

CHEMICAL WEED CONTROL IN VEGETABLE CROPS
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NOTE: A mode of action code (MOA) has been added to the Herbicide and Formulation column in this table. Use MOA codes for herbicide resistance.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
ASPARAGUS (seeded)	Annual broadleaf and some grass weeds	linuron, MOA 7 (Lorox DF) 50 WDG	2 lb	1	Preemergence application. Plant seed 0.5 in. deep in coarse soils. Apply to soil surface. See label for further instruction.
			1 to 2 lb	0.5 to 1	Postemergence application. Apply when ferns are 6 to 18 in. tall. Make one or two applications, but do not exceed 2 lb active ingredient total per acre. Do not use surfactant or oil, as injury will occur.
	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.7 to 2.7 pt 2.5 to 4 pt	0.6 to 1	Apply to emerged weeds in a minimum of 20 gal spray mix per acre before crop emergence as a broadcast or band treatment over a preformed row. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before crop emergence. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations may require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
Annual and perennial grasses only		clethodim, MOA 1 (Select Max) 1 EC (Arrow) 2 EC	9 to 16 oz 6 to 8 oz	0.07 to 0.125 lb 0.094 to 0.125	Apply to emerged grasses. Consult the manufacturer's label for best times to treat specific grasses. For Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. With sethoxydim, add 1 qt crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. With fluzifop, add 1 qt of nonionic surfactant or 1 gal crop oil concentrate per 100 gal of spray mix.
		fluzifop, MOA 1 (Fusilade DX) 2 EC	6 to 16 oz	0.1 to 0.25	
		sethoxydim, MOA 1 (Poast) 1.5 EC	1.5 to 2.5 pt	0.3 to 0.5	
ASPARAGUS (new crown plantings)	Annual broadleaf and some grass weeds	linuron, MOA 7 (Lorox) 50 WDG	1 to 2 lb	0.5 to 1	Apply when ferns are 6 to 18 in. tall. Make one or two applications, but do not exceed 2 lb active ingredient total per acre. Do not use oil or surfactant, as injury will occur.
		Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.7 to 2.7 pt 2.5 to 4 pt	0.6 to 1
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before crop emergence. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations may require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual and perennial grasses only	clethodim, MOA 1 (Select Max) 1 EC (Arrow) 2 EC fluzifop, MOA 1 (Fusilade DX) 2 EC sethoxydim, MOA 1 (Poast) 1.5 EC	9 to 16 oz 6 to 8 oz	0.07 to 0.125 lb 0.094 to 0.125	Apply to emerged grasses. Consult the manufacturer's label for best times to treat specific grasses. For Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. With sethoxydim, add 1 qt crop oil concentrate per acre. With fluzifop, add 1 qt nonionic surfactant or 1 gal crop oil concentrate per 100 gal of spray mix.
	6 to 16 oz		0.1 to 0.25		
	1.5 to 2.5 pt		0.3 to 0.5		
ASPARAGUS (established) Preemergence	Annual broadleaf and some grass weeds	linuron, MOA 7 (Lorox DF) 50 WDG	1 to 2 lb	0.5 to 1	Apply before cutting season or immediately after a cutting. From one to three applications can be made per year but do not exceed 4 lb active ingredient total per year. Lorox can also be applied as a directed spray to the base of the ferns. Make one application of 2 lb active ingredient per acre. Lorox will also control emerged annual broadleaf weeds up to 3 in. in height or spread. Do not apply within 1 day of harvest.
		napropamide, MOA 15 (Devrinol) 50 DF	8 lb	4	Apply to the soil surface in spring before weed and spear emergence.
	Annual grasses and small-seeded broadleaf weeds	diuron, MOA 7 (Karmex) 80 DF (Direx) 4 L	1 to 4 lb 0.8 to 3.2 qt	0.8 to 3.2	Apply in spring before spear emergence but no earlier than 4 weeks before spear emergence. A second application may be made immediately after last harvest. For the majority of N.C. plantings, a 1 to 2 lb per acre dosage of 80 DF or 0.8 to 1.6 qt rate of Direx should be used. Diuron also controls small emerged weeds but less effectively.

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Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
ASPARAGUS (established) Preemergence (continued)	Annual grasses and small-seeded broadleaf weeds (continued)	trifluralin, MOA 3 (Treflan) 4 EC (Trilin) 4 EC (Treflan HFP) 4 EC (Treflan) 4 L	1 to 4 pt	0.5 to 2	Apply to established asparagus as a single or split application. In winter or early spring, apply to dormant asparagus after ferns are removed but before spear emergence, or apply after harvest in late spring or early summer. In a calendar year, the maximum rate is 2 pints per acre for coarse soils, 3 pints on medium soils and 4 pints on fine soils. See label for further restrictions on rates for soil types.
		flumioxazin (Chateau) 51 WDG	6 oz	0.188	Apply only to dormant asparagus no sooner than 14 days before spears emerge or after the last harvest. Do not apply more than 6 oz per acre during a single growing season. Provides residual weed control. Can be tank mixed with paraquat for control of emerged weeds. Apply in a minimum of 15-gal spray mix per acre. Add a nonionic surfactant at 1 qt per 100 gal of spray mix. A spray-grade nitrogen source (either ammonium sulfate at 2 to 2.5 lb per acre or 28 to 32 percent nitrogen solutions at 1 to 2 qt per acre) may be added to increase herbicidal activity.
		metribuzin, MOA 5 (TriCor DF, Sencor DF) 75 WDG (Metri, Sencor) 4 F	1.3 to 2.67 lb 2 to 4 pt	1 to 2	Make a single application to small emerged weeds and the soil surface in early spring before spear emergence. Do not apply within 14 days of harvest or after spear emergence. For the majority of N.C. plantings, the low rate should be used. Do not make postharvest applications until after the last harvest of spears. A split application can be used. See label for rates.
		terbacil, MOA 5 (Sinbar) 80 WP	0.25 to 0.5 lb	0.2 to 0.4	Apply in spring before spear emergence or immediately after last clean-cut harvest. Use the lower rate on sandy soils and the higher rate on silty or clay soils. Do not use on soils containing less than 1% organic matter nor on gravelly soils or eroded areas where subsoil or roots are exposed. Do not harvest within 5 days after application.
