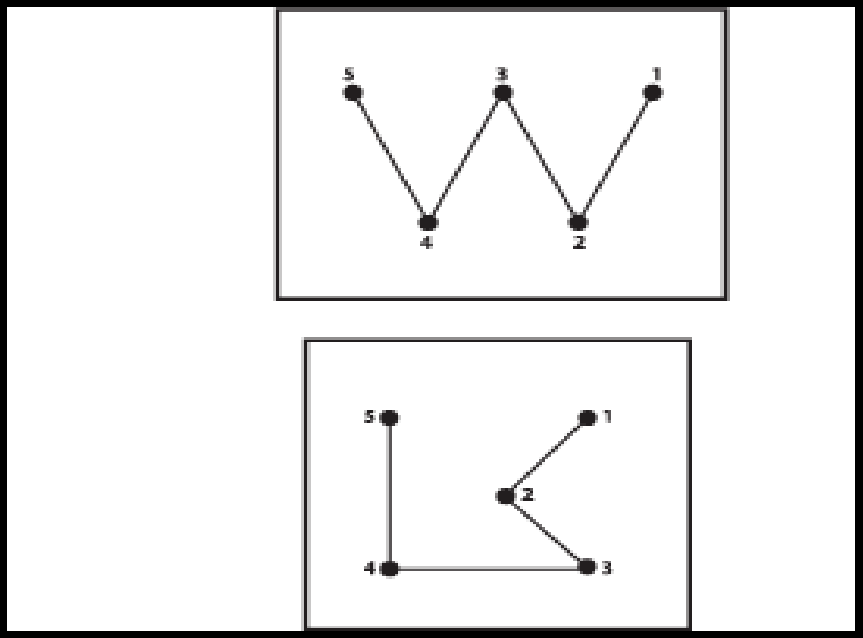
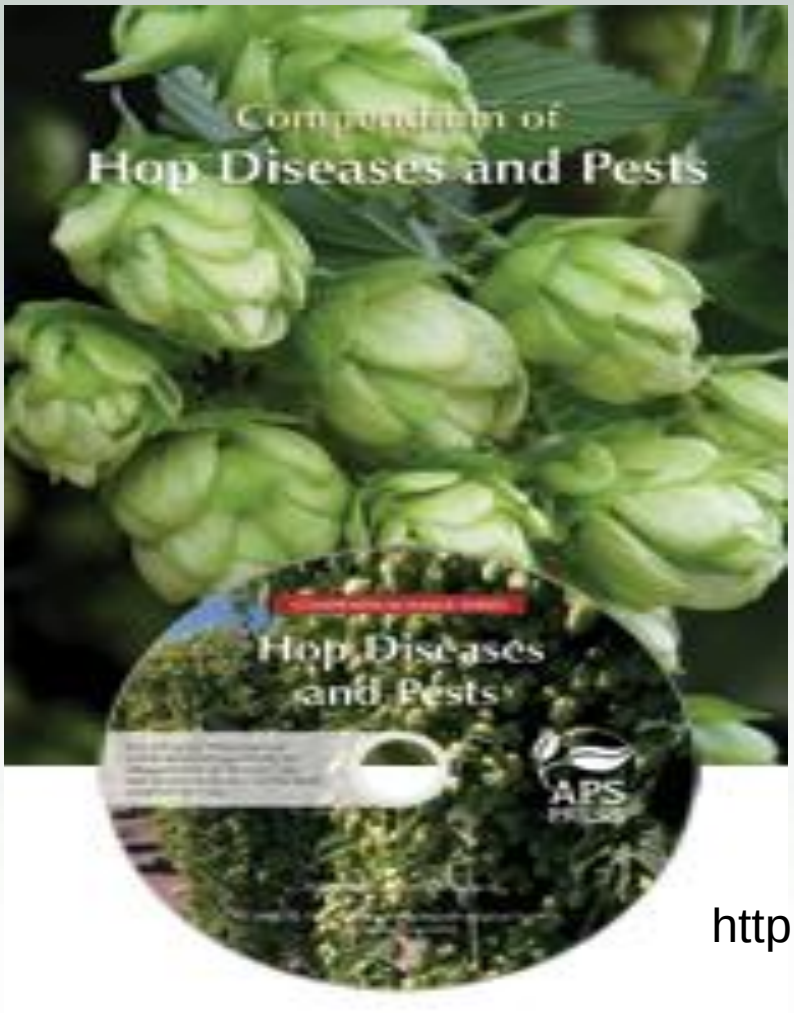
What is wrong with my hops plant?

