

Managing Weeds in and around the Greenhouse and Nursery

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<http://ccesuffolk.org/weed-science/>
"Selected Publications"



bittercress removal ■

The cost of weeds in a
greenhouse or nursery...

increased labor costs
decreased plant vigor



liverwort preventing water movement

The cost of weeds in a greenhouse...

~ increased expense
for weed prevention

~ increased plant loss



Who belongs in the the greenhouse weed club?

*~ admission by invitation only ~
(we create the environment for certain
weeds to thrive)*

*~ exclusive membership ~
(only well-adapted weeds need apply)*

How do weeds move into greenhouses?

Vectors that move weeds into houses:

wind

equipment

humans and other animals

plant material

stored growing media

Vectors that move weeds around houses:

self propulsion

irrigation

air movement

human traffic

plants and pots

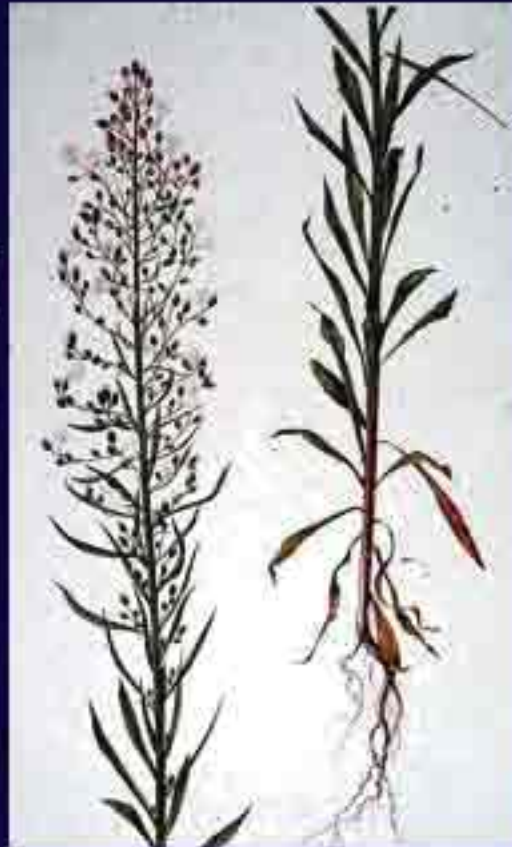
Abiotic vectors that move weeds around

Several pesky weeds are moved by wind to new sites.



Horseweed (marestail)

Conyza canadensis



Common groundsel
Senecio vulgaris



Groundsel Rust (*P. Lagenophorae*) Infection

Prominent Symptoms On Groundsel



Groundsel rust has been in the Northeast for past 10 years.
Will injure, but rarely kill groundsel.

Can also infect Cineraria crop.

Epilobium spp.
Willowherb



Weeds can move by animal vectors

Dodder seeds can be dropped into houses by birds landing on vents



Weed seed vectors: equipment, soil components, clothing

Weeds like Carolina
geranium have structures
which allow for 'hitchhiking'
when they are mature



Bittercress (*Cardamine* spp.)



explosive dehiscence or seed release

Creeping Woodsorrel

(Oxalis corniculata)



seedling

- **prostrate**
stoloniferous
perennial, creeps
along soil surface

- **alternate trifoliate**
leaves with heart-
shaped leaflets,
often dark green-
purple



Wood-sorrel family
(Oxalidaceae)

Yellow Woodsorrel (*Oxalis stricta*)



- erect perennial
- reproduces primarily by seed. Plants spread by rhizomes
- 5 yellow petals
- cylindrical, hairy fruit capsules
- seeds eject from capsules up to 12 feet away

Wood-sorrel family (*Oxalidaceae*)

J. Neal



**Birdeye
Pearlwort**
*Sagina
procumbens*

- **Winter annual or perennial**
- **Carnation or 'Pink' Family**
- **Weed of containers & drain holes**
- **Seed is dustlike in size**





**Moss can
look like:**



**Birdeye
pearlwort**

Liverwort



A. Senesac



A. Senesac

Spore structures

- Primitive, mat-forming plants
- Reproduces by gemmae and spores
- Prefers excessively moist soil; common in frequently irrigated container crops
- no true roots or leaves
- a bryophyte related to mosses

Gemmae cup

(Marchantia polymorpha)

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Division Bryophyta, Class Hepaticae

Gemma cup

**Gemmae
(clones)**

Air pore



**Gamete producing structures
will shed sporangia
(sexual reproduction)**

**Gemma cups
will shed clonal
gemmae
(asexual
reproduction)**



rhizoids

**thallus
(vegetative body)**

Other Weeds

Weed problems can be transitory

- This season's problem may not even exist next year.
- It's important to scout often especially on new plants.