ASPARAGUS (established) Postemergence	Broadleaf weeds including trumpetcreeper	2,4-D, MOA 4 (Amine 4 and various other brands) 4 SL	1.5 to 2 qt	1.5 to 2	Apply in spring before spear emergence or immediately following a clean cutting. Make no more than two applications during the harvest season and these should be spaced at least 1 month apart. Postharvest sprays should be directed under ferns, avoiding contact with ferns, stems, or emerging spears. Add a nonionic surfactant at a rate of 1 qt per 100 gal spray mix.
		dicamba, diglycolamine salt, MOA 4 (Clarity) 4 L	8 to 16 oz	0.25 to 0.5	Apply to emerged and actively growing weeds in 40 to 60 gallons of diluted spray per treated acre immediately after cutting in the field but at least 24 hours before the next cutting. If spray contacts emerged spears, twisting of spears may occur. Discard twisted spears. See label for more information. Follow precautions on label concerning drift to sensitive crops.
	Contact kill of emerged annual weeds, suppression of emerged perennial weeds, and contact kill of volunteer ferns	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.7 to 2.7 pt 2.5 to 4 pt	0.6 to 1	Apply to asparagus at least 2 years old. Apply in a minimum of 20 gal spray mix per acre to control emerged weeds before spears emerge or after last harvest. Provides good contact control of volunteer ferns if applied immediately after last harvest. Do not apply within 6 days of harvest. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Volunteer ferns (seedling) and certain broadleaf weeds	linuron, MOA 7 (Lorox DF) 50 WDG	2 lb	1	Apply before cutting season or immediately after cutting. Do not apply within 1 day of harvest. Lorox will also control emerged annual broadleaf weeds that are less than 3 in. in height or spread.
	Annual and perennial grass and broadleaf weeds. Established volunteer ferns.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds up to 1 week before spear emergence or immediately after last cutting has removed all above-ground parts or as a directed spray under mature fern. Avoid contact with the stem to reduce risk of injury. Perennial weeds may require higher rates of glyphosate. For spot treatment, apply immediately after cutting but prior to emergence of new spears. Certain glyphosate formulations may require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual and perennial grasses only	clethodim, MOA 1 (Select Max) 1 EC (Arrow) 2 EC	9 to 16 oz 6 to 8 oz	0.07 to 0.125 0.094 to 0.125	For Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. DO NOT USE CLETHODIM WITHIN 1 DAY OF HARVEST.
		fluzifop, MOA 1 (Fusilade DX) 2 EC	6 to 16 oz	0.1 to 0.25	Apply to emerged grasses. Consult the manufacturer's label for best times to treat specific grasses. With sethoxydim, add 1 qt crop oil concentrate per acre. With fluzifop, add 1 qt nonionic surfactant or 1 gal crop oil concentrate per 100 gal of spray mix. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperature. DO NOT USE FLUAZIFOP OR SETHOXYDIM WITHIN 1 DAY OF HARVEST.
		sethoxydim, MOA 1 (Poast) 1.5 EC	1.5 to 2.5 pt	0.3 to 0.5	

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Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
ASPARAGUS (established) Postemergence (continued)	Yellow and purple nutsedge, several broadleaf weeds	halosulfuron, MOA 2 (Sanda) 75 DF	0.5 to 1.5 oz	0.024 to 0.072	Postemergence and Post-transplant. Apply before or during the harvesting season. Do not use a nonionic surfactant or crop oil or unacceptable crop injury may occur. Without the addition of a nonionic surfactant, postemergence weed control may be reduced. Do not exceed 2 oz per acre per year. Do not harvest within 1 day of application. Postharvest. Apply after final harvest with drop nozzles to limit contact with crop. Contact with the fern may result in temporary yellowing. Add a nonionic surfactant at 1 qt per 100 gal of spray mixture. Under heavy nutsedge pressure, split applications will be more effective; see label for details. Do not exceed 2 oz per acre per year.
BEANS Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.5 to 2.7 pt 2 to 4 pt	0.6 to 1	Lima or snap beans only. Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence as a broadcast or band treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply prior to planting or emergence of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Various beans are covered. Apply to emerged weeds before crop emergence. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations may require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	ethalfuralin, MOA 3 (Sonalan HFP) 3 EC	1.5 to 3 pt	0.6 to 1.1	Dry beans only. Apply preplant and incorporate into the soil 2 to 3 in. deep using a rototiller or tandem disk. If groundcherry or nightshade is a problem, the rate range can be increased to 3 to 4.5 pt per acre. For broader spectrum control, Sonalan may be tankmixed with Eptam or Dual. Read the combination product label for directions, cautions, and limitations before use.
		dimethenamid, MOA 15 (Outlook) 6.0 EC	See label	See label	Dry beans only. Apply preplant incorporated, preemergence to the soil surface after planting, or early postemergence (first to third trifoliolate stage). Dry beans may be harvested 70 or more days after Outlook application. See label for further instructions including those for tank mixtures.
		trifluralin, MOA 3 (Treflan HFP) 4 EC (Trifluralin) 4 EC (Trifluralin HF) 4 EC (Trilin) 4 EC	1 to 1.5 pt	0.5 to 0.75	Dry, lima, or snap beans only. Apply preplant and incorporate into the soil 2 to 3 in. deep within 8 hr. Incorporate with a power-driven rototiller or by cross disking.
		pendimethalin, MOA 3 (Prowl H ₂ O) 3.8 AS	1.5 to 3 pt	0.75 to 1.5	Dry, lima, or snap beans only. Apply preplant and incorporate into the soil 2 to 3 in. using a power-driven rototiller or by cross disking. DO NOT APPLY AFTER SEEDING.