Ann Hazelrigg
Hops Conference
March 19, 2012

Scout/monitor: earlier you find problem, easier to fix!



GET A POSITIVE ID!



- Reference Books: HOPS Compendium
- Web-University sites
- Plant Diagnostic Clinic

http://pss.uvm.edu/pd/pdc/

http://ipm.wsu.edu/field/pdf/HopHandbook2010.pdf

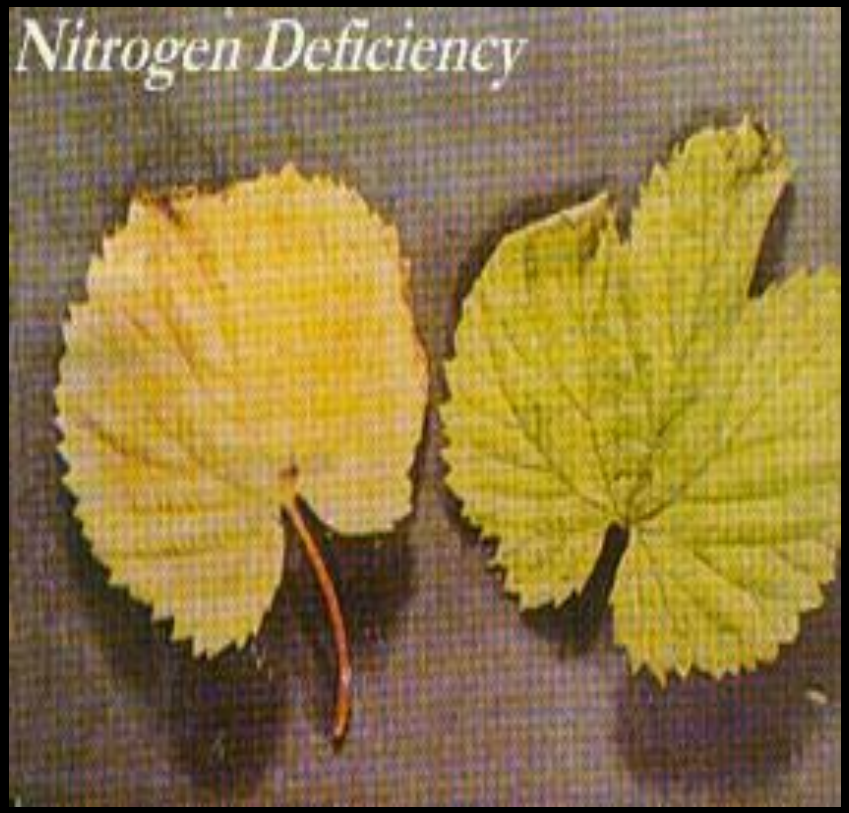
UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Cone diseases-what the)$#(&)%(?


Disease is the rule rather than the exception!

AGENT THAT CAUSES DISEASE IS THE PATHOGEN

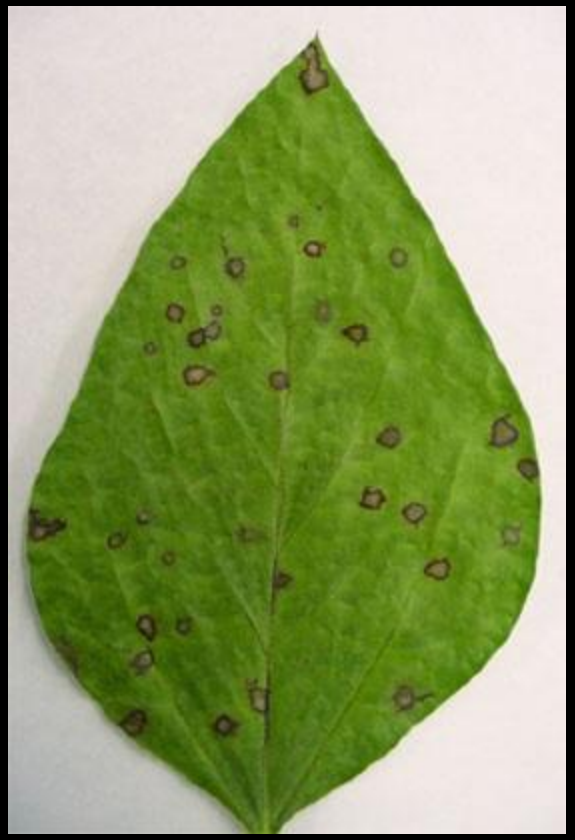
ABIOTIC



BIOTIC

SYMPTOMS ARE THE PHYSICAL EXPRESSION OF THE PLANT TO DISEASE

SYMPTOMS ARE NOT SPECIFIC!



