Fungus Gnats in New England Greenhouses

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UNH Cooperative Extension

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- **Fungus gnats comprise two entire families (Sciaridae and Mycetophilidae).**
- **Mostly we are concerned about Sciarids, a family with 65 Nearctic species.**
- **In greenhouses mostly we see 2 species: *Bradysia coprophila* and *B. impatiens***
- **Because we see several species, some characteristics can vary (size, antennae length, etc)**

Fungus Gnats

Long legs

Rel. thin abdomen

No thread waist

Longish antennae

Body length usu. 1.5-3mm

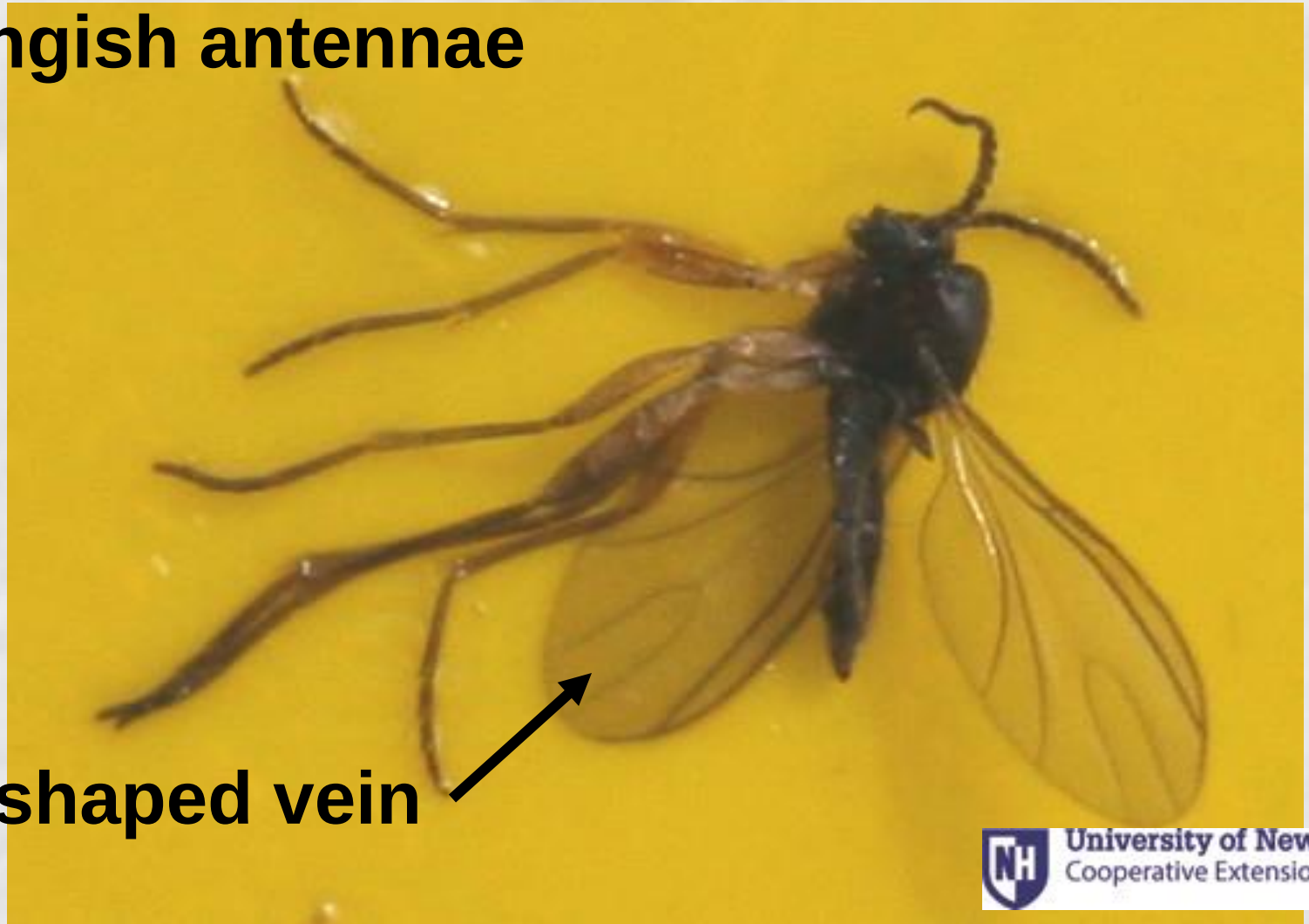

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Photo: Whitney Cranshaw, Colo State Univ. Bugwood.org

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Larvae:

- long, narrow, translucent or whitish “worms”
- no legs
- dark head capsule
- Up to 5mm long

Larvae feed on plant material… roots, inside succulent stems, tubers..

Photo: Whitney Cranshaw, Colo State Univ. www.Bugwood.org

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The egg-laying adults are **strongly attracted to the odor of fresh media**.

Females prefer moist media/soil for egg-laying.

FG's survive best in humid conditions, both larvae and adults.

Females lay many eggs.

Life cycle 12-28d (varies with spp. & temp)

FG Scouting:
YSC's on stakes
or laid on top of pot.

Disturbance of vegetation and/or pot causes adults to fly… can cause increase in YSC catch

Start in or concentrate on mist beds, houses with wet soil floors, not as much light

Sometimes we insert potato wedges to evaluate larvae numbers.

Mark the pots! Check 48 hrs after insertion.

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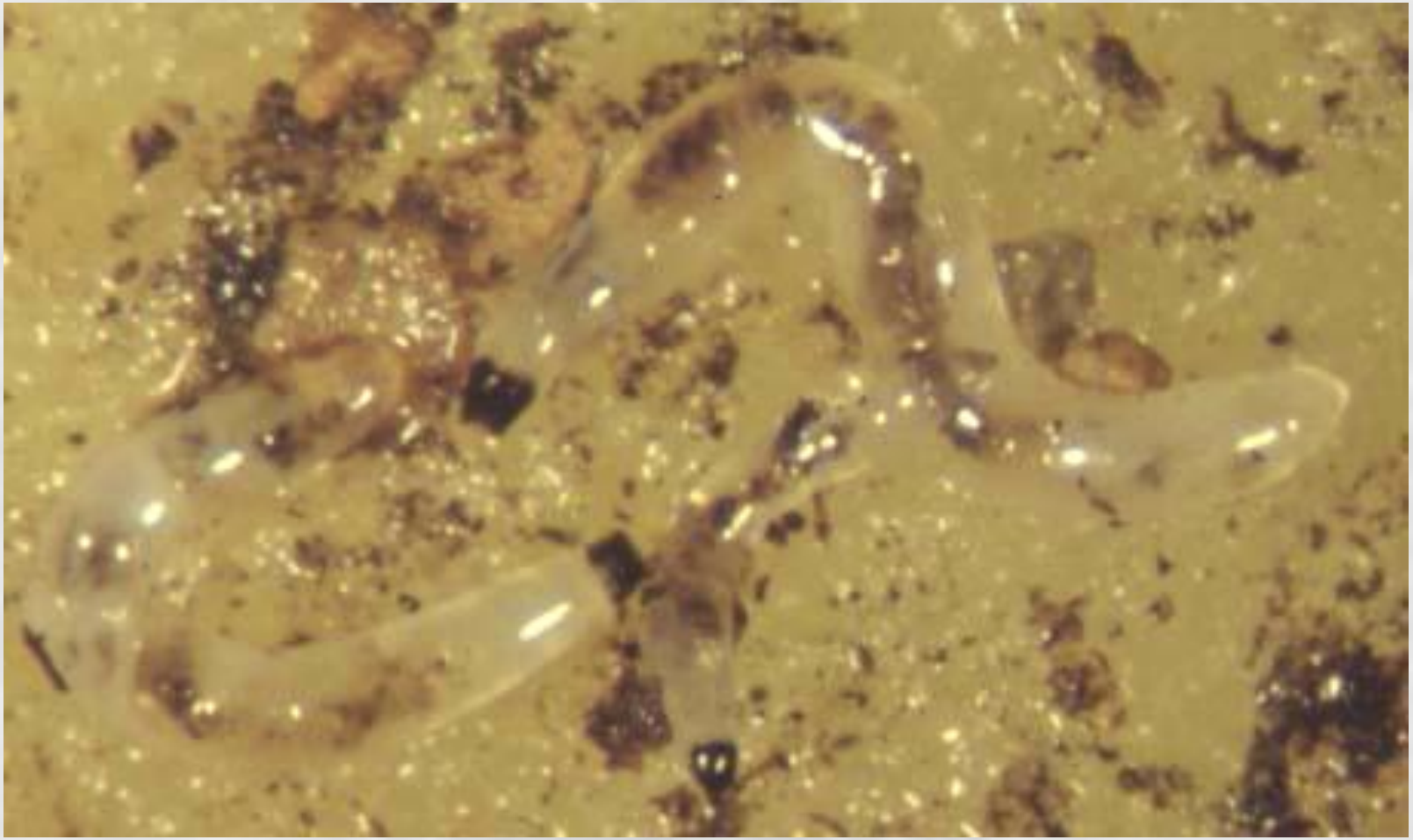
Remove the wedge carefully, so you won't dislodge any larvae.



