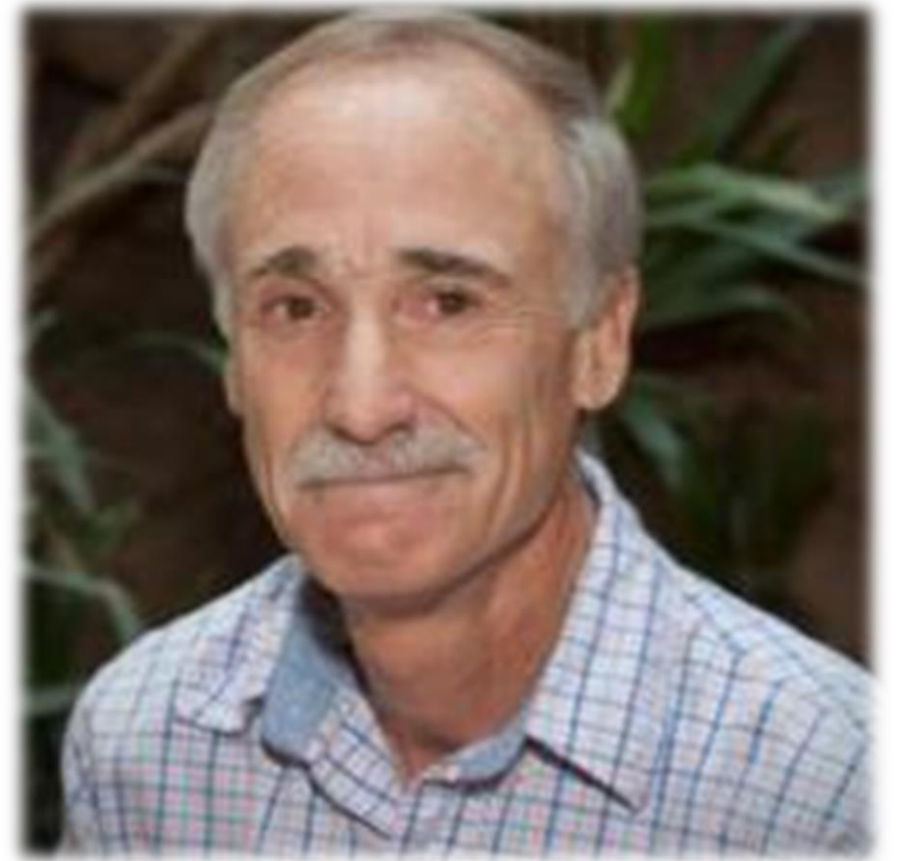
Fax: 928-782-1940







# Weed Diagnosis and Management



Barry Tickles

[btickes@cals.arizona.edu](mailto:btickes@cals.arizona.edu)

928-580-9902





# Thank you!



***“Extension is not just about how much you know, it is also about how much you care”***

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