LEAFSPOTS

SCORCH


5394167

BLIGHTS

GALLS

WILTS

Verticillium wilt

- Soilborne fungus that infects through rootlets
- Leaves turn yellow and die from the base up
- Brown discoloration of woody tissue under the bark.
- Heavily infected plants die on the string, usually just before or at harvest.
- Virulent form of wilt that occurs in Europe has not been found in the United States.
- Fields infected with the mild form decline over a number of years, while the virulent form will kill a plant in a couple of years or less

Verticillium management

- Resistant cultivars
- Good weed control. The mild form of Verticillium wilt infects many common weeds found in hop yards.
- Irrigation management. Avoid excessive irrigation in early spring.
- Nitrogen management. Apply sufficient nitrogen for the crop, but avoid excessive N fertilization.
- Field sanitation. Do not put vines and harvest debris taken from areas that you suspect has wilt

Canker-(swollen at base)

SYMPTOMS ARE NOT SPECIFIC!!

RULE OUT INSECTS

Japanese beetle

Earwigs

Spider Mites-2 spot

- hot dry conditions
- feed on plant juices
- contaminate pods
- decrease yield
- quality loss-detrimental flavor

mies

Aphids

- Overwinters as egg on Prunus species
- Populations can build up rapidly
- Common in early spring-like succulent new tissue and like over N fertilization
- Sooty mold

Abiotic vs Biotic

Potato leafhopper

ABIOTIC

- non-living
- pattern
- timing
- gradient of injury
- non host specific
- Check new growth

Potassium deficiency


A. R. Biggs


UGA4214019

INDESCRIBABLE... INDESTRUCTIBLE! NOTHING CAN STOP IT!

THE BLOB

'X'

STEVEN McQUEEN

ANETA CORSEAUT · EARL ROWE

PRODUCED BY JACK H. HARRIS · DIRECTED BY IRVIN S. YEAWORTH, JR. · SCREENPLAY BY THEODORE SIMONSON AND KATE PHILLIPS

FROM AN IDEA BY IRVINE H. MILLIGAN

A TONEYN PRODUCTION · COLOUR BY DELUXE

BIOTIC

- living
- random
- slow moving
- spreads from host to host
- very host specific
- Often has a sign-presence of the pathogen

