

Weed Management

Several weeds are usually cited by growers as problem species. As a general rule, always look for new or unusual weed species in fields. Attempt to cultivate or hand remove these weeds before seeds are produced. Following is some information on the most troublesome weeds with suggestions for control. Specific recommendations for any herbicides mentioned below can be found in the tables that follow.

Common Chickweed (*Stellaria media*): Common chickweed is a winter annual with an extended germination period. Germination can usually begin in late August or early September and continue into the next spring. Seeds are produced in late spring and early summer. 2,4-D is not effective on this weed and labeled rates of Sinbar™ applied at mulching over emerged chickweed are generally ineffective. Cultivation is impractical since the most competitive weeds are in the strawberry row where they also receive good winter protection. Effective control can be achieved with an application of Devrinol™ in late August. Since Devrinol™ does not control emerged weeds, it is important to make the application before emergence. While Dacthal™ can also control this weed from seed, residual activity is too short to make this application cost effective.

Field Pansy (Johnny jump-up) (*Viola*, spp.): This winter annual weed has become a serious problem for many growers. As with chickweed, germination is in the late summer, fall, and early spring. Cultivation is impractical in the strawberry row. Unfortunately, the weeds in the row are often better winter protected and produce more seed than those in the row middles. There is currently no postemergence herbicide control of this weed. The only herbicide that can provide effective control from seed (preemergence) is Dacthal™ which should be applied in late summer; however, Dacthal™ is rarely used in late summer because of its cost and short residual (4-6 weeks). Only the first flush can be controlled with this method. Until better control options become available, growers will continue to have serious problems with this weed.

Yellow Wood Sorrel (*Oxalis*, spp.): This weed is perhaps the most troublesome for many strawberry growers. Several species exist. Some are perennials and some are winter annuals. Seed production usually occurs during harvest with the plants “spitting” their seeds across the strawberry rows. This, of course, allows free spreading of this

weed across the field. As with the above-mentioned weed species, germination can take place over several months making control difficult. 2,4-D provides good control of oxalis plants if they are small and not hidden under the strawberry foliage. Therefore a late fall application, prior to mulching over dormant strawberry plants, can be at least partially effective. A 2,4-D application prior to renovation is usually not effective since seed dispersal has already taken place. Sinbar™ also has some activity on this weed. Splitting the annual use rate of Sinbar™ into a renovation and late fall (dormant) application can also provide some control. This weed usually shortens the life of a planting due to its quick spreading habit.

Dandelion (*Taraxacum officinale*): While dandelion has been cited as a problem weed by many growers, acceptable control is possible. Dandelion is a “simple” perennial weed. Unlike other perennials, it does not spread by rhizomes, has a taproot, and uses seed dispersal as its primary method of reproduction. Seeds germinate in the fall and produce good size plants by November. None of the soil-applied herbicides currently registered in strawberry will control dandelion. The only effective control strategy is a late fall application of 2,4-D. This application must be made after the strawberry plants are dormant (no new growth, reddened leaves). If few plants are present, hand removal may be an option. Be sure, however, to remove the entire tap root or regrowth will occur.

The following Tables (21-23) provide information of on weed management and herbicide effectiveness in strawberries. Any questions about specific weed problems or weed management strategies should be directed to your local University or Extension Specialist. See *Integrated Pest Management for Strawberries in the Northeastern United States* for details on alternative weed management strategies.

Table 21. Weed management in strawberries during the transplant and establishment years.