		S-metolachlor, MOA 15 (Dual Magnum) 7.62 EC (Dual II Magnum) 7.64 EC	1 to 2 pt	0.95 to 1.91	Dry, lima, or snap beans only. Apply preplant incorporated or preemergence to the soil surface after planting.
	Annual grasses and broadleaf weeds	clomazone, MOA 13 (Command) 3ME	0.4 to 0.67 pt	0.15 to 0.25	Succulent beans only. Apply to the soil surface immediately after seeding. Offers weak control of pigweed. See label for further instructions. Limited research has been done on this product in this crop in North Carolina.
	Yellow and purple nutsedge, grasses and some small-seeded broadleaf weeds	EPTC, MOA 8 (Eptam) 7 EC	2.25 to 3.5 pt	2 to 3	Dry or snap beans only. Apply preplant and incorporate immediately to a depth of 3 in. or may be applied at lay-by as a directed application before bean pods start to form to control late season weeds. See label for instructions on incorporation. May be tank mixed with Prowl.
Many broadleaf weeds	fomesafen, MOA 14 (Reflex 2 EC)	See label	See label	Dry bean and snap beans only. Apply preplant surface and preemergence. Total use per year cannot exceed 1.5 pt per acre. See label for further instructions and precautions.	
Yellow and purple nutsedge, common cocklebur, and other broadleaf weeds	halosulfuron-methyl, MOA 2 (Sanda) 75 DG	0.5 to 0.75 oz	0.024 to 0.036	Dry beans, lima beans, bush-type snap beans only. Apply after seeding but prior to cracking. Do not apply more than 0.67 oz product per acre to dry bean. Data is lacking on runner-type snap beans. See label for other instructions.	

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Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
BEANS Preplant and Preemergence (continued)	Broadleaf weeds including morningglory, pigweed, smartweed, and purslane	imazethapyr, MOA 2 (Pursuit) 70 DG	0.72 to 1.08 oz	0.032 to 0.04	Dry beans and lima beans only. Apply preemergence or preplant incorporated. Pursuit should be applied with a registered preemergence grass herbicide. Snap beans only. Apply preemergence or preplant incorporated. For preplant incorporated application, apply within 1 week of planting. May be used with a registered grass herbicide. Reduced crop growth, quality, yield, and/or delayed crop maturation may result.
		(Pursuit) 2 EC	1.5 oz	0.018	
BEANS Postemergence	Annual broadleaf weeds and yellow nutsedge	bentazon, MOA 6 (Basagran) 4 SL	1 to 2 pt	0.5 to 1	Dry, lima, or snap beans only. Apply overtop of beans and weeds when beans have one to two expanded trifoliolate leaves. Two applications spaced 7 to 10 days apart may be made for nutsedge control. Do not apply more than 2 qt per season or within 30 days of harvest. Do not add crop oil concentrate with applications to snapbean or polebean. See label regarding crop oil concentrate use in other crops.
	Many broadleaf weeds	fomesafen, MOA 14 (Reflex 2 EC)	0.75 to 1 pt	0.0625 to 0.125	Dry or snap beans only. Apply postemergence to dry beans or snap beans that have at least one expanded trifoliolate leaf. Include a nonionic surfactant at 1 qt per 100 gal spray mixture. Total use per year cannot exceed 1.5 pt per acre. Do not apply within 45 days of dry bean harvest or 30 days of snap bean harvest. See label for further information.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Yellow and purple nutsedge	EPTC, MOA 8 (Eptam) 7 EC	3.5 pt	3	Green or dry beans only. Do not use on lima bean or pea. Apply and incorporate at last cultivation as a directed spray to soil at the base of crop plants before pods start to form.
	Yellow and purple nutsedge, common cocklebur, and other broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 0.66 oz	0.024 to 0.031	Lima or bush-type snap bean. Apply after crop has reached the 2- to 4-trifoliolate leaf stage but prior to flowering. Postemergence application may cause significant but temporary stunting and may delay maturation of crop. Do not apply within 30 days of harvest. See label for further precautions. Data is lacking on runner-type snap beans.
	Annual broadleaf weeds, including morningglory, pigweed, smartweed, and purslane	imazethapyr, MOA 2 (Pursuit) 70 DG (Pursuit) 2.EC	0.72 to 1.08 oz 1.5 to 3 oz	0.032 to 0.047 0.018 to 0.036	Dry beans and snap beans only. Pursuit DG formulation is registered for dry beans only. Use only 1.5 oz EC formulation on snap bean and up to 3 oz on dry beans. DO NOT use DG formulation on snap beans. Apply postemergence to 1- to 3-in. weeds (one to four leaves) when dry beans have at least one fully expanded trifoliolate leaf. Add nonionic surfactant at 2 pt per 100 gal of spray mixture with all postemergence applications. For dry bean, do not apply within 60 days of harvest. For succulent lima beans, do not apply within 30 days of harvest. See label for instructions on use.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses	sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Dry or snap beans only. Sethoxydim is also labeled for limbean; quizalofop is not. Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. With sethoxydim, add 1 qt of crop oil concentrate per acre. With quizalofop, add 1 qt oil concentrate or 1 qt nonionic surfactant per 100 gal spray. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply on days that are unusually hot and humid. Do not apply within 15 days and 30 days of harvest for succulent and dry beans, respectively.
quizalofop p-ethyl, MOA 1 (Assure II or Targa) 0.88 EC		6 to 12 oz	0.04 to 0.08		
clethodim, MOA 1 (Arrow, Clethodim, or Select) 2 EC (Select Max) 1 EC		6 to 16 oz 9 to 16 oz	0.094 to 0.25 0.07 to 0.125		

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Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
BEETS (Garden or Table) Preplant and Preemergence	Annual and perennial grasses and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Garden beets only. Apply to emerged weeds before seeding or after seeding but before crop emergence. Perennial weeds may require higher rates of glyphosate. Certain glyphosate formulations may require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Broadleaf weeds only including common ragweed, smartweed, and wild mustard	pyrazon, MOA 6 (Pyramin) 65 DF	4.6 to 5.4 lb	3.1 to 3.7	Do not use on light sandy soils. Apply to the soil surface immediately after planting. If rain does not occur within 5 to 10 days after application, beets should be irrigated.