The Disease Triangle

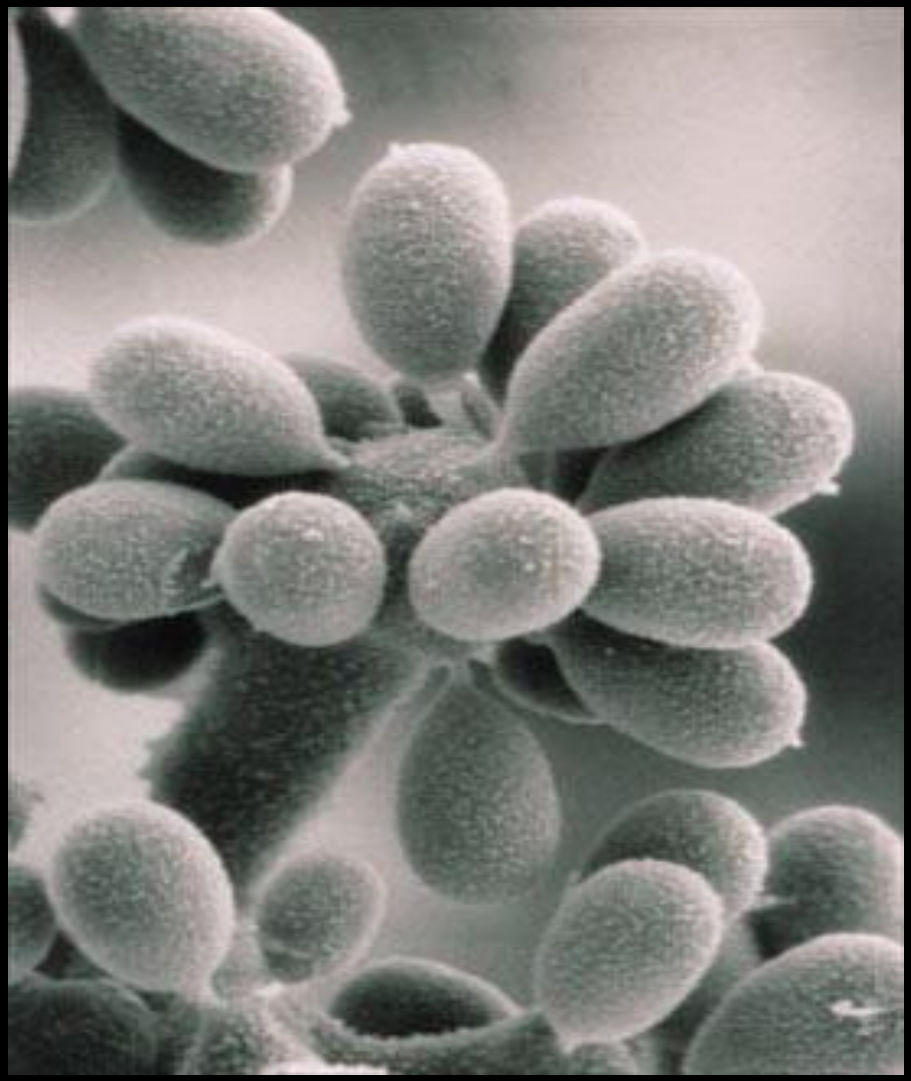
BIOTIC DISEASES

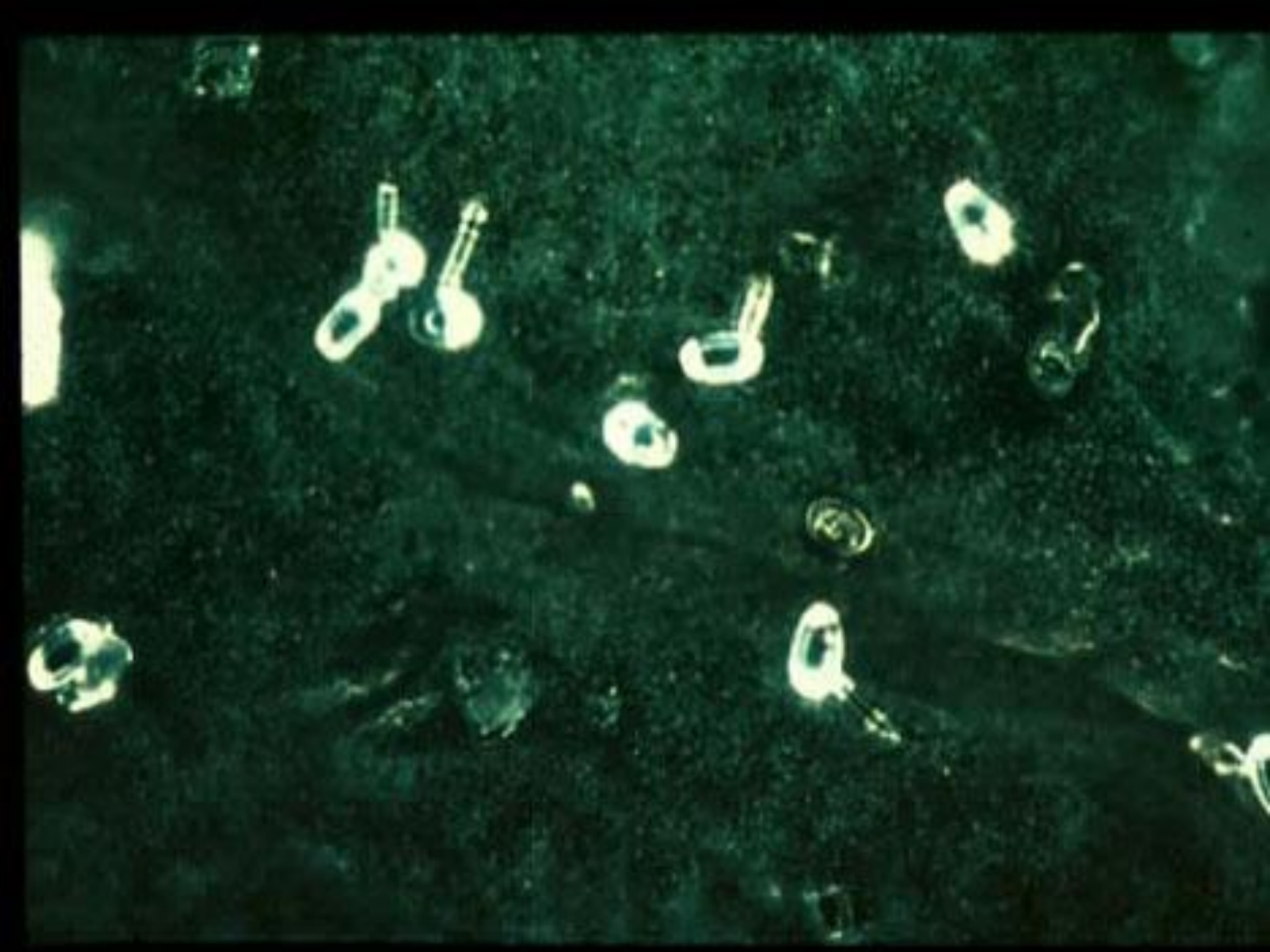