TRANSPLANT YEAR			
Weed Problem	Herbicide	Rate/Acre	Comments and Limitations
PREPLANT WEED CONTROL			
Many annual broadleaf weeds	(oxyflourfen) Goal 2XL	1 to 2 pt	Must be applied at least 30 days prior to transplanting. The soil must be worked to a depth of at least 2.5 inches prior to transplanting the crop. The use of a preemergence herbicide after transplanting is also recommended.
Emerged annual and perennial weeds	(glyphosate) Roundup Ultra	1 to 5 pt	Must be applied at least 30 days prior to transplanting. Provides control of most annual and perennial weeds. Application to perennial weeds should take place the fall prior to transplanting for best control.
PREEMERGENCE WEED CONTROL			
Annual grasses and small seeded broadleaf weeds	(DCPA) Dacthal W 75	8 to 12 lb	Weak on ragweed, smartweed, and galinsoga. Apply at transplanting or after cultivating. Irrigation, rainfall, or shallow cultivation after application will improve control. This product is no longer being manufactured.
	(napropamide) Devrinol 50 DF	2 to 4 lb	Apply to weed-free soil after strawberry plants become established. Heavy rate after planting may inhibit rooting of daughter plants. Application in late summer will control winter annuals. Application in late fall will control annual grasses and volunteer grains until harvest. This material must be activated with rainfall, irrigation, or shallow cultivation within 24 hrs. Consider using the 2 to 4 lb rate twice, once in late summer and again just prior to mulching in late fall.
Broadleaf weeds, some grasses, and some suppression of perennial weeds	(terbacil) Sinbar 80 WP	2 to 8 oz	The supplemental label for strawberries has been revised to allow use during the transplant year as well as on soils with between 0.5% and 2% organic matter. During the planting year, Sinbar may be applied at 2 to 3 ounces per acre after transplanting but before new runners start to root. If strawberry plants have developed any new foliage prior to application, irrigation or rainfall (0.5 to 1 inch) is required to wash the Sinbar off the strawberry plants. In late summer or early fall, a second application may be made at 2 to 6 ounces per acre to control winter annual weeds. This application must also be followed by 0.5 to 1 inch of irrigation or rainfall to wash the Sinbar off the plants. A third application of 2 to 4 ounces per acre can be made, as usual, after the strawberry plants are dormant and just prior to mulching. For soils with at least 2% organic matter, there is no maximum amount per application; however, no more than 8 ounces of Sinbar can be applied per year. For soils with between 1 and 2% organic matter, a maximum of 4 ounces of Sinbar can be applied at any one time with an annual maximum of 8 ounces per acre. For soils with between 0.5% and 1 % organic matter, a maximum of 3 ounces of Sinbar can be applied at any one time with an annual maximum of 6 ounces per acre. Sinbar will also provide early postemergence control of weeds.

TRANSPLANT YEAR

Weed Problem	Herbicide	Rate/Acre	Comments and Limitations
POSTEMERGENCE WEED CONTROL			
Emerged annual grasses and broadleaf weeds. Suppression of emerged perennial weeds between rows after plant establishment	(paraquat) *Gramoxone Max	1.3 pt	Contact herbicide. Use with a non-ionic surfactant. Direct spray between rows using a shield to prevent contact with strawberry plants. Do not apply within 21 days before harvest or more than 3 times in a season.
Emerged annual and most perennial grasses	(sethoxydim) Poast	1 to 2.5 pt	Effective on small actively growing grasses. Do not apply to grasses under stress (e.g. drought). Add 1 qt of crop oil concentrate per acre. Application within 6 weeks of Sinbar may cause leaf injury. Applications on days that are unusually hot and humid will likely cause leaf burn. Avoid applications on these hot and humid days or delay application until late evening.
Emerged annual weeds and suppression of perennial weeds.	(pelargonic acid) Scythe	3-10% solution	Contact herbicide for burn down only. See Scythe comments below this table. See label for complete instructions.