BEETS (Garden or Table) Postemergence	Broadleaf weeds including sowthistle clover, cocklebur, jimsonweed, and ragweed	clopyralid, MOA 4 (Stinger) 3 EC	0.25 to 0.5 pt	0.093 to 0.187 lb	Apply to beets having 2 to 8 leaves when weeds are small and actively growing. Will control most legumes. Do not apply within 30 days of harvest.
	Broadleaf weeds only	phenmedipham, MOA 6 (Spin-aid) 1.3 EC	3 to 6 pt	0.5 to 1	Apply postemergence when beets are past the six true leaf stage and when weeds are in cotyledon to four-leaf stage. Do not apply within 60 days of harvest.
		pyrazon, MOA 6 (Pyramin) 65 DF	5.4 lb	3.7	Do not use on light sandy soils. Apply postemergence after beets have two expanded true leaves and before weeds have more than two true leaves.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a crop oil concentrate or a nonionic surfactant with Aim. See label for directions. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses	sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 60 days of harvest.
clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC		6 to 8 oz 9 to 16 oz	0.094 to 0.125 0.07 to 0.125	Apply postemergence for annual grasses at 6 to 8 oz per acre or bermudagrass and johnsongrass at 8 oz per acre. For Arrow, Clethodim, or Select, add a crop oil concentrate at 1 gal per acre. For Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 30 days of harvest.	
COLE CROPS: BROCCOLI CABBAGE CAULIFLOWER Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence or transplanting as a broadcast or band treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before crop emergence or before transplanting. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. When applying Roundup before transplanting crops into plastic mulch, care must be taken to remove residues of this product from the plastic prior to transplanting. To prevent crop injury, residues can be removed by 0.5 in. natural rainfall or by applying water via a sprinkler system. Certain glyphosate formulations may require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.

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COLE CROPS: BROCCOLI CABBAGE CAULIFLOWER Preplant and Preemergence (continued)	Annual grasses and small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Also labeled for Chinese broccoli, broccoli raab, Chinese cabbage (bok choy, Napa), Chinese mustard cabbage (gai choy), and kohlrabi. Apply preplant or preemergence after planting. With preemergence application, irrigate immediately after application. See label for more directions.
		trifluralin, MOA 3 (Treflan HFP) 4 EC (Trifluralin) 4 EC (Trifluralin HF) 4 EC (Trilin) 4 EC	1 to 1.5 pt	0.5 to 0.75	Transplants. Apply preplant and incorporate into the soil 2 to 3 in. within 8 hr. Direct Seeded. Apply preplant and incorporate 2 to 3 in. into the seed bed within 8 hr. Caution: If soil conditions are cool and wet, reduced stands and stunting may occur.
		DCPA, MOA 3 (Dacthal) W-75 (Dacthal) 6 F	8 to 10 lb 8 to 10 pt	6 to 7.5	Also labeled for rape greens and mustard spinach. Apply immediately after seeding or transplanting. May also be incorporated.
	Annual grasses and broadleaf weeds	clomazone, MOA 13 (Command) 3ME	0.67 pt	0.25	Direct seeded cabbage only. Apply to the soil surface immediately after seeding. Offers weak control of pigweed. See label for further instructions. Limited research has been done on this product in this crop in North Carolina. Transplanted cabbage only. Apply broadcast to the soil prior to transplanting cabbage. See label for further instructions. Offers weak control of pigweed. Limited research has been conducted with this product on this crop in North Carolina.
			0.67 to 1.3 pt	0.25 to 0.50	
Annual grasses and small-seeded broadleaf weeds, including galinsoga, common ragweed, and smartweed	napropamide, MOA 15 (Devrinol) 50 DF	2 to 4 lb	1 to 2	Apply to weed-free soil just after seeding or transplanting as a surface application. Light cultivations, rainfall, or irrigation will be necessary within 24 hr to activate this chemical.	
Many broadleaf weeds, including galinsoga, common ragweed, and smartweed	oxyfluorfen, MOA 14 (Goal 2 XL) 2 EC (Galigan) 2 E (GoalTender) 4 E	1 to 2 pt 1 to 2 pt 0.5 to 1 pt	0.25 to 0.5	Transplants only. Surface apply before transplanting. Do not incorporate or knock the bed off after application. <i>Do not spray over the top of transplants.</i> Oxyfluorfen is weak on grasses. Expect to see some temporary crop injury.	
COLE CROPS BROCCOLI CABBAGE CAULIFLOWER Postemergence	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use crop oil concentrate at up to 1 gal per 100 gal solution or a nonionic surfactant at 2 pt per 100 gal of spray solution. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Broadleaf weeds including sowthistle, clover, cocklebur, jimsonweed, and ragweed	clopyralid, MOA 4 (Stinger) 3 EC	0.25 to 0.5 pt	0.09 to 0.187	Labeled for broccoli, cabbage, cauliflower, broccoli raab, brussel sprouts, cavalo broccolo, Chinese cabbage (bok choy), Chinese broccoli, Chinese mustard, and Chinese cabbage (Napa). Apply to crop when weeds are small and actively growing. Will control most legumes. Do not apply within 30 days of harvest.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses only	sethoxydim, MOA 1 (Poast) 1.5 EC clethodim, MOA 1 (Arrow, Clethodim, or Select) 2 EC (Select Max) 1 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. For sethoxydim, add 1 qt of crop oil concentrate per acre. For Arrow, Clethodim, or Select, add crop oil concentrate at 1 gal per 100 gal of spray solution. For Select Max, add 2 pt nonionic surfactant per 100 gal of spray mixture. Adding crop oil to Poast or Select may increase the likelihood of crop injury at high air temperature. Do not apply Poast or Select plus crop oil on days that are unusually hot and humid. Do not apply within 30 days of harvest.