LIVING ORGANISMS

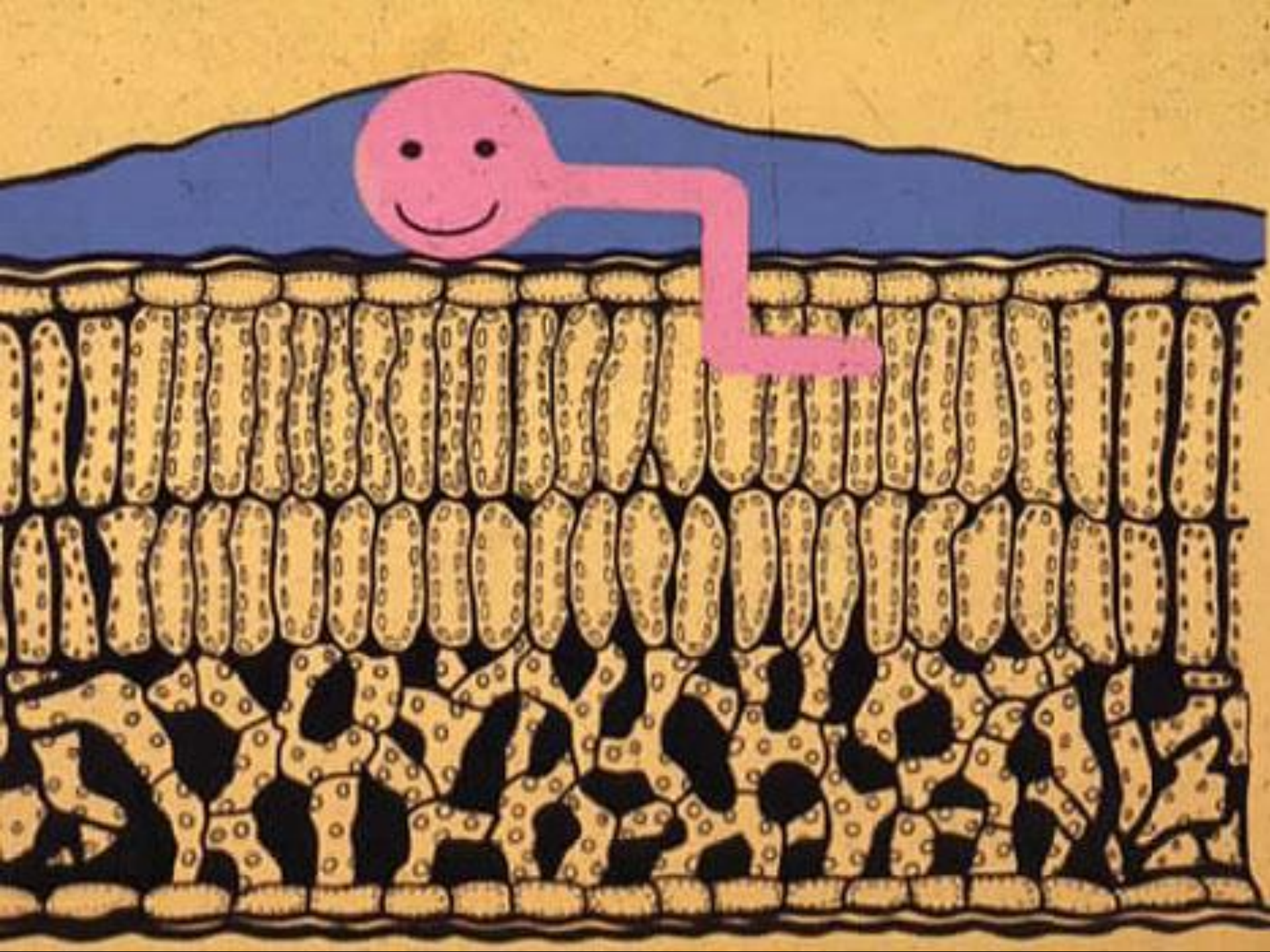
- Fungi
- Bacteria
- Viruses
- Nematodes
- Higher plants