Traveling Companions?

'Southern' weeds that we may see in
the north as temporary pests
~ usually infesting plants or media
brought in from southern areas



Long Stalk
Phyllanthus



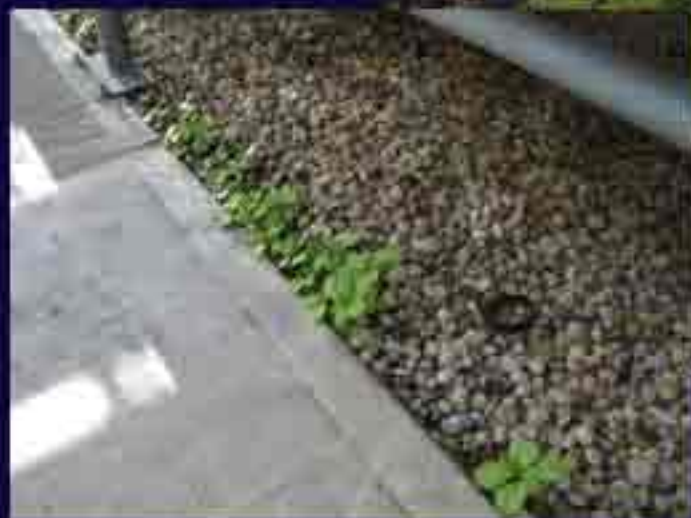
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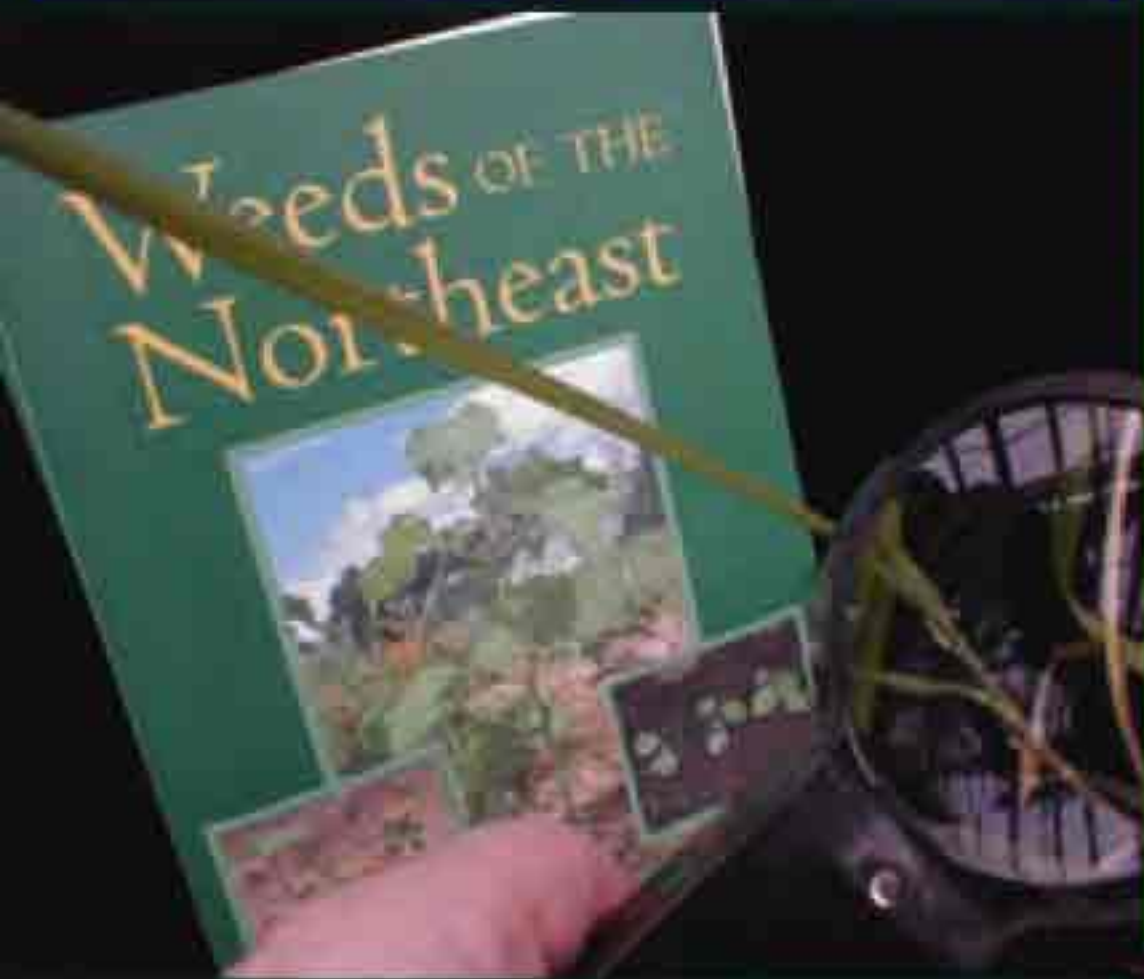
Several Spurge species

Some Crops can become weedy

• *Talinum Limon*
CORNELL



Identifying Weeds



- Know which weeds are regularly escaping control.
- Scout the greenhouse and outdoors for new weed problems.
- Inspect new plant material carefully for “new” weeds.