6 to 8 oz 9 to 16 oz			0.084 to 0.125 0.07 to 0.125		

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
CANTALoupES (MUSKMELONS) Preplant and Preemergence	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Not registered for seeded crops. Apply prior to transplanting of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a crop oil at up to 1 gal per 100 gal of spray solution or a nonionic surfactant at 2 pt per 100 gal of spray solution. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emerges or before transplanting as a broadcast or band treatment over a preformed row. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds at least 3 days before seeding or transplanting. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. When applying Roundup before transplanting crops into plastic mulch, carefully remove residues of this product from the plastic prior to transplanting. To prevent crop injury, residues can be removed by 0.5 in. natural rainfall or by applying water via a sprinkler system. Certain glyphosate formulations may require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Apply preplant and incorporate into the soil 1 to 2 in. (1 in. incorporation is optimum) with a rototiller or tandem disk, or apply preemergence after seeding and follow with irrigation. Check replant restrictions for small grains on label.
	Annual grasses and broadleaf weeds	clomazone, MOA 13 (Command) 3 ME	0.4 to 0.67 pt	0.15 to 0.25	Apply immediately after seeding, or just prior to transplanting with transplanted crop. Roots of transplants must be below the chemical barrier when planting. Offers weak control of pigweed. See label for further instruction.
	Broadleaf weeds (including cocklebur, jimsonweed, ragweed, smartweed, and velvetleaf)	naptalam, MOA 19 (Alanap) 2 EC	4 to 8 qt	2 to 4	Seeded crop. Apply to the soil surface immediately after seeding. Control will not be good if rainfall or irrigation does not occur within 5 days. Transplanted crop. Apply as postemergence spray immediately after transplanting.
	Annual grasses and broadleaf weeds (including cocklebur, jimsonweed, ragweed, smartweed, and velvetleaf)	bensulide, MOA 8 (Prefar) 4 EC + naptalam, MOA 19 (Alanap) 2 EC	4 to 6 qt + 4 to 8 qt	4 to 6 + 2 to 4	Apply preplant and incorporate into the soil 0.5 to 1 in. before planting. Irrigation or rainfall within 5 days will greatly improve control. Check replant restrictions for small grains on Prefar label. Deep incorporation will lead to reduced weed control.
	Annual grasses and some small-seeded broadleaf weeds	ethalfuralin, MOA 3 (Curbit) 3 EC	3 to 4.5 pt	1.1 to 1.7	Apply to the soil surface immediately after seeding. DO NOT SOIL INCORPORATE. May also be used as a BANDED spray BETWEEN rows of plastic mulch. See label for timing. Shallow cultivation, irrigation, or rainfall within 5 days is needed for good weed control. Do not use under mulches, row covers, or hot caps. Under conditions of unusually cold or wet soil and air temperatures, crop stunting and injury may occur. Crop injury can occur if seeding depth is too shallow.
	Annual grasses and broadleaf weeds	ethalfuralin, MOA 3 + clomazone, MOA 13 (Strategy) 2.1 L	2 to 6 pt	0.4 to 1.2 + 0.125 to 0.375	Apply to the soil surface immediately after seeding crop for preemergence control of weeds. DO NOT APPLY PRIOR TO PLANTING CROP. DO NOT SOIL INCORPORATE. May also be used as a banded treatment between rows after crop emergence or transplanting. Do not apply over or under plastic mulch.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sanda) 75 DG	0.5 to 0.75 oz	0.024 to 0.036	Apply after seeding or prior to transplanting crop. For transplanted crop, do not transplant until 7 days after application. Rate can be increased to 1 ounce of product per acre to middles between rows. Do not apply within 57 days of harvest.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
CANTALOUPE (MUSKMELONS) Postemergence	Annual grasses and small-seeded broadleaf weeds	DCPA, MOA 3 (Dacthal) W-75 (Dacthal) 6 F	8 to 10 lb 8 to 10 pt	6 to 7.5	Not labeled for transplanted crop. To improve preemergence control of late emerging weeds. Apply only when crop has four to five true leaves, is well-established, and growing conditions are favorable. Will not control emerged weeds. Incorporation not recommended. Will not control emerged weeds.
		trifluralin, MOA 3 (Treflan HFP) 4EC (Trifluralin) 4EC (Trifluralin HF) 4EC	1 to 2 pt	0.5 to 0.75	Row middles only. To improve preemergence control of late emerging weeds. Apply after emergence when crop plants have reached the three to four true leaf stage of growth. Apply as a directed spray to soil between the rows. Avoid contacting foliage as slight crop injury may occur. Set incorporation equipment to move treated soil around base of crop plants. Do not apply within 30 days of harvest. Will not control emerged weeds.
	Broadleaf weeds	naptalam, MOA 19 (Alanap) 2 EC	4 to 8 qt	2 to 4	Apply postemergence before crop is ready to vine for pre-emergence control of late emerging weeds and suppression of pigweed and common lambsquarters 1 to 2 in. tall. Do not mix with crop oil.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sanda) 75 DG	0.5 to 0.75 oz	0.024 to 0.036	Apply postemergence only after the crop has reached 3 to 5 true leaves but before first female flowers appear. Do not apply sooner than 14 days after transplanting. Controls many broadleaf weeds postemergence including cocklebur, galinsoga, smartweed, ragweed, wild radish, and pigweed. Use nonionic surfactant at 1 qt per 100 gal of spray solution with all postemergence applications. Avoid over-the-top applications during late summer when temperature and humidity are high. Do not apply within 57 days of harvest.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a crop oil concentrate or a nonionic surfactant with Aim. See label for directions. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses only	sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 3 days of harvest.
clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC		6 to 8 oz 9 to 16 oz	0.094 to 0.125 0.07 to 0.125	Apply postemergence for control of grass in cantaloupes (muskmelons). For Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. For Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 3 days of harvest.	
