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HS203

Weed Management in Leafy Greens (Lettuce, Endive, Escarole, and Spinach)[1]

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Optimal leaf crop production depends on successful weed control. Weeds reduce leaf crop yields by direct competition for nutrients, water, and light.

Weed control is especially important early in the growth of the crop. Competition from amaranth (spiney, common, or livid) weeds can cause 20%–40% yield reduction in lettuce if not controlled within 3–5 weeks of emergence. One spiney amaranth plant can reduce yield and quality of four lettuce plants in the row around it.

Effective weed control should include a combination of practices designed to suppress weeds during the entire year.

Management practices include crop rotation, cover cropping, cultivation flooding, and mulching. Crop rotation and flooding are routinely followed in Florida's more intensively cultivated organic soils. Care should be taken when leaf crops are rotated behind crops where more persistent herbicides were used. If carried out before planting, bioassays using indicator crops can save valuable time and problems by indicating if an herbicide persists in the soil.

Mulching should be considered for any lettuce grown in mineral soils. Colored mulches can increase or decrease soil temperature depending on the time of year. A labeled multipurpose fumigant may eliminate many soilborne insects, diseases, and weeds.

Figure 1. Henbit growing in romaine lettuce.
Credits: Peter Dittmar, UF/IFAS

Cultivation in leaf crops is a necessity and is a detriment if not done properly.

In seeded lettuce, thinning and blocking usually are done at 21–28 days. Cultivation at this time is required to reduce any competition from weeds emerging in the row. Cultivation also prunes lettuce plant roots and in itself reduces subsequent quality and yield if special care is not exercised. Cultivation in older lettuce has also been shown to reduce quality if carried out improperly.

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Pursuit® is a third-party registration. For legal use of the herbicide, the grower (applicator) must obtain the label from the third-party registrant (in this case TPR, Inc., Orlando). Use of the product without having a signed authorization and waiver and limitation of liability agreement is a misuse of the product.

To reduce confusion, the EPA has recently defined tolerance terminology in lettuce. If a label states head lettuce, the pesticide may only be applied to the crisp head varieties of lettuce. If leaf lettuce is stated, this may be applied to all leaf lettuce types, including leaf lettuce, cos (Romaine), and butterhead varieties. The term "lettuce" includes head and leaf lettuce (i.e., all types except endive and escarole). Endive is a separate tolerance crop and includes endive and escarole.

The leafy greens group includes lettuce (head and leaf), endive, and spinach, as well as amaranth, arugula (roquette), chervil, chrysanthemum, corn salad, garden and upland cress, dandelion, dock, orach, parsley, purslane (garden and winter), radicchio, New Zealand spinach, and vine spinach. A label for the "leafy greens" group includes all of these. If a label has the term "leafy vegetables," it is labeled for the leafy greens plus the leaf petiole (celery) group.

Table 1. Preplant chemical weed control in leafy greens (lettuce, endive, escarole, and spinach).