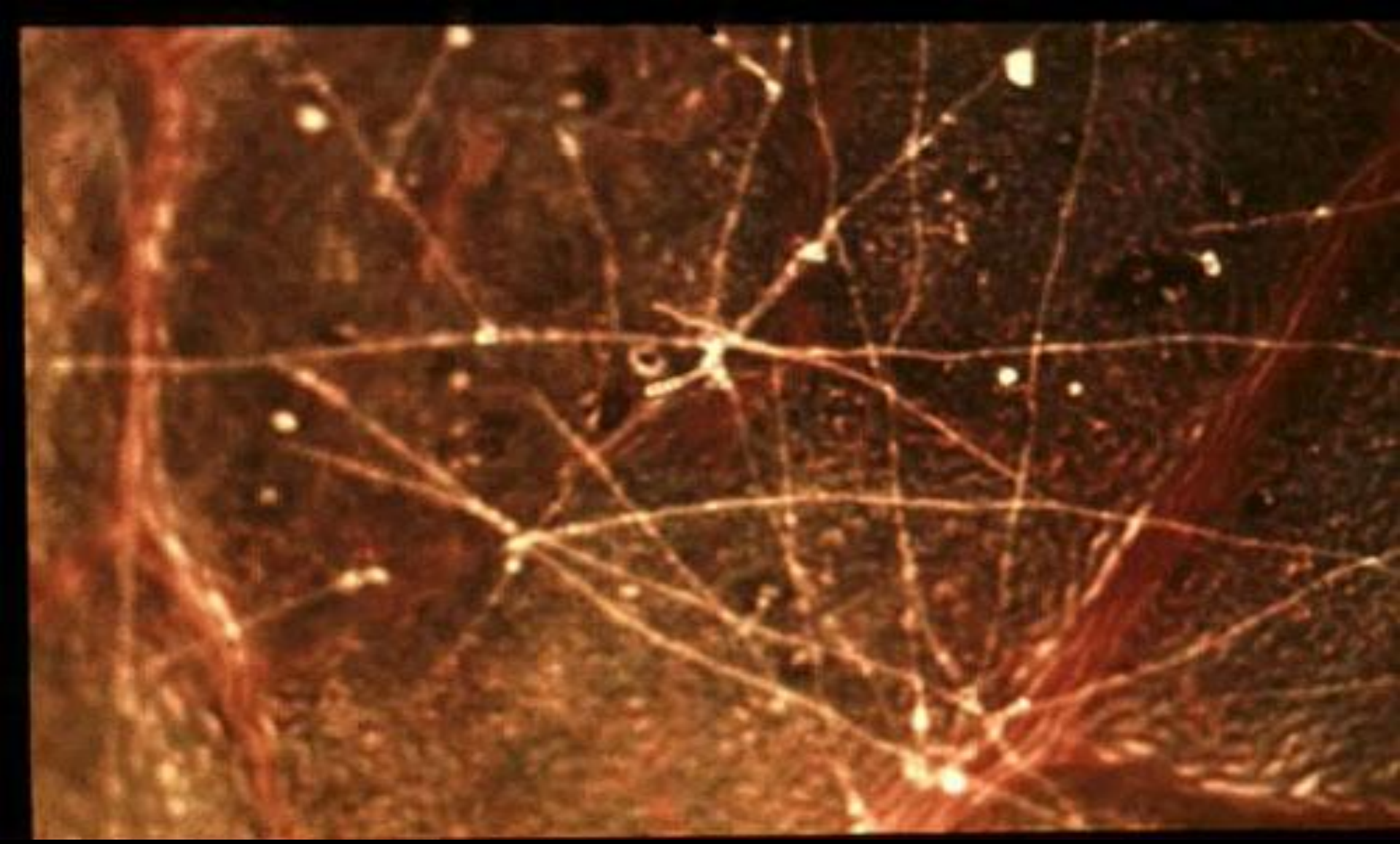
FUNGI

- New kingdom-lack chlorophyll so can't make their own food
- over 100,000 but 8,000 cause disease
- can be large (mushrooms) but most are microscopic
- reproduce by spores