How many FG's trigger treatment?

We have no established thresholds because each situation is so variable.

You can establish your own.

The monitoring tells you where & when you have hotspots.

It also tells you if your controls worked.

Controlling Fungus Gnats

DO NOT OVER-WATER
Don’t let floor (dirt floor) to get too wet

Biological treatments: Nematodes, B.t.i.

Chemicals

Parasites/predators

Steinernema feltiae

- Check viability of shipment
- Don’t store a long time
- If apply by sprayer:
  - Remove screens in spray hose
  - Use low pressure

PROFESSIONAL PRODUCTS

VALENT®

Gnatrol® WDG

BIOLOGICAL LARVICIDE

FOR ORGANIC PRODUCTION

Active Ingredient:	
Bacillus thuringiensis, subsp. *israelensis*, strain AM 65-52 fermentation solids and solubles	37.4%
Other Ingredients	62.6%
Total	100.0%

[Potency: 3000 International Toxic Units (ITU) per mg].
Equivalent to 1.36 billion ITU/lb.
The percent active ingredient does not indicate product performance and potency measurements are not Federally standardized.

2.0 PRECAUTIONARY

2.1 HAZARD TO HUMA
CAUTION

Harmful if inhaled. A
inated clothing and w
eye irritation. Avoid
thoroughly with soap

2.2 Personal Protectiv

Applicators and othe

- Long-sleeved shirt
- Waterproof gloves
- Shoes plus socks

Follow manufacturer'
PPE. If no such instr
and hot water. Keep
laundry.

Mixer/loaders and a
aircraft must wear a
NIOSH standards of

l Range Rate
tation: z/100 gallons a soil drench station: /100 gallons a soil drench

by soil drench
ve and under
nder benches
of the primary
tions where all
) are present,
ree (3) weekly
r heavy infes-
the suggested
n maintenance

nd of irrigation

through any type of irrigation system.

APPLICATION DIRECTIONS

Fungus Gnat Control in Indoor Ornamental and Plantscape Use

Fungus Gnat Habitat	Suggested Range Rate
Indoor ornamental and plantscape use.	**Light infestation:** 3.2 to 6.4 oz/100 gallons applied as a soil drench **Heavy infestation:** 13 to 26 oz/100 gallons applied as a soil drench

Apply *Gnatrol* WDG with adequate water by soil drench to sufficiently wet the soil surface. Reapply as needed. In situations where all life forms (eggs, larvae, pupae and adults) are present, such as with existing infestations, make (3) weekly applications at the suggested range rate for heavy infestations. Regular follow-up using suggested light infestation rates will establish a long term maintenance program.

Gnatrol WDG is a larvicide and will not control adult gnats, therefore, applications must be

From 2001-5, we experimented with “topping” to control fungus gnats.

We almost filled the pot with a standard Metro mix, then added 2cm (abt 1 inch) of a different material on top, Then planted scaevola or poinsettias. Several weeks later we cut off the plants & counted the fungus gnats.

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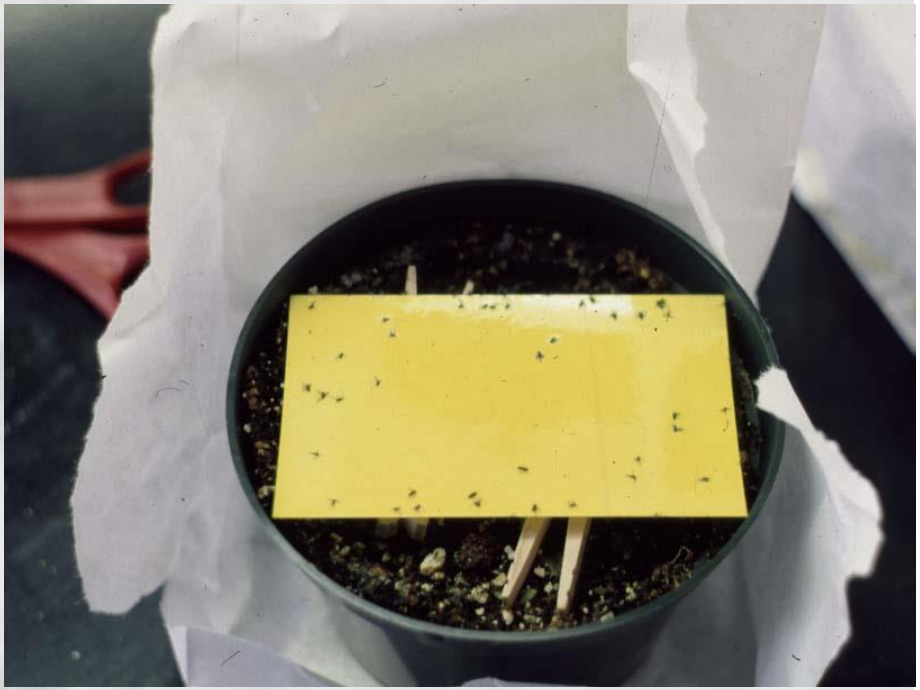
We bagged & sealed each pot. Inside each bag was a yellow sticky card to catch & count the fungus gnats as they emerged.



We held them 2 weeks, then counted. Some topping materials <u>really reduced</u> FG numbers.

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TC 10 1
TF 10 1
TN 10 1
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Chemical controls

One treatment typically does not work well, because usually all life stages are present, and not all are reached by the treatment.

Usually we use 2 treatments one week apart.