Weeds of the Northeast

Available from publisher: Cornell University Press
or major bookstore chains

2012 Cornell Guide for the Integrated Management of Greenhouse Floral Crops



<http://ipmguidelines.org/greenhouse/>

Managing Weeds

The primary means of greenhouse weed control is to minimize weed seed access to growing surfaces



**Keep it
Clean!**





Sheltered site for winter weed growth



**Thoroughly washing recycled
containers can reduce
bittercress seed by 7 fold!**

- ~Weeds can grow on almost any substrate.
- ~The prime goal of any weed species is to reproduce rapidly.
- ~Knowing and interrupting the weed life cycle is a key to successful management.

For example :
Yellow nutsedge >
prevent new tubers from forming



For example :
Crabgrass >
prevent new seeds from forming



LABELED FOR GREENHOUSE USE-2011c

TRADE NAME	ACTIVE INGREDIENT	%	PRECAUTION	OMRI APPROVED	NYS LABELED
ROUNDUP Pro (other trade names)	glyphosate	41	CAUTION	NO	YES
FINALE	glufosinate	11	WARNING	NO	YES
REWARD*	Diquat Dibromide	37	CAUTION	NO	YES (SLN LABEL)
ENVOY PLUS*	Clethodim	12	CAUTION	NO	YES
FUSILADE II*	Fluazifop-p	25	CAUTION	NO	YES
SCYTHE (Dow > Gowan)	Pelorgonic Acid	57	WARNING	NO	YES

* Restricted-use pesticide

Post-emergence Options

- Roundup Pro (glyphosate)
- Fusilade II (fluazifop-p)
- Envoy Plus (clethodim)
- Finale (glufosinate)
- Reward (diquat)
- Scythe (pelorgonic acid)
- Weed Pharm*

*not labeled for enclosed structures

Systemic

Contact



Liverwort Management

Chemical control is not usually sustainably effective.

- Best management practice is a change in practices so that surfaces have a dry period between irrigation.
- If that is not possible, then a top-dressing material that will dry out is temporarily effective.

**PRODUCTS FOR GREENHOUSE USE
WITH POTENTIAL FOR LIVERWORT AND OTHER WEED CONTROL**

TRADE NAME	ACTIVE INGREDIENT	%	PRECAUTION	OMRI APPROVED	NYS LABELED
GREENMATCH	D-Limonene	55	CAUTION	YES	YES
RACER	Ammonium Nonoate	40	WARNING	NO	YES
SCYTHE (Dow > Gowan)	Pelorgonic Acid	57	WARNING	NO	YES
TERRACYTE	Hydrogen Dioxide	28	DANGER	NO	YES
WEED PHARM	Acetic Acid	20% RTU	DANGER	YES	<u>Not labeled INSIDE</u> enclosed structures
BRYOPHYTER	Oregano Oil Extract	2%R TU	REDUCED RISK	~	YES

Unintended consequences...

Off target herbicide drift
or fumes from applications
inside or outside
the greenhouse

Glyphosate Drift Injury

7 days after exposure

Poinsettia



Glyphosate Drift Injury Tomatoes



How to reduce problems:

Roundup Pro (glyphosate)

- best to apply with no plants in house
- if not possible, no fans and minimal air movement at application time
- can be absorbed if applied to soil-less media and watered into root zone.
- minimize drift with larger droplet size

Scythe injury from simulated drift



Reward (diquat) injury from simulated drift



2,4-D injury from simulated drift

Poinsettia

- petiole twisting
- upward leaf curl
- latex bleeding



Weed Management for Nurseries

Good Weed management

- Assess the problem weeds
 - Where are they the most troublesome?
 - Why do they get that way?
- Assess the management tools:
 - What is available for NY ?
 - Chemicals <http://ipmguidelines.org/treesandshrubs/>
 - Cultural Practices

Recent herbicide developments

Sedgehammer –Halosulfuron

Current label does not allow for use on field grown ornamentals

New major revision (result of much cooperative work) will allow for use on some field grown ornamentals.

Sedgehammer will be much more useful to growers soon.