ESTABLISHED PLANTINGS

PREEMERGENCE WEED CONTROL			
Annual grasses and small seeded broadleaf weeds.	(DCPA) Dacthal W 75	8 to 12 lb	Weak on ragweed, smartweed, and galinsoga. Apply to weed-free soil in early spring after mulch removal or in late fall. Irrigation, rainfall, or shallow cultivation after application will improve control. Do not apply between first bloom and harvest. May be less effective on cool heavy soils.
	(napropamide) Devrinol 50 DF	4 to 8 lb	Apply to weed-free soil. Heavy rate after renovation may inhibit rooting of daughter plants. Application in late summer will provide preemergence control of winter annuals. Application prior to mulching will control annual grasses and volunteer grains until harvest. This material must be activated with rainfall, irrigation, or shallow cultivations within 24 hrs. May be applied more than once per year but do not exceed a total of 8 lbs per acre per year. Do not apply from bloom through harvest. Consider the 4 lb rate twice. Once in late summer and again just prior to mulching in late fall.
Broadleaf weeds, some grasses, and some suppression of perennial weeds.	(terbacil) Sinbar 80WP	2 to 8 oz	Will also provide early postemergence weed control. Apply at renovation, immediately after mowing and tilling but before new growth begins. A second application may be made in late fall, after strawberry plants become dormant, for additional control of winter annual weeds. DO NOT USE AT ANY OTHER TIMINGS AS PLANT DEATH MAY RESULT. Do not apply more than 6-8 oz of Sinbar per acre per growing season depending on soil type. Use only on plants established 6 months or longer. Do not use on soils with less than 0.5% organic matter. Following the establishment year, applications can only be made just after renovation and just prior to mulching. Applications are now allowed, however, on soils with between 0.5% and 2% organic matter using the same guidelines for rates as above. As always, be careful with Sinbar in strawberries, especially with potential overlap of sprayer passes which will double the rate and increase the potential for injury in some varieties. Please consult the new supplemental label for additional information, rates, precautions, etc.

Table 21 continued. Weed management in strawberries during the transplant and establishment years.

ESTABLISHED PLANTINGS			
Weed Problem	Herbicide	Rate/Acre	Comments and Limitations
POSTEMERGENCE WEED CONTROL			
Emerging annual grasses and broadleaf weeds. Suppression of emerged perennial weeds between rows.	(paraquat) *Gramoxone Max	1.3 pt	Contact herbicide. Use with a non-ionic surfactant. Direct spray between rows using a shield to prevent contact with strawberry plants. Do not apply within 21 days before harvest or more than 3 times in a season.
Emerging annual and most perennial grasses	(sethoxydim) Poast	1 to 2.5 pt	Effective on small actively growing grasses. Do not apply to grasses under stress (e.g., drought). Add 1 qt of crop oil concentrate per acre. Application within 6 weeks after Sinbar may cause leaf injury. Avoid applications on days that are unusually hot and humid. Do not apply within 7 days before harvest or use more than 2.5 pints per acre per season.
Most emerged broadleaf weeds including dandelion	(2,4-D) Amine 4	2 to 3 pt	Apply at renovation, immediately after last harvest. Wait 3 to 5 days before mowing. Can also be used in late fall after strawberries are dormant for control of certain winter annual and biennial, and perennial weeds. Be sure that strawberry plants are dormant (i.e., no new growth and reddened leaves).
Emerging annual weeds and suppression of perennial weeds.	(pelargonic acid) Scythe	3-10% solution	Contact material for burn down only. See Scythe comments below this table. See label for complete instructions.

[†]Where brand names for chemicals are used, it is for the reader's information. No endorsement is implied, nor is discrimination intended against products with similar ingredients. Please consult pesticide product labels for rates, application instructions and safety precautions. Users of these products assume all associated risks.

*Restricted use material; pesticide applicators license required.

Scythe (pelargonic acid) Note: General - Scythe herbicide is part of EPA's reduced-risk pesticide strategy. Scythe is a contact, non-selective, broad spectrum, foliar-applied herbicide. It controls only actively growing emerged green vegetation. It provides burndown of both annual and perennial grass and broadleaf weeds as well as most mosses. The degree of burndown and the longevity of control is less when the weeds are inactive, mature, or biennial/perennial types. The herbicide is not translocated; it will burn only those plant parts that are coated with the spray solution. Visible effects on most weeds occur within hours. This product does not damage non-green, woody parts of plants. Cool weather following treatment may slow the activity of this herbicide and delay or reduce visual effects. The burndown activity is similar to that of Gramoxone Extra (paraquat). DO NOT contact desirable crop plants or damage will occur.