Safari (dinotefuran) label

ORNAMENTAL PLANTS AND FORESTS – APPLICATION TO SOIL: For systemic insect control on containerized and field grown (in-ground) ornamental plants in nurseries, greenhouses, interior plantscapes, lath and shade-houses, outdoor landscapes (commercial, industrial, recreational and residential), tree plantations, reforestation nurseries and forests when applied via soil drench, soil injection, micro-irrigation (spaghetti tube or emitter), drip irrigation, overhead irrigation, ebb and flood irrigation equipment or motorized irrigation equipment.

Crops	Pests	Product Rate (By Weight)	Remarks
Ornamental plants including: Shrubs Bedding Plants Flowering Plants Foliage Plants Ground Covers Evergreens Ornamental Trees Non-Bearing Fruit Trees Non-Bearing Nut Trees Non-Bearing Vines Christmas Trees Trees in Plantations including: Conifers Deciduous Trees Reforestation Nurseries Forests and Wooded Areas: National,	Adelgids including: Hemlock Woolly Balsam Woolly Aphids including: Balsam Crepe Myrtle Green Peach Melon Bagworms Eastern Tent Caterpillar Erythinia Gall Wasp Flatheaded Borers including: Alder Bronze Birch Emerald Ash Flatheaded Appletree Two-Lined Chestnut Froghoppers Fungus Gnats (larvae)	**Containerized Plants Soil Media Drench** 3/4 to 1-1/2 pounds per 100 gallons 12 to 24 ounces per 100 gallons 1.5-3.0 teaspoons per gallon **Media Drench Volume for Individual Pots** Pot diameter (inches) / Fl oz of dilute solution per pot 4 / 2 5 / 3 6 / 4 7 / 5 8 / 6 For larger pot volumes, apply 3-4 fl oz of dilute solution (0.11 to 0.22 g product per 4 fl oz water) per gallon of potting media. Use a drench volume that is sufficient to wet soil media without resulting in overflow	Only apply to moist soil media. Do not apply to dry or saturated media. Do not apply media drench until roots from transplanted plugs or liners have extended at least half way to the edge of pots. Do not leach treated soil media for at least 7 days after application or performance may be reduced. Heavy rainfall or excessive irrigation following application may decrease performance. Higher rates will be needed to control insects on woody plants than on herba-

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2005 Fungus Gnat Experiment

4 commercial greenhouses & UNH
Colorado, Michigan, New Jersey, NH

Control (no treatment)
Adept (diflubenzuron)
Azatin (azadirachtin)
Citation (cyromazine)
Distance (pyriproxifen)
Duraguard (chlorpyrifos)
Marathon (imidacloprid)
Nemasys (nematode)
Safari (dinotefuran)

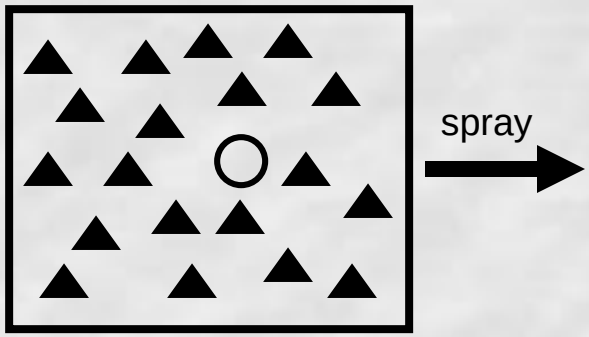
of Fungus Gnats High to low:

Control	(no treatment)		54/pot
Duraguard	1 appl	(chlorpyrifos)	68
Azatin	1 appl	(azadirachtin)	52
Adept	1 appl	(diflubenzuron)	42
Duraguard	2 appl	(chlorpyrifos)	39
Azatin	2 appl	(azadirachtin)	37
Citation	1 appl	(cyromazine)	24
Distance	1 appl	(pyriproxifen)	11
Marathon	1 appl	(imidacloprid)	9
Nemasys	1 appl	(nematode)	7
Citation	2 appl	(cyromazine)	3
Nemasys	2 appl	(nematode)	2
Safari	1 appl	(dinotefuran)	1
Distance	2 appl	(pyriproxifen)	1

Today there are additional chemical pesticide choices, including

Enstar (IGR for larvae)
Flagship (thiamethoxam)

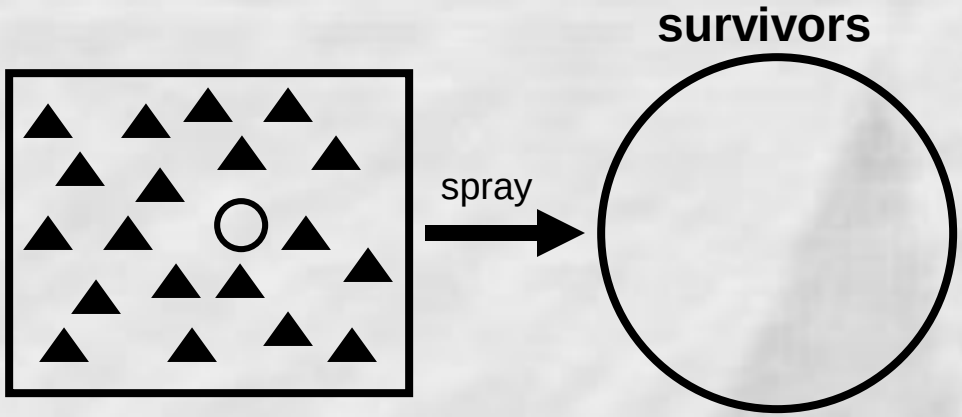
Pesticide Resistance is a serious risk in greenhouse crops, much more than outdoor crops.



▲ **Not resistant**

○ **Inherited resistance**

● **Not resistant, avoided pesticide**



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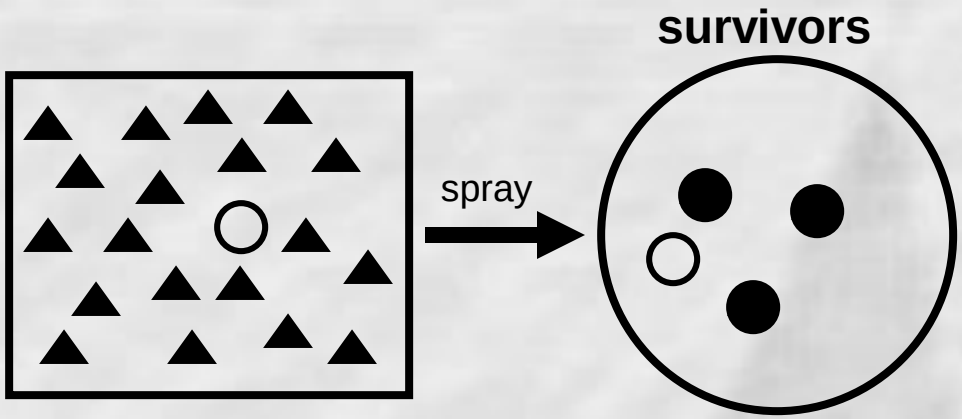