Recent herbicide developments, CONT'D.

Dimension (dithiopyr) 2EW

A reduced rate of 1 pint (0.25 lbs/a) can be used on LI for container, field and landscape use. Higher rate for NY state.

Similar MOA to Treflan, Barricade, Surflan

Recent label changes allows many more woody and herbaceous ornamentals for over the top application

Will provide some control of bittercress and oxalis
May be a product to consider for rotational use.

Recent herbicide developments, CONT'D.

Dimethenamid-P (BASF)

Recent national label for 2 products:

Tower 6EC

Freehand (G)

The active ingredient is chemically similar to metolachlor (Pennant) & alachlor (Lasso).

Because of potential problems with leaching, LI use will not be allowed, but NY state should see a label soon.

Recent herbicide developments, CONT'D.

FLUMIOXAZIN:

BROADSTAR (granule)&

SUREGUARD (wdg)

PPO inhibitor: prevents chlorophyll synthesis in weed seedlings after they have been exposed to light. As WEED seedlings grow through the herbicide layer, they absorb flumioxazin and are killed before they have one true leaf

Recent herbicide developments, CONT'D.

Sureguard & Broadstar

Flumioxazin is the the most recent active ingredient that NY growers have as a weed management tool.

Can be very useful because the Annual broadleaf control is excellent and annual grass control is good.

Recent herbicide developments, CONT'D.

Sureguard has new label with more ornamental species.

Can be used OT on dormant conifers or after new growth has hardened off.

Can be used as a directed spray to many deciduous trees and well established shrub species in field and landscape.

Recent herbicide developments, CONT'D.

Broadstar and Sureguard have recently received a registration for use in the landscape.

The new Broadstar formulation is safer for use over foliage. Burning & spotting injury problem after irrigation has decreased. Efficacy has also decreased in some situations.

Recent herbicide developments, CONT'D.

Broadstar Label cautions against use on:

Azalea Delaware Vall. White

Buddleia

Clethera

Deutzia

Ilex verticillata

Spirea japonica

Myrica cerifera

2 spp of Ligustrum are labeled, but not Ca. Privet

Spraying Pre-Emergence Herbicides over containers

More efficient

Lower product cost

Less labor required



What is available for New York?

The most commonly used sprays in other parts of the country contain Gallery (isoxaben). This is an excellent BL herbicide. Not available in NY.

Spraying Pre-Emergence Herbicides over containers

- What is available for New York?
- Barricade
- Devrinol
- Dimension
- Pendulum
- Ronstar
- Pennant Magnum
- Surflan
- Limited applications:
 - Goal XL
 - Sureguard



Some Problem Nursery Weeds

- Bittercress
- Oxalis (woodsorrel)
- Liverwort
- Mugwort
- Yellow nutsedge
- Crabgrass & other SAG
- Horseweed

Bittercress (*Cardamine* spp.)

- What works: (to varying degrees)
 - Pre-emergence

Dimension

Goal

OH2

Ronstar

Rout

Jewel

Surflan

BroadStar/SureGuard

Postemergence

Goal 2XL

Reward

Roundup Pro

SureGuard



Oxalis (Woodsorrel)

- What works:
 - Pre-emergence

Barricade

BroadStar/SureGuard

Dimension*

Goal 2XL

OH2

Jewel

Pendulum

Ronstar

Rout

Surflan

- Postemergence

Reward

Roundup Pro



Liverwort (*Marchantia* spp.)



- **What works:**

- **Pre-emergence**

- BroadStar/SureGuard
 - Ronstar
 - Tower / Freehand

- **Postemergence**

- Gramoxone
 - Reward
 - Roundup Pro
 - SureGuard
 - Tower

- Other contact sprays-partial control

- Scythe
 - Acetic acid



Mugwort (*Artemisia vulgaris*)

- What works:
 - Pre-emergence
Casoron
 - Postemergence
Clopyralid (LONTREL)
Roundup Pro



Yellow Nutsedge (*Cyperus esculentus*)

- What works:
 - Pre-emergence
Casoron
Pennant
Tower/Freehand
 - Postemergence
Basagran
Roundup Pro
SedgeHammer



Summer Annual Grasses (crabgrass & others)

- What works:
 - Pre-emergence

Barricade

BroadStar/SureGuard

Devrinol

Jewel

Pendulum

Surflan

Treflan

Dimension

Pennant

Tower/Freehand

Postemergence

Envoy

Fusilade II

Sethoxydim G

Roundup Pro



Horseweed (*Conyza* spp.)

What works

Pre-emergence

- Casoron
- Dimension
- OH2
- Rout
- BroadStar/SureGuard

Post-emergence

- Asulox
- Roundup Pro
- Touchdown Pro