CARROTS Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence as a broadcast or band treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before crop emergence. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
CARROTS Preemergence (continued)	Annual grasses and small-seeded broadleaf weeds	pendimethalin, MOA 3 (Prowl H ₂ O) 3.8	2 pt	1	No research has been conducted in North Carolina evaluating carrot tolerance to Prowl H ₂ O. Do not allow spray to contact carrot plants or injury may occur. Emerged weeds will not be controlled. Do not apply more than 2 pt per acre per season. Do not apply within 60 days of harvest. See label for further instructions and precautions. Row Middle. Apply as a directed spray to the soil between rows. Row. May be applied as a single broadcast application as a post-lant treatment prior to the emergence of the crop and before weed emergence. Apply as a preemergence treatment within 2 days after planting.
		trifluralin, MOA 3 (Treflan, Treflan HFP, Trifluralin, Trilin) 4 EC	1 to 2 pt	0.5 to 1	Apply preplant and incorporate into the soil 2 to 3 in. within 8 hr with a power-driven rototiller or tandem disk.
CARROTS Postemergence	Annual grasses and broadleaf weeds	linuron, MOA 7 (Lorox DF) 50 WDG	1.5 to 3 lb	0.75 to 1.5	Apply as a broadcast spray after carrots are at least 3 in. high. Annual grasses should be less than 2 in. tall and annual broadleaf weeds should be less than 6 in. high. Avoid spraying after three or more cloudy days. Repeat applications may be made, but do not exceed 4 lb of Lorox DF per acre per season. Do not use a surfactant or crop oil. Do not apply within 14 days of harvest.
	Annual broadleaf weeds and some grasses	metribuzin, MOA 5 (TriCor DF, Sencor DF) 75 WDG (Metri, Sencor) 4 F	0.33 lb 0.5 lb	0.25	Apply as a broadcast spray overtop of carrots when weeds are less than 1 in. high and carrots have formed five to six true leaves. A second application may be made in 3 weeks. Do not apply unless 3 sunny days precede application. Do not apply within 60 days of harvest.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a crop oil concentrate or a nonionic surfactant with Aim. See label for directions. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (various brands) 4SL (various brands) 5SL (Roundup Weathermax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots or stems, exposed roots, or fruit of crop. Do not apply within 14 days of harvest.
	Emerged annual and perennial grasses	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC	6 to 8 oz 9 to 16 oz	0.094 to 0.125 0.07 to 0.125	Apply postemergence for control of grasses. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt nonionic surfactant per 100 gal of spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 30 days of harvest.
		fluazifop, MOA 1 (Fusilade DX) 2 EC	6 to 16 oz	0.1 to 0.25	Apply to emerged, actively growing grasses. Up to 48 oz of Fusilade DX may be applied per year. Do not apply within 45 days of harvest. See label for rates for specific weeds. Add 1 gal crop oil concentrate or 1 qt nonionic surfactant per 100 gal spray mix.
		sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rate and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 30 days of harvest.
CELERY Preplant and Preemergence	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before crop emergence. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	trifluralin, MOA 3 (Treflan, Treflan HFP, Trifluralin, Trilin) 4 EC	1 to 2 pt	0.5 to 1 lb	Apply incorporated to direct seeded or transplant celery before planting, at planting, or immediately after planting.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
CELERY Postemergence	Annual broadleaf and grass weeds	linuron, MOA 7 (Lorox DF) 50 WDG	1.5 to 3 lb	0.75 to 1.5	Apply after celery is transplanted and established but before celery is 8 in. tall. Grasses should be less than 2 in. in height, and broadleaf weeds should be less than 6 in. in height. Do not use a surfactant or crop oil.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a crop oil concentrate or a nonionic surfactant with Aim. See label for directions. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (various brands) 4SL (various brands) 5SL (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to .94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses only	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC sethoxydim, MOA 1 (Poast) 1.5 EC	6 to 8 oz 9 to 16 oz 1 to 1.5 pt	0.094 to 0.125 0.07 to 0.125 0.2 to 0.3	Apply postemergence for control of grasses. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt of nonionic surfactant per 100 gal spray mixture. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Adding crop oil may increase the likelihood of crop injury at high air temperature. Do not apply within 30 days of harvest. Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 30 days of harvest.
CORN (sweet) Pre-plant Burndown	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 2 EC	0.8 to 1.5 oz	0.008 to 0.025	Apply prior to planting or emergence of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a crop oil concentrate or a nonionic surfactant with Aim. See label for directions. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Contact kill of all green foliage. Stale bed and minimum tillage application.	paraquat, MOA 22 (Firestorm, Parazone) 3 SL (Gramoxone Inteon) 2 SL	1.5 to 2.7 pt 2.4 to 4 pt	0.6 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence as a broadcast or band treatment over a preformed row. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100-gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix. May be tank mixed with atrazine or simazine. Check label for directions and specific rates.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL	1 to 3 pt 0.8 to 2.4 pt	0.5 to 1.5	Apply to emerged weeds before crop emergence. Do not feed crop residue to livestock for 8 weeks following treatment. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Check label for directions. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Broadleaf weeds	2,4-D amine 4, MOA 4 (various brands)	1 to 3 pt	0.5 to 1	May be tank mixed with glyphosate for broad spectrum weed control. See label for planting restrictions if applied prior to planting.
CORN (sweet) Preemergence	Most annual grass weeds, including fall panicum, broadleaf signalgrass, and small-seeded broadleaf weeds	alachlor, MOA 15 (Micro-Tech) 4 FME	2 to 4 qt	2 to 4	Apply to soil surface immediately after planting. Higher rates will improve control of ragweed and lambsquarter. May be tank mixed with atrazine, glyphosate, or simazine. Various other brands are available. Check label for directions.
		dimethenamid, MOA 15 (Outlook) 6.0 EC	12 to 21 oz	0.56 to 1.0	Apply to soil surface immediately after planting. May be tank mixed with atrazine, glyphosate, or paraquat.
		S-metolachlor, MOA 15 (Dual II Magnum) 7.64 EC	1 to 2 pt	0.95 to 1.91	Apply to soil surface immediately after planting. May be tank mixed with atrazine, glyphosate, or simazine. Check label for directions. Rate is soil-texture and organic-matter dependent. See label for details.