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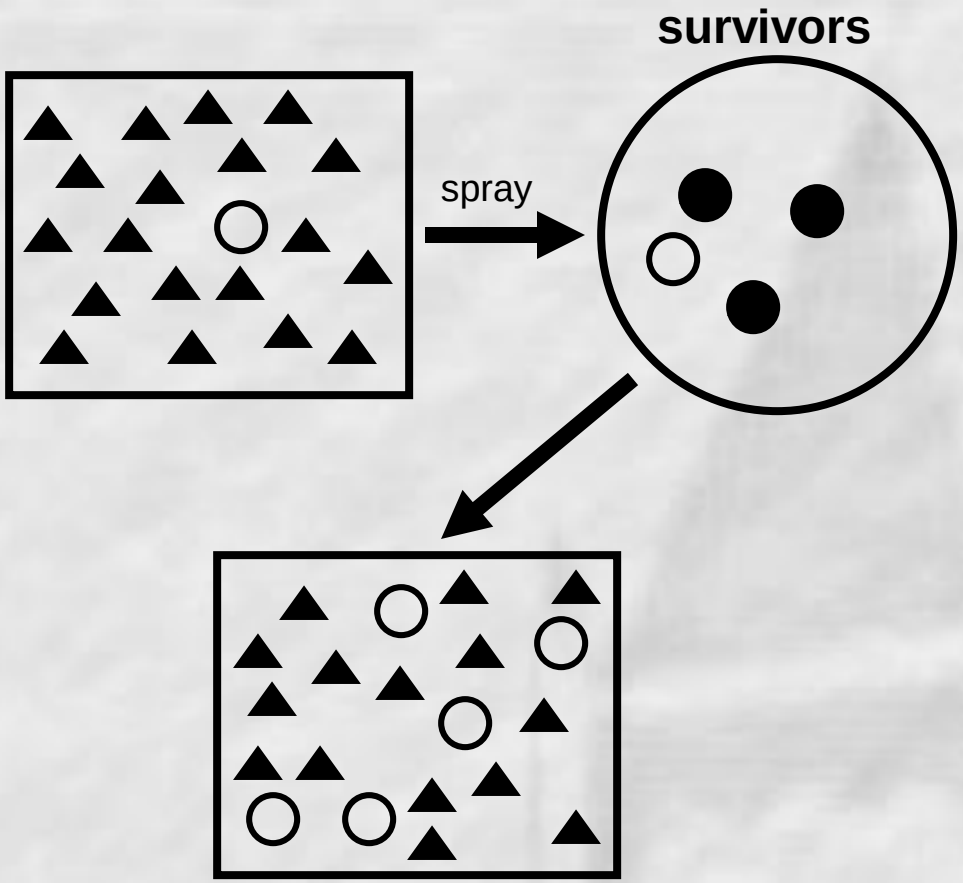

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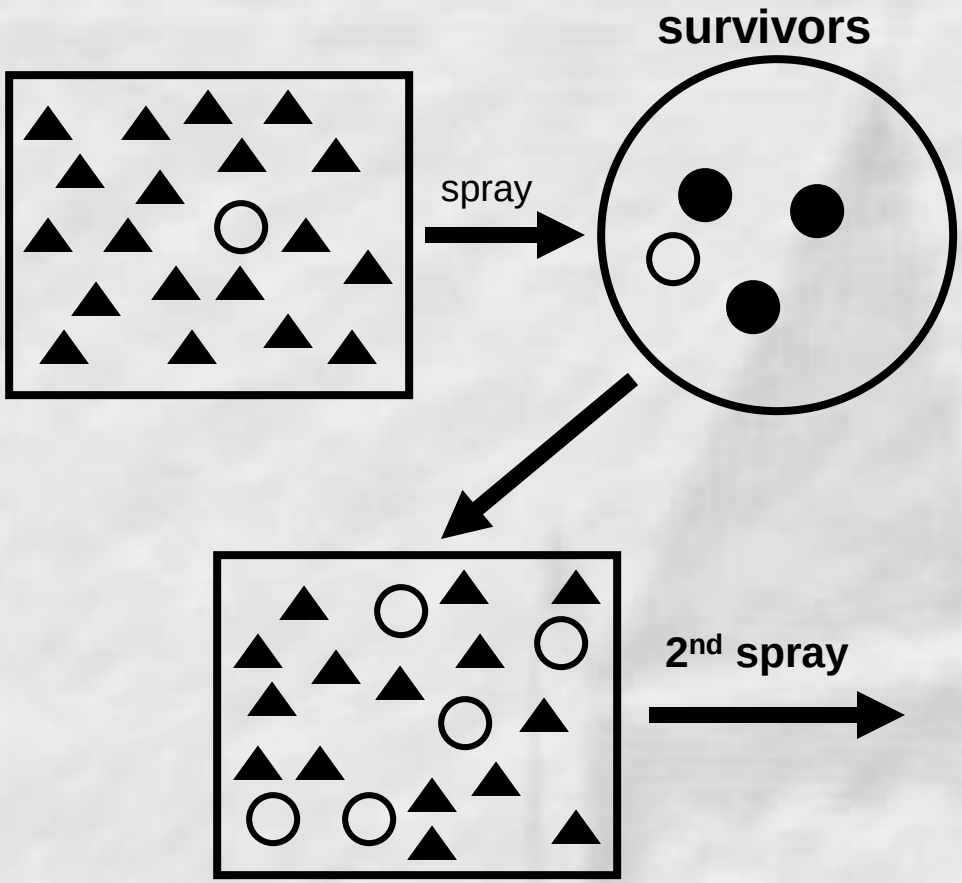

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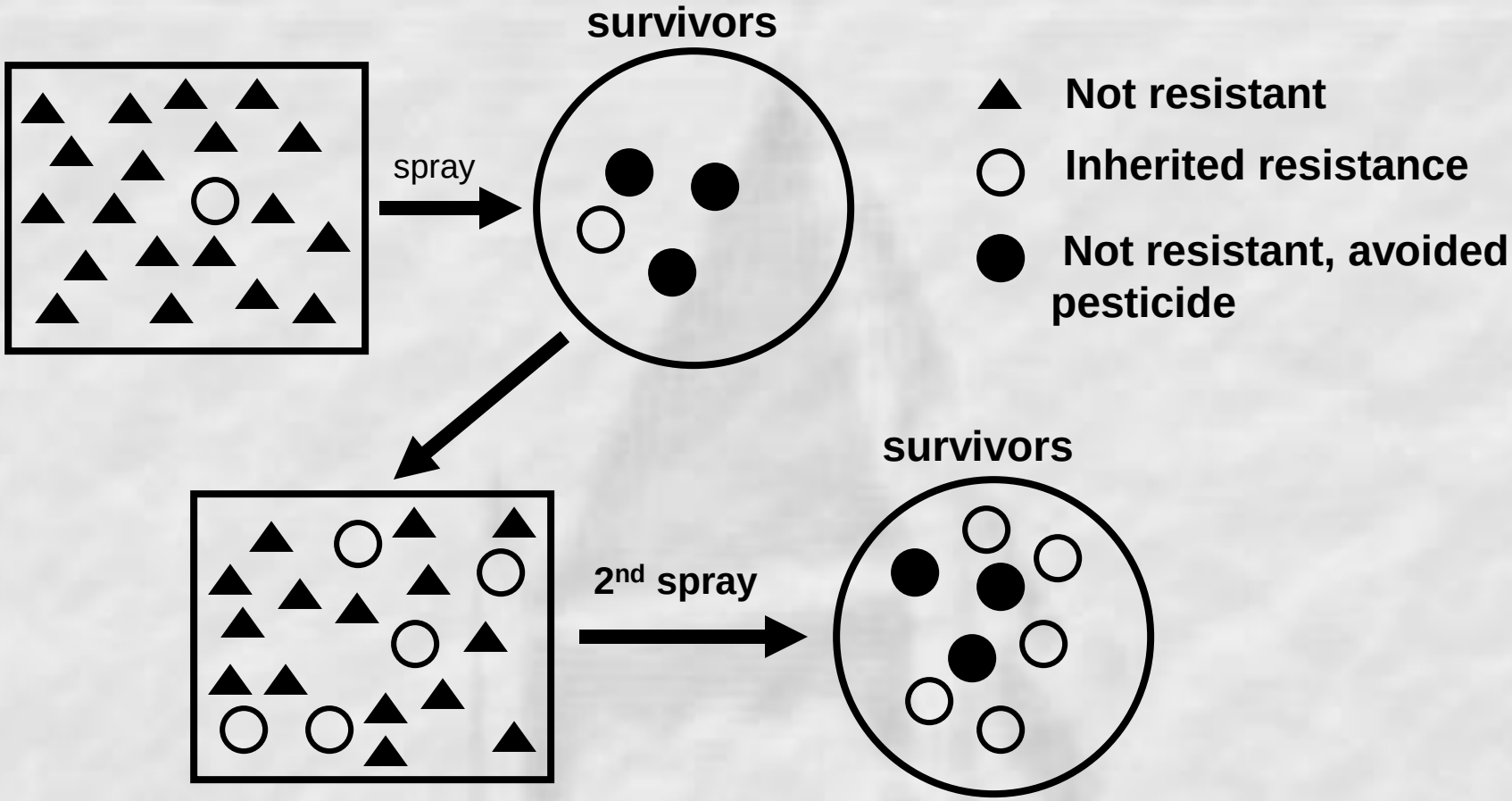