Hyphae-mycelieum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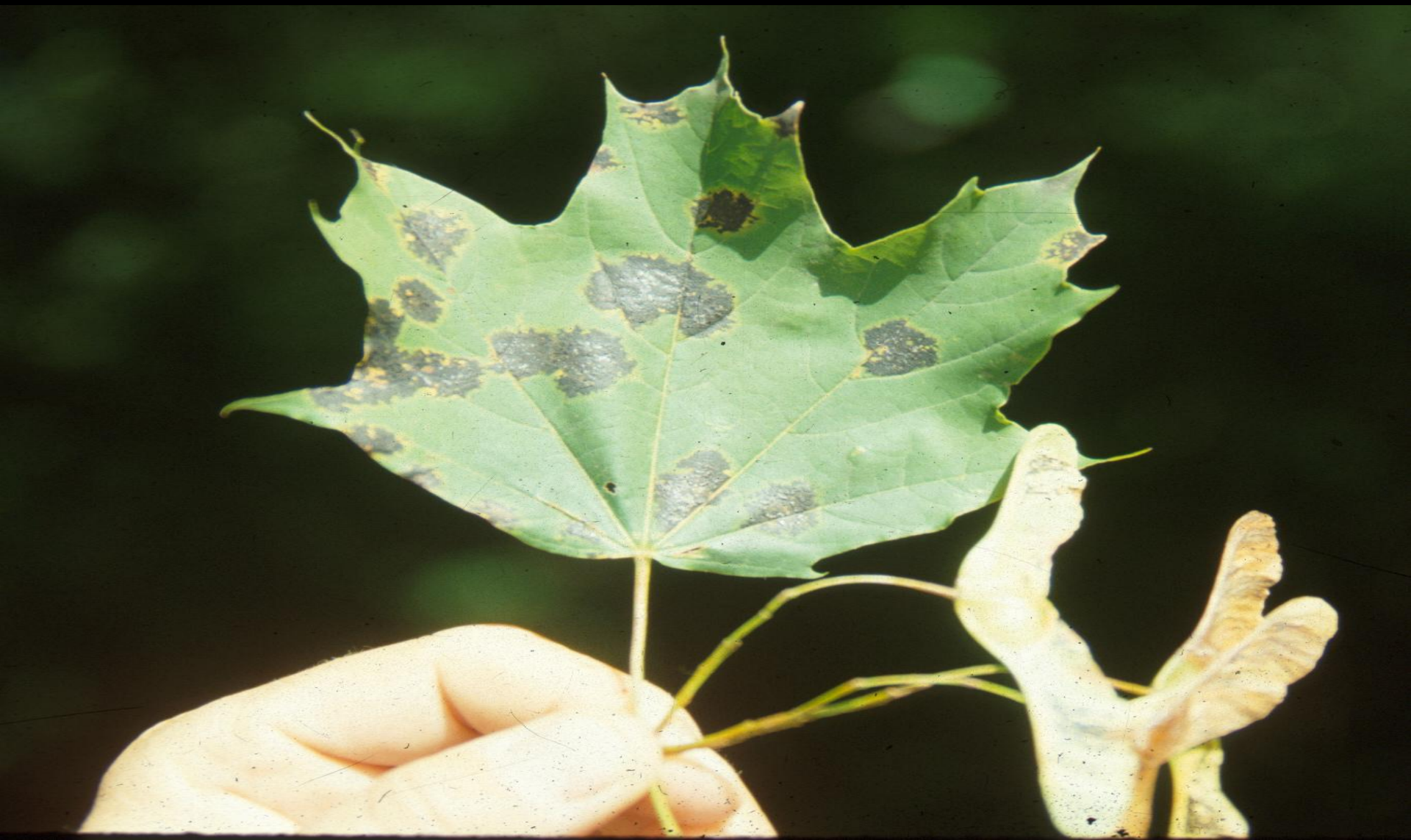
Most fungi overwinter on leaf tissue



SIGN

Actual presence of the pathogen

Helps in ID

Sclerotinia white mold

Powdery Mildew

- First appears as small, circular, powdery colonies
- Young and rapidly growing tissue is very susceptible to infection
- The colony size increases from about a sixteenth of an inch, to a half an inch or larger until the entire vine may be white.

Powdery Mildew

•infections at the burr stage can lead to flower abortion, which diminishes fruiting and yield.

•Cones infected with powdery mildew are stunted and malformed.

•They mature rapidly, leading to cone shatter and uneven crop maturity.

•Powdery mildew may impact the biochemical makeup and subsequent taste of the hops.