	Most annual broadleaf and grass weeds	atrazine, MOA 5 (various brands) 4 F (various brands) 90 WDG	1 to 2 qt 1.1 to 2.2 lb	1 to 2	Apply to soil surface immediately after planting. Shallow cultivations will improve control. Check label for restrictions on rotational crops. See label for reduced rate if soil coverage with plant residue is less than 30% at planting. Does not control fall panicum or smooth crabgrass. May be tank mixed with metolachlor, alachlor, glyphosate, paraquat, bentazon, or simazine. Check label for directions.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
CORN (sweet) Preemergence (continued)	Most annual broadleaf and grass weeds (continued)	alachlor, MOA 15 + atrazine, MOA 5 (Bullet or Lariat) 4 F	2.5 to 4.25 qt	1.56 to 2.7 + 0.94 to 1.6	Apply to soil surface immediately after planting. Soil texture and organic matter influence application rate. See label for further instruction.
		dimethenamid, MOA 15 + atrazine, MOA 5 (Guardsman Max) 5 F	2.5 to 4.6 pt	0.73 to 1.5 + 0.83 to 1.7	
		S-metolachlor, MOA 15 + atrazine, MOA 5 (Bicep II Magnum) 5.5 F	1.3 to 2.6 qt	1 to 2 + 0.78 to 1.56	
CORN (sweet) Postemergence	Most annual broadleaf and grass weeds	atrazine, MOA 5 (various brands) 4 L (various brands) 90 WDG	2 qt 2.2 lb	2	Apply overtop before weeds exceed 1.5 in. in height. See label for additional information in controlling larger weeds. See label for amount of oil concentrate to add to spray mix.
	Annual grasses and broadleaf weeds	dimethenamid, MOA 15 (Outlook) 6.0 EC + atrazine, MOA 5 (AAtrex) 4 F or 90 WDG	8 to 21 oz + See label for rate	0.375 to 1 + See label for rate	Apply overtop corn (8 in. or less) before weeds exceed the two-leaf stage. Larger weeds will not be controlled. Good residual control of annual grass and broadleaf weeds. Also available as the commercial products Guardsman or LeadOff.
		S-metolachlor, MOA 15 (Dual II Magnum) 7.64 EC + atrazine, MOA 5 (AAtrex) 4 F (AAtrex) 90 WDG	1 to 1.67 pt + 1 to 2 qt 1.3 to 2.2 lb	0.95 to 1.58 + 1 to 2	
	Cocklebur, common ragweed, jimsonweed, Pennsylvania smartweed, velvetleaf, yellow nutsedge, and morningglory	bentazon, MOA 6 (Basagran) 4 SL	0.75 to 1 qt	0.75 to 1	Apply early postemergence overtop when weeds are small and corn has one to five leaves. See label for rates according to weed size and special directions for annual morningglory and yellow nutsedge control. Use a crop oil at a rate of 1 qt per acre.
	Many broadleaf weeds	mesotrione, MOA 27 (Callisto) 4 EC	3 oz	0.094	Apply overtop corn 30 in. or less or 8 leaves or less to control emerged broadleaf weeds. Use nonionic surfactant at 2 pt per 100 gal of spray solution. DO NOT add VAN or AMS when making post application in sweetcorn or severe injury will occur. Most effective on small weeds, however, if weeds are greater than 5 in. or for improved control of certain weeds, certain atrazine formulations may be mixed with this herbicide. See label for further information. Do not apply within 45 days of harvest.
	Annual broadleaf weeds	tembotrione, MOA 27 (Laudis) 3.5 L	3 fl oz	0.082	Can be applied overtop or with drop nozzles to sweet corn from emergence up to V7 stage. Controls most broadleaf weeds. Does not control sicklepod or prickly sida and only suppresses morningglory. Controls or suppresses some grasses. See label for weeds controlled and recommended size for treatment. Herbicide sensitivity in all hybrids and inbreds of sweet corn has not been tested. See label for further restrictions and instructions.
		Topramezone, MOA 27 (Impact) 2.8 L	0.75 fl oz	0.016	Can be applied overtop or with drop nozzles to sweet corn from emergence until 45 days prior to harvest. Does not control sicklepod and only suppresses morningglory. Controls or suppresses some grasses. See label for weeds controlled and recommended size for treatment. This product has not been tested on all inbred line for tolerance. See label for further restrictions and instructions.
	Velvetleaf, pigweed, nightshade, morningglory, common lambsquarters	carfentrazone-ethyl, MOA 14 (Aim) 2.0 EC	0.5 to 1 oz	0.008 to 0.016	Apply postemergence to actively growing weeds less than 4 in. high (rosettes less than 3 in. across) up to the eight-leaf collar stage of corn. Directed sprays will lessen the chance of crop injury. Coverage of weeds is essential for control. Use nonionic surfactant (2 pt per 100 gal of spray) with all applications. Under dry conditions, the use of crop oil concentrate may improve weed control. Mix with atrazine to improve control of many broadleaf weeds. Limited information is available concerning the use of this product in sweetcorn. Do not apply more than 2 oz per acre per season.
	Broadleaf weeds including sowthistle, clover, cocklebur, jimsonweed, ragweed, Jerusalem artichoke, and thistle	clopyralid, MOA 4 (Stinger) 3 EC	0.25 to 0.67 pt	0.095 to 0.25	Apply to sweet corn when weeds are small (less than 5-leaf stage) and actively growing. Do not apply to sweet corn over 18 in. tall. Will control most legumes. Do not apply within 30 days of harvest.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
CORN (sweet) Postemergence (continued)	Cocklebur, passionflower (maypop), pigweed, pokeweed, ragweed, smartweed (Pennsylvania), velvetleaf	halosulfuron, MOA 2 (Sandea) 75 WDG	0.67 to 1 oz	0.032 to 0.047	Apply over the top or with drop nozzles to sweet corn from spike to lay-by for control of emerged weeds. Add nonionic surfactant at 1 to 2 qt per 100 gal of spray solution. See label for all instructions and restrictions. Do not apply within 30 days of harvest.