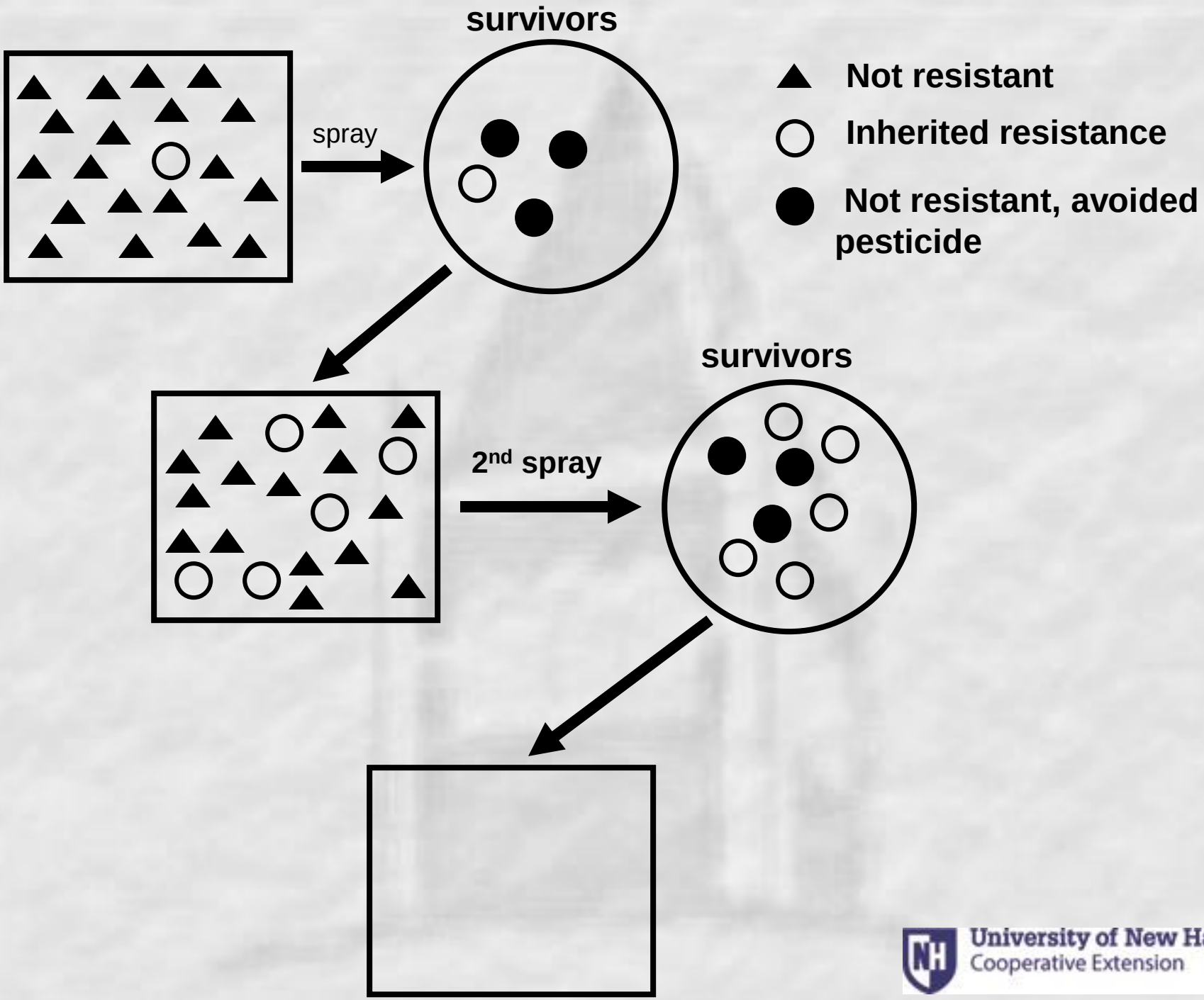

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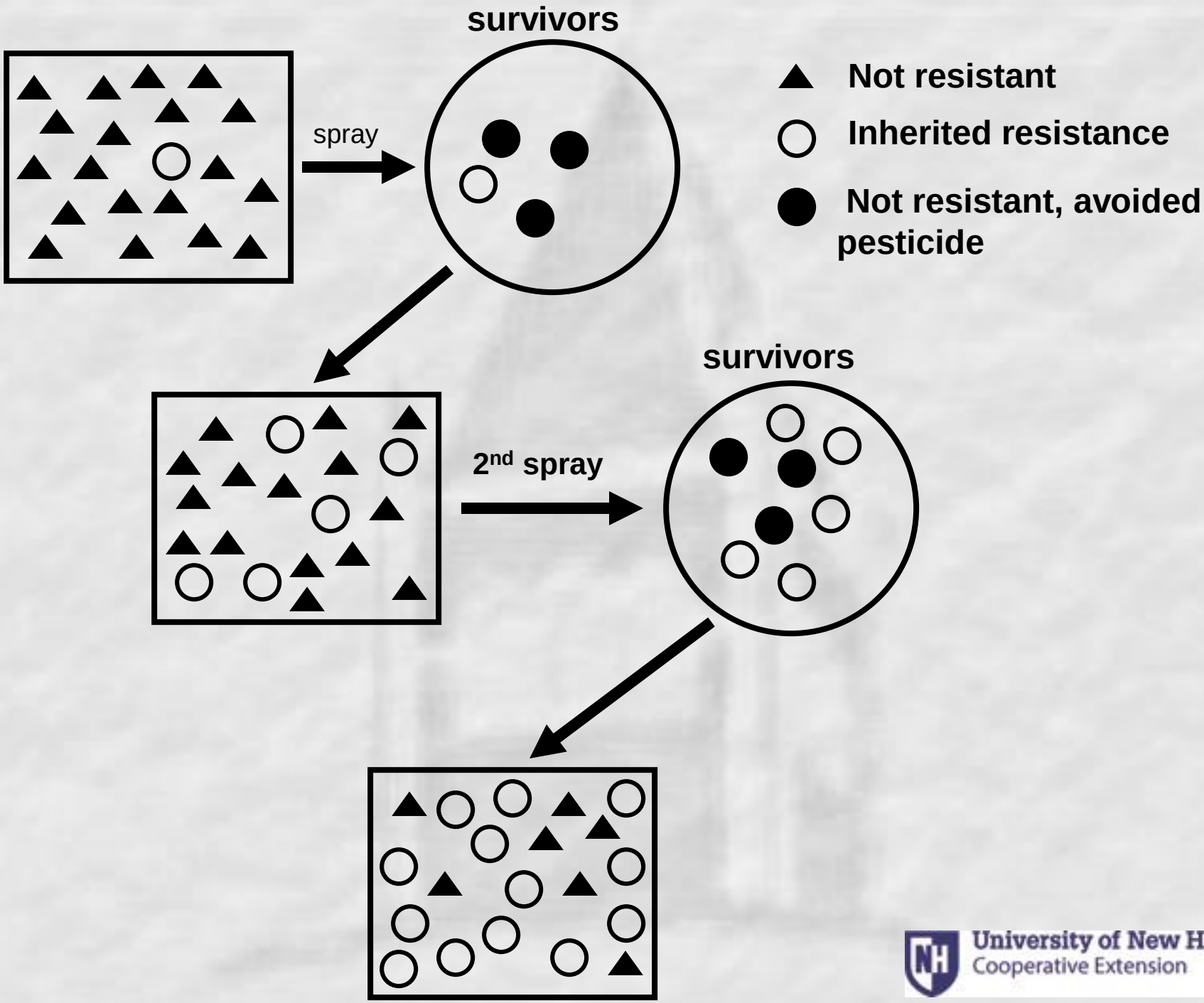