Active ingredient lb. a.i./A	(Trade name) amount of product/A	MOA code	Crops	Weeds controlled/remarks
Benefin 1.2	(Balan™) 2.0	3	Lettuce	Annual broadleaf and grass weeds. Apply before seeding or transplanting. Incorporate with cultivation or irrigation into the top 2–3 inches of the final bed.
Bensulide 5–6	(Prefar®) 4 E 5–6 qt.	8	Leafy vegetables	Annual broadleaf and grass weeds. Incorporate with cultivation or irrigation. Do not use on spinach or Swiss chard.
Carfentrazone Up to 0.031	(Aim®) 2.0 EC Up to 2 fl. oz. (Aim®) 1.9 EW Up to 2 fl. oz.	14	Leafy vegetables	Apply as a preplant burn down for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb. a.i./A per season. No pretransplant interval.
Glyphosate	(Various formulations) Consult label	9	Leafy vegetables	Emerged broadleaf and grass weeds. Apply as a preplant burndown. Consult label for individual product directions.
Imazethapyr 0.016–0.031	(Pursuit®) 2 1–2 fl. oz.	2	Lettuce, endive, escarole	Broadleaf weeds. Apply in fields with 40% organic matter or greater. Do not make more than two applications per crop. A maximum of 4 oz. of product may be used per crop season. Should be applied in 2 or more gal. of water per acre. Potential for rotational crop damage is highly variable. Label is a third-party registration (TPR, Inc.). Use without having a signed authorization and waiver of liability agreement is a misuse of the product. PHI 30 days.
Paraquat 0.5–1.0	(Gramoxone®) 2 SL 2–4 pt. (Firestorm®) 3SL 1.3–2.7 pt.	22	Lettuce	Emerged broadleaf and grass weeds. Apply as a preplant burndown. Do not make more than three applications per year.
Pelargonic acid	(Scythe®) 4.2 EC 3–10% v/v	27	Leafy vegetables	Emerged broadleaf and grass weeds. Apply as a preplant burndown before planting.
Pronamide 1.0–2.0	(Kerb®) 50 WP 2.0–4.0 lb.	3	Head lettuce, endive, escarole	Certain annual broadleaf and grass weeds. Overhead irrigate with 1–2 inches following applications. Observe rotational restrictions to other crops. Not recommended for soils with high organic matter. PHI 55 days.
Pyraflufen 0.0008–0.003	(ET® Herbicide) 0.5–2.0 fl. oz.	14	Leafy vegetables	Emerged broadleaf weeds. Apply as a preplant burndown 1 day prior to planting. Include a NIS at 0.25% or COC at 1.0% to the spray solution.
Trifluralin 0.5	(Treflan®, Trifluralin) 4 EC 1.0 pt. (Trifluralin) 10 G 5 lb.	3	Endive, escarole, radicchio	Annual broadleaf and grass weeds. Apply as preplant incorporated to mineral soils only.

Table 2. Postemergence chemical weed control in leafy greens (lettuce, endive, escarole, and spinach).

Active ingredient lb. a.i./A	(Trade name) amount of product/A	MOA code	Crops	Weeds controlled/remarks
Carfentrazone Up to 0.031	(Aim®) 2.0 EC Up to 2 fl. oz. (Aim®) 1.9 EW Up to 2 fl. oz.	14	Leafy vegetables	Emerged broadleaves. Use a hooded/shielded sprayer to direct spray to the row middles only. Use a crop oil concentrate (COC) or nonionic surfactant (NIS). PHI 0 days.
Clethodim 0.094–0.125 0.07–0.125	(Arrow®) 2 EC 6–8 fl. oz. (Select Max®) 1 EC 9–16 fl. oz.	1	Leafy vegetables	Emerged annual and perennial grass weeds. Allow a minimum of 14 days between repeated applications. PHI 14 days.
Imazethapyr 0.016–0.031	(Pursuit®) 2 1–2 fl. oz.	2	Lettuce, endive, escarole	Broadleaf weeds. Apply in fields with 40% or greater organic matter. Apply postemergence after three to four true leaf stage. Do not make more than two applications per crop. A maximum of 4 oz. of product may be used per crop season. Apply in 2 or more gal. of water per acre. Potential for rotational crop damage is highly variable. Label is a third-party registration (TPR, Inc.). Use without having a signed authorization and waiver of liability agreement is a misuse of the product. PHI 30 days.
Paraquat 0.3-0.5	(Gramoxone) 2 SL 1.2–1.9 pt.	22	Lettuce	Emerged broadleaf and grass weeds. Row middles only. Consult individual labels for not all formulations are labeled for this use pattern. Include a NIS. PHI 24 hrs.
Pelargonic acid	(Scythe®) 4.2 EC 3–10% v/v		Leafy vegetables	Emerged broadleaf and grass weeds. Apply as a directed or shielded spray to row middles.
Sethoxydim 0.19–0.28	(Poast®) 1.5 EC 1.0–1.5 pt.		Head/leaf lettuce, endive, radicchio	Emerged grass weeds. Do not exceed 3.0 pt./A per season. Include a COC at 2 pt. per 5–20 gal. of water. Head lettuce and radicchio PHI 30 days. Leaf lettuce and endive PHI 15 days.