•For susceptible varieties under severe disease pressure, yields can drop by 80% or more, even with the application of fungicides

PM Management

- Resistant varieties
- Good air circulation/pruning to decrease RH
- Fungicides-Hort oils, sulfur

Downy Mildew

New spikes are pale green/yellow and have shortened internodes and stunted leaves

Curled and browned lower leaves on infected newly emerged shoots

Leaf undersides-dirty spores

Downy Mildew Management

Remove primary basal spikes and heavily prune and strip leaves.

Decreases moisture and humidity in the lower parts of the canopy

Downy mildew management

- Keep up good air circulation
- Mow cover crops
- Train vines so no soil contact
- Remove suckers as soon as vines are strung
- Strip leaves up to 4 feet soon after training
- Use only drip irrigation

Fungicides

- Sporatec (rosemary oil, clove oil and thyme oil)
- **Copper products (look for OMRI label)**
- Sonata (*Bacillus pumulis* strain QST 2808)

Downy Mildew

Can cause rot in rhizome

Can affect cone-bitter

Vermont Pesticide license

- You need a private pesticide license if you are applying RESTRICTED USE pesticides on your own farm.
- You need a commercial pesticide license if you apply or supervise the application of any pesticides for other individuals for pay.
- Commercial applicators also need to pass a “category” exam in their field (ag-plants, ag animals, cooling towers, structural pests, etc)
- Licenses are good for 5 years-8 and 16 credits req.

Lethal Dose 50

LD 50- Amount of a toxicant required to kill 50% of a test population of animals under a set of standard conditions (mg/kg)

LD 50 VALUES

- 2,4-D 375
- Sevin 500
- Roundup 4,300
- B.t. 15,000
- Rotenone 132

SIGNAL WORDS

used on the label to express LD 50

- CAUTION-low toxicity

  LD 50>500mg/kg

- WARNING-mod toxicity

  LD 50-50-500mg/kg

- **DANGER-skin/eye irritation**

- **DANGER-POISON**

LD 50 trace to 50mg/kg

SIGNAL WORDS EXPRESS THE LD 50 OF THE PESTICIDE

ACTIVE INGREDIENT:

Dimethylamine Salt of 2,4-Dichlorophenoxyacetic acid*	47.5%
INERT INGREDIENTS	52.5%
TOTAL	100.0%

*(Equivalent to 39.5% 2,4-Dichlorophenoxyacetic acid.) This Product Contains 3.86 Pounds of 2,4-Dichlorophenoxyacetic Acid per Gallon. Isomer Specific by AOAC Method No. 6.D01-5.

A Selective Herbicide

KEEP OUT OF REACH OF CHILDREN

CAUTION

PRECAUCION AL USUARIO: Si usted no lee ingles, no use este producto hasta que le etiqueta haya sido explicado ampliamente.

NOT FOR SALE TO OR USE BY HOMEOWNERS

See side panel for additional precautionary statements and directions for use.

NET CONTENTS 55 GALLONS

Always use PPE

At minimum;

- Long pants
- Boots -pants outside
- Gloves
- Eye protection
- Hat

MIXING AND LOADING IS MOST DANGEROUS!

Spray apron-AM Leonard

Sprayer calibration-read the label

- Many pesticides specify using a defined amount of a formulation/gallon of water and spraying until runoff.
- EX. –Entrust Naturalyte insect control-

“for small plantings, or spot sprays, add the required amount of Entrust to the rec amount of H20, mix, apply uniformly to foliage until runoff. Do not use more than 3 gal/spray/1000ft squared.

Sprayer calibration

- What if the pesticide specifies a defined amount of product be applied per acre?
- EX. Champ WG for early blight

"Apply 2-4 pounds/acre in a minimum spray volume of 20 gallons"

Need to calibrate what your sprayer will do:

Constant pressure, nozzle with uniform pattern,

Each applicator will apply at different rate so important to calibrate for each applicator!

Linear test method:

- Measure out area 18.5 feet X 18.5 feet
- Measure number of seconds necessary to spray this area
- Spray into a container the number of ounces for the same time measured in Step 2
- # of ounces collected = Gallons per acre

- WHY?
- 18.5 X 18.5=340 sq ft or 1/128 of an acre
- There are 128 ounces in a gallon
- Therefore ounces=gallons in this calculation

Example:

- It takes 40 seconds to spray the 18.5 X 18.5 area
- In 40 seconds you collect 30 ounces of spray
- So, you are applying at 30 Gallons/acre
- You have a 3 gal sprayer
- 30 gallons needed to treat one acre
- One full sprayer will treat 10% of an acre.