Crop application timing and registration - For most small fruit crops, applications can be made in a number of ways: Vegetative Burndown: General control of weeds for site preparation, non-crop, and around aquatic sites. Prior to Crop Emergence: Be sure that applications are made before crop emerges from soil or crop injury will occur. Directed and Shielded Sprays: Applications may be made in and around desirable plants as long as contact of foliage and green bark is avoided. Use of a shield is highly recommended. Sucker Control, Pruning, and Trimming: To burn back unwanted foliage growth on vines and excessive cane growth in brambles. Apply only to unwanted vegetative parts. Apply before suckers become woody. The current label for Scythe herbicide allows application in the following small fruit crops: blackberry, blueberry, boysenberry, cranberry, currant, dewberry, grape (all types), loganberry, raspberry, and strawberry.

Rates - Use a 3-5% solution for annual weeds (4-6 oz/gal water), a 5-7% solution for biennial and perennial weeds (6-9 oz/gal water), and 7-10% solution for maximum burndown (9-13 oz/gal water). Delivery rate for boom applications should be 75 to 200 gallons of spray solution per acre. For hand-held equipment, spray to completely wet all weed or plant foliage but not to the point of runoff. Repeat applications as necessary. Tank mixes are allowed with this product. These include tank mixes with glyphosate (Roundup), sulfosate (Touchdown), and residual herbicides. SEE THE LABEL FOR COMPLETE DETAILS!

Table 22. Transplant year strawberry herbicide calendar.

TREATMENT TIMING	TREATMENT	RATE
SPRING OR FALL PRIOR TO PLANTING		
Weeds and other pests	Fumigation or	See label
Perennial weeds	Roundup Ultra 4S	1 - 5 qt (see label)
Many annual weeds	Goal 2XL	1 - 2 pt (see label)
ATPLANTING		
Planting (April - June)	Dacthal 75WP or Sinbar 80 WP	8 - 12 lb 2 - 3 oz
POST PLANT (3 NEW LEAVES OF 6 WEEKS AFTER PLANTING)		
Preemergence control of grasses, small seeded broadleaf weeds and some winter annuals	Devrinol 50DF	2 - 4 lb (8 lb max/year)
Preemergence control of broadleaves	Sinbar 80 WP	2 - 6 oz
Postemergence control of grasses	Poast 1.53EC	1 - 2.5 pt (2.5 pt max/year)
Postemergence control of emerged annual weeds between rows	Gramoxone Max	1.3 pt/acre
FALL		
Preemergence control of volunteer grains in mulch (apply just before mulching)	Devrinol 50DF	2 - 4 lb (8 lb max/year)
Postemergence control of grasses	Poast 1.53EC	1 - 2.5 pt (2.5 pt max/year)
Preemergence control of broadleaves	Sinbar 80WP	2 - 4 oz (strawberries must be established for at least 6 months and dormant)
Postemergence control of broadleaves	Amine 4	2 - 3 pt (strawberries must be dormant)

Sinbar 80 WP (terbacil) - The supplemental label for strawberries has been revised to allow use during the transplant year as well as on soils with between 0.5% and 2% organic matter. During the planting year, Sinbar may be applied at 2 to 3 ounces per acre after transplanting but before new runners start to root. If strawberry plants have developed any new foliage prior to application, irrigation or rainfall (0.5 to 1 inch) is required to wash the Sinbar off the strawberry plants. In late summer or early fall, a second application may be made at 2 to 6 ounces per acre to control winter annual weeds. This application must also be followed by 0.5 to 1 inch of irrigation or rainfall to wash the Sinbar off the plants. A third application of 2 to 4 ounces per acre can be made, as usual, after the strawberry plants are dormant and just prior to mulching.

For soils with at least 2% organic matter, there is no maximum amount per application; however, no more than 8 ounces of Sinbar can be applied per year. For soils with between 1 and 2% organic matter, a maximum of 4 ounces of Sinbar can be applied at any one time with an annual maximum of 8 ounces per acre. For soils with between 0.5 and 1% organic matter, a maximum of 3 ounces of Sinbar can be applied at any one time with an annual maximum of 6 ounces per acre.

Following the establishment year, applicaitons can only be made just after renovation and just prior to mulching. Applications are now allowed, however, on soils with between 0.5 and 2% organic matter using the same guidelines for rates as above. As always, be careful with Sinbar in strawberries, especially with potential overlap of sprayer passes which will double the rate and increase the potential for injury in some varieties. Please consult the new supplemental label for additional information, rates, precautions, etc.