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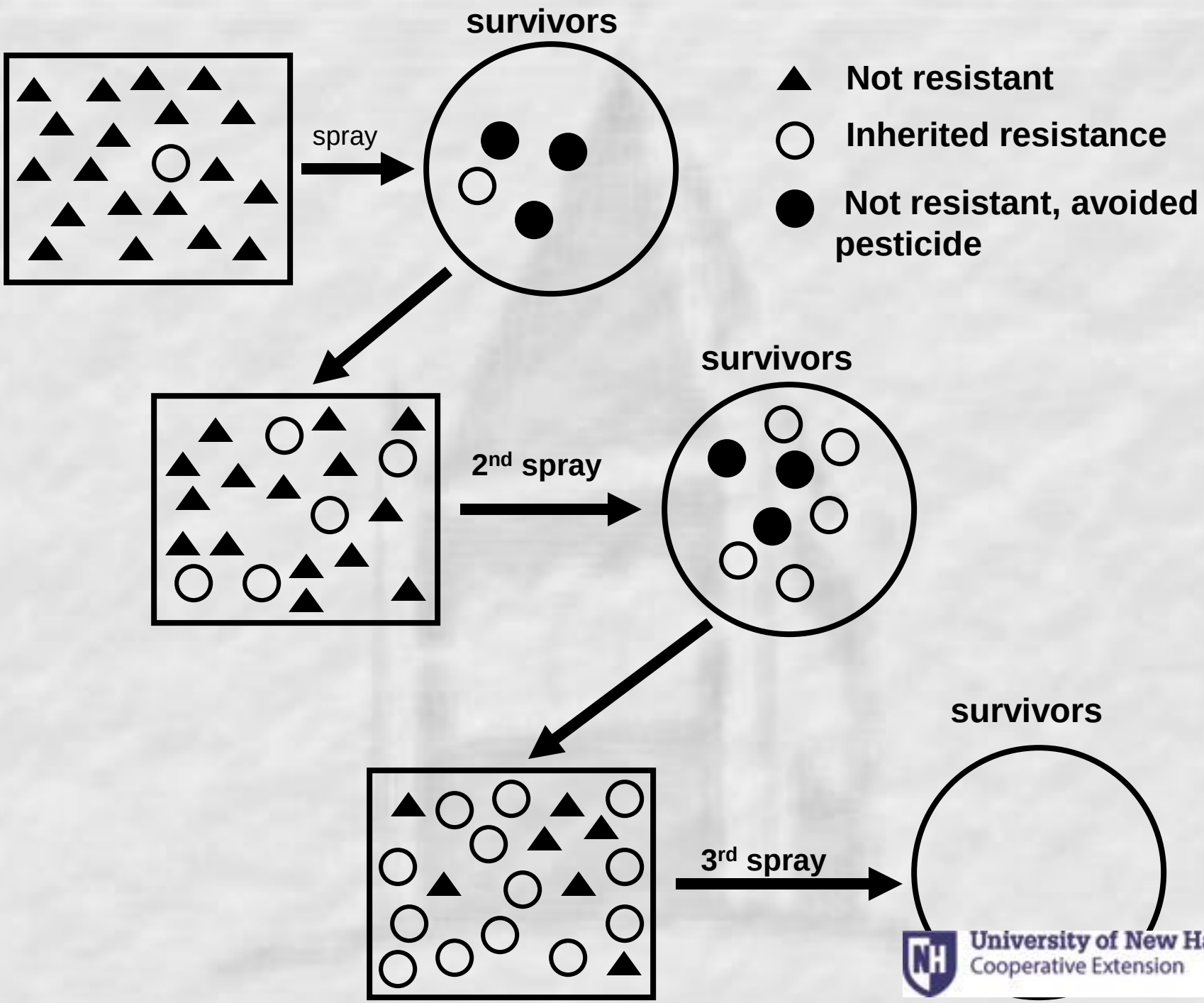
survivors
spray
Not resistant
Inherited resistance
Not resistant, avoided pesticide
survivors
2nd spray
survivors
3rd spray
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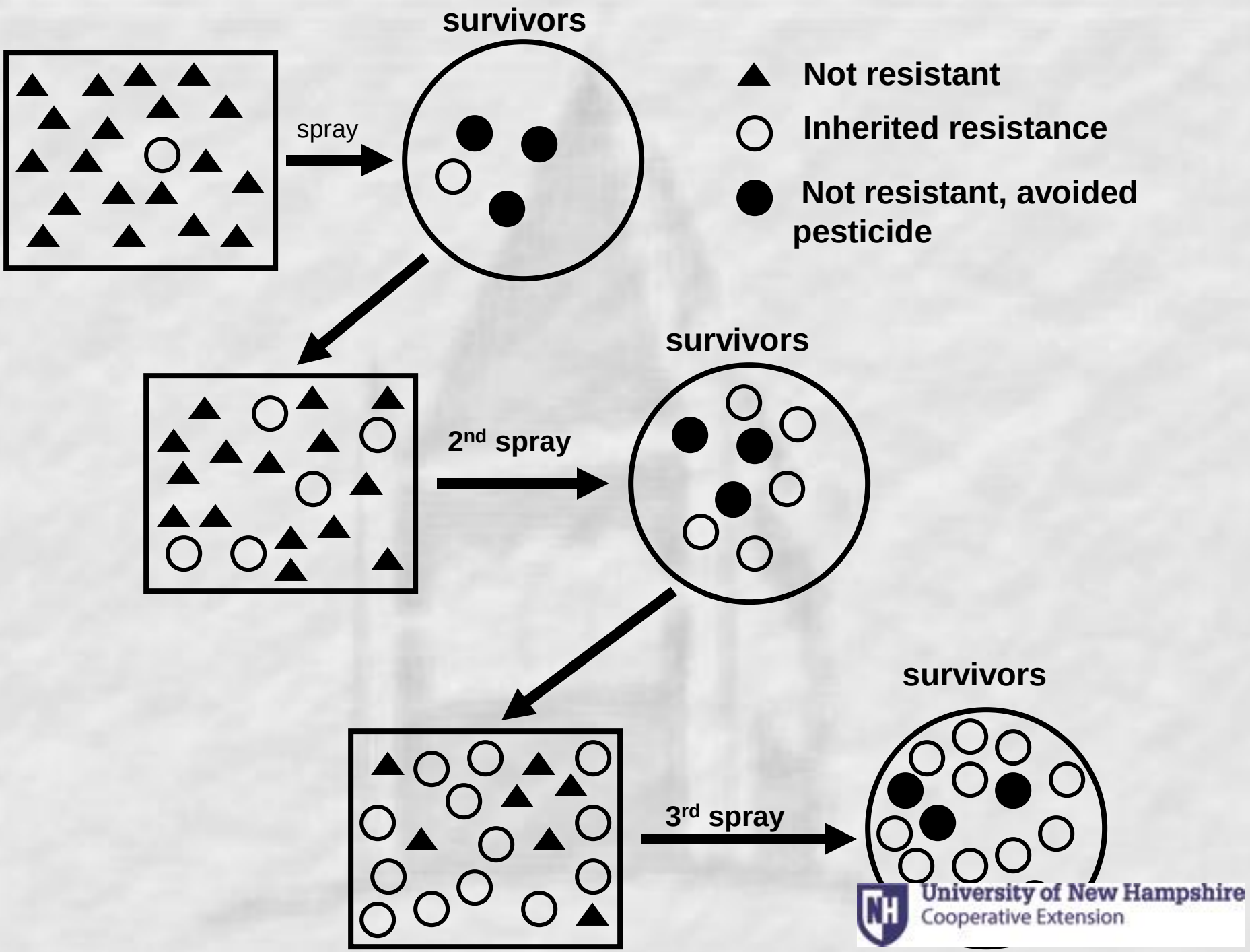
survivors
spray
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To minimize the chances of getting pesticide resistance:

Use water management as a primary tool.

Don’t use chemicals with the same MOA repeatedly. Rotate!

Treat only when you need to.

Consider using biological pesticides or predators.

Predators to control Fungus Gnats

Hypoaspis miles (mite)

Atheta coriaria
(rove beetle)

Photo: Jack Kelly Clark

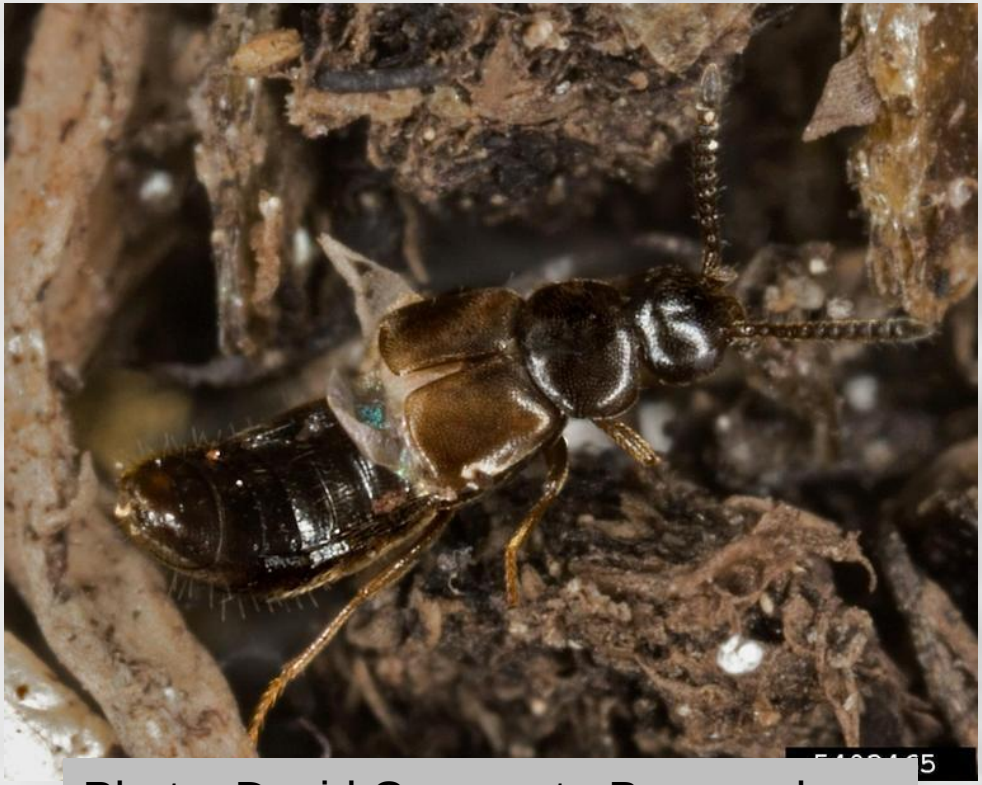

Photo: David Cappaert Bugwood.org

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SHORE FLIES and DRAIN FLIES are sometimes confused with FG's. Neither attack plants, but they do feed on algae, and give the illusion of pests to customers.

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Shore flies have broad bodies and smoky wings with clear spots. Their larvae feed on algae.

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Drain flies feed on algae as larvae. Sometimes they colonize tanks in greenhouse recycling systems.


Photo: Joseph Berger bugwood.org


Photo: A. Eaton

a.k.a. “moth flies”