	Cocklebur, pigweed, lambsquarters, morningglory, sicklepod, and many other annual broadleaf weeds	2,4-D amine, MOA 4 (various brands) 3.8 SL	0.5 to 1 pt	0.24 to 0.48	Use 0.25 lb of 2,4-D overtop when corn is 4 to 5 in. tall and weeds are small. Increase rate to 0.5 lb as corn reaches 8 in. Use drop nozzles and direct spray toward base if corn is over 8 in. tall . Do not cultivate for about 10 days after spraying as corn may be brittle. Reduce rate of 2,4-D if extremely hot and soil is wet. For better sicklepod and horsenettle control, add a nonionic surfactant when using a directed spray at a rate of 1 qt per 100 gal spray solution.
	Annual grasses and broadleaf weeds	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	0.7 to 1.3 pt 1 to 2 pt	0.25 to 0.5	DO NOT SPRAY OVERTOP OF CORN OR SEVERE INJURY WILL OCCUR. Make a postdirected application in a minimum of 20 gal spray mix per acre to emerged weeds when the smallest corn is at least 10 in. tall . Use nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix. Use of a hooded or shielded sprayer will reduce crop injury.
	Certain grasses, including barnyardgrass, foxtails, Texas panicum, and johnsongrass; and broadleaf weeds, including burcucumber, jimsonweed, pigweed, pokeweed, and smartweeds	nicosulfuron, MOA 2 (Accent) 75 WDG	0.67 oz	0.031	Apply to sweet corn up to 12 in. tall or up to and including 5 leaf collars. For corn 12 to 18 in. tall, apply only with drop nozzles. Sweet corn hybrids vary in their sensitivity to Accent. Do not apply to Merit sweet corn. Contact company representative for information on other local hybrids that have been evaluated with Accent. Accent may be applied to corn previously treated with Fortress, Aztec, or Force, or non-organophosphate soil insecticides regardless of soil type. See label for more information on use of soil insecticides with Accent. Label prohibits application of Accent to corn previously treated with Counter insecticide, and also indicates that applying Accent to corn previously treated with Counter 20 CR, Lorsban, or Thimet may result in unacceptable crop injury, especially on soils with less than 4% organic matter. See label for information on use of adjuvants.
CUCUMBERS Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence as a broadcast or band treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5 0.5 to 1.5 0.5 to 1.4	Apply to emerged weeds at least 3 days before seeding or transplanting. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. When applying Roundup before transplanting crops into plastic mulch, care must be taken to remove residues of this product from the plastic prior to transplanting. To prevent crop injury, residues can be removed by 0.5 in. natural rainfall or by applying water via a sprinkler system. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Apply preplant and incorporate into the soil 1 to 2 in. (1 in. incorporation is optimum) with a rototiller or tandem disk, or apply to the soil surface after seeding and follow with irrigation. Check replant restrictions for small grains on label.
	Broadleaf weeds (including cocklebur, jimsonweed, ragweed, smartweed and velvetleaf)	naptalam, MOA 19 (Alanap) 2 EC	4 to 8 qt	2 to 4	Seeded crop. Apply to the soil surface immediately after planting. Control will not be good if rainfall or irrigation does not occur within 5 days.
	Annual grasses and broadleaf weeds (listed above for naptalam)	bensulide, MOA 8 (Prefar) 4 EC + naptalam, MOA 19 (Alanap) 2 EC	4 to 6 qt + 4 to 8 qt	4 to 6 + 2 to 4	Apply preplant and incorporate into the soil 0.5 to 1 in. before planting. Irrigation or rainfall within 5 days will greatly improve control. Check replant restrictions for small grains on Prefar label. Deep incorporation will lead to reduced weed control.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
CUCUMBERS Preplant and Preemergence (continued)	Annual grasses and some small-seeded broadleaf weeds	clomazone, MOA 13 (Command) 3 ME	0.4 to 1 pt	0.15 to 0.375	Apply immediately after seeding. Offers weak control of pigweed. See label for further information.
		ethalfuralin, MOA 3 (Curbit) 3 EC	3 to 4.5 pt	1.1 to 1.7	Apply to the soil surface immediately after seeding. DO NOT SOIL INCORPORATE. May also be used as a BANDED spray BETWEEN rows of plastic mulch. See label for timing. Shallow cultivation, irrigation, or rainfall within 5 days is needed for good weed control. Do not use under mulches, row covers, or hot caps. Under conditions of unusually cold or wet soil and air temperatures, crop stunting or injury may occur. Crop injury can occur if seeding depth is too shallow.
	Annual grasses and broadleaf weeds	ethalfuralin, MOA 3 + clomazone, MOA 13 (Strategy) 2.1 L	2 to 6 pt	0.4 to 1.2 + 0.125 to 0.375	Apply to the soil surface immediately after crop seeding for preemergence control of weeds. DO NOT APPLY PRIOR TO PLANTING CROP. DO NOT SOIL INCORPORATE. May also be used as a banded treatment between rows after crop emergence or transplanting. Do not apply over or under plastic mulch.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 0.75 oz	0.024 to 0.036	Apply after seeding or prior to transplanting crop. For transplanting, do not transplant until 7 days after application. For seeded or transplanting cucumbers in plasticulture, do not plant within 7 days of Sandea application. Rate can be increased to 1 ounce of product per acre to middles between rows.
CUCUMBERS Postemergence	Annual grasses and small-seeded broadleaf weeds	D CPA, MOA 3 (Dacthal) W-75 (Dacthal) 6 F	8 to 10 lb 8 to 10 pt	6 to 7.5	Will not control emerged weeds. To improve preemergence control of late emerging weeds. Apply only when crop has four to five true leaves, is well-established, and growing conditions are favorable. Will not control emerged weeds. Incorporation not recommended. Not labeled for transplanted crop.
		trifluralin, MOA 3 (Treflan HFP) 4EC (Trifluralin) 4EC (Trifluralin HF) 4EC	1 to 2 pt	0.5