Table 23. Herbicide efficacy against common weeds in strawberries.

HERBICIDE	Postemergence				Preemergence				
	Scythe ¹ (pelargonic acid)	Gramoxone Extra ² (paraquat)	Amine 4 ³ (2,4-D)	Poast ⁴ (sethoxydim)	Devrinol ⁵ (napropamide)	Dacthal ⁶ (DCPA)	Sinbar ⁷ (terbacil)	Goal ⁸ (oxyflourfen)	Roundup Ultra ⁹ (glyphosate)
Common Weeds									
PERENNIALS									
Canada thistle	P	P	G	N	N	N	N	N	E
clovers	P	P	E	N	N	N	F	N	E
curly dock	P	P	G	N	N	N	N	N	E
dandelion	P	P	E	N	N	N	F	N	E
goldenrods	P	P	G	N	N	N	P	N	E
quackgrass	P	P	N	G	N	N	P	N	E
red sorrel	P	P	E	N	N	N	F	N	E
yellow nutsedge	P	P	F	N	P	N	F	N	G
ANNUAL GRASSES									
barnyardgrass	F	E	N	E	E	G	F	F	E
fall panicum	F	E	N	E	E	F	F	F	E
large crabgrass	F	E	N	E	E	E	G	F	E
oats or rye (from mulch)	F	E	N	E	E	E	G	F	E
ANNUAL BROADLEAVES									
bedstraw	G	E	E	N	P	P	F	F	E
carpetweed	G	E	G	N	G	G	G	F	E
common chickweed	G	E	F	N	E	G	E	F	E
common lambsquarters	G	E	E	N	G	E	E	G	E
common purslane	G	E	G	N	G	G	G	E	E
corn speedwell	G	E	G	N	F	F	G	F	E
galinsoga	G	E	G	N	G	P	G	G	E
horseweed	G	E	G	N	N	N	G	G	E
prickly lettuce	G	E	E	N	E	P	E	G	E
redroot pigweed	G	E	E	N	G	E	G	E	E
shepherd's purse	G	E	G	N	P	P	E	E	E
Virginia pepperweed	G	E	E	N	P	P	G	G	E
yellow wood sorrel	G	E	G	N	P	P	G	E	E

E=90% control or better; G=75-90% control; F=50-75% control; P=5-50% control; N=less than 5% control.

¹ **Scythe**; non-selective contact herbicide. See information on rates and timings earlier in this section.

² **Gramoxone Extra**; non-selective contact herbicide. Excellent for use on emerged vegetation. Use between rows, with directed spray; use shields to prevent contact with non-target plants; extremely toxic to birds and wildlife.

³ **Amine 4**; systemic broadleaf herbicide. Typically used just before renovation; allow 5 days before mowing; also can be used when strawberries are dormant on winter annuals and perennial broadleaf weeds. Never use an ester or low-volatile ester formulation.

⁴ **Poast**; systemic grass herbicide; use on actively growing grasses; will not kill old established grasses. Use with crop oil, avoid applying on hot humid days.

⁵ **Devrinol**; preemergent selective herbicide, must be activated with water or cultivation. Application after renovation for summer annual weed control or in late summer for winter annual weed control. Application before mulching will control volunteer grain from mulch. Heavy rates can inhibit daughter plant rooting.

⁶ **Dacthal**; preemergent selective herbicide, use after mulch removal in spring or in late fall; water or cultivation after application improves control. May be ineffective on cool heavy soils. Do not apply between bloom and harvest. Safe on new plantings.

⁷ **Sinbar**; selective preemergent herbicide. Moisture is required to activate the chemical; also provides early postemergence control.

⁸ **Goal**; selective preplant herbicide. Must be applied at least 30 days prior to transplanting. The soil must be worked to a depth of at least 2.5 inches prior to transplanting the crop. The use of a preemergence herbicide after transplanting is also recommended.

⁹ **Roundup Ultra**; non-selective preplant herbicide. Must be applied at least 30 days prior to transplanting. Provides control of most annual and perennial weeds. Application to perennial weeds should take place the Fall prior to transplanting for best control.