Adults: slow-moving, with hairy, pointed wings

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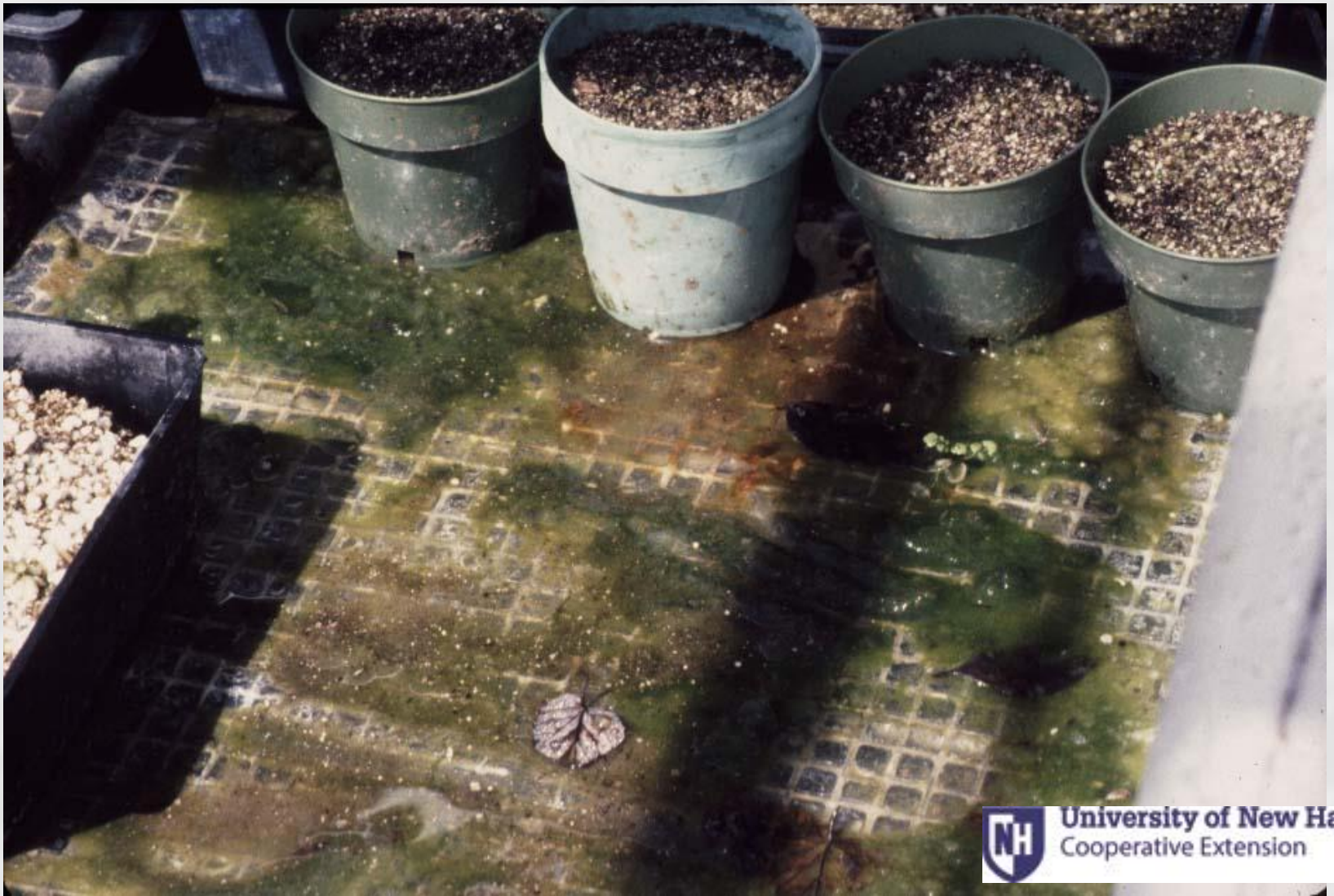
Both drain flies and shore flies are indicators of wet conditions.



Nearby Sources of Biological Controls for Greenhouses

The Green Spot, Ltd. 93 Priest Rd Nottingham NH 03290-6204 942-8925
www.greenmethods.com

IPM Laboratories, Inc. P.O. Box 300 Locke, NY 13092-0300 315-497-2063
www.ipmlabs.com

Biobest www.biobest.be They are farther away, but a good source to check out.

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If you purchase predators/parasites, be certain to read the instructions BEFORE releasing them.

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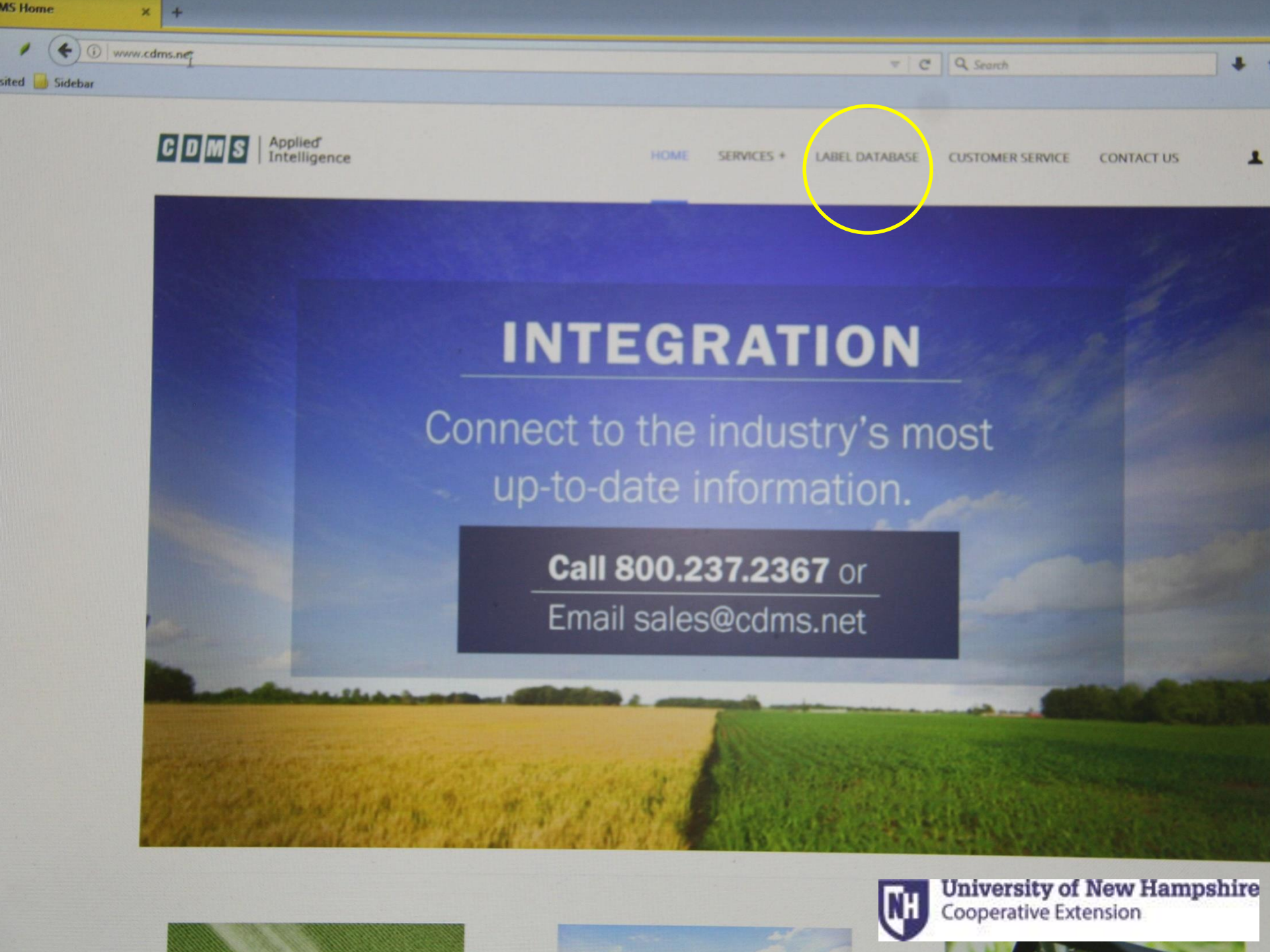
To See Pesticide Labels Before You Buy:

With product name and EPA registration number, you can view the entire label at manufacturer's websites. Many labels are visible at www.cdms.net

Specific wording is important! It affects the legality of using the product indoors.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Call 800.237.2367 or
Email sales@cdms.net
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Label Database

www.cdms.net/Label-Database

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Agro Logistic Systems, Inc.	Agro-Culture Liquid Fertilizers	Agromarketing Company, Inc.
Agsurf Corporation	AKUSA, Inc.	Albaugh, LLC/Agri Star
Albion Laboratories, Inc.	Alligare, LLC	Amvac Chemical Corporation
Argustoli H.C., LLC	Arysta LifeScience Canada	Arys

www.cdms.net/Label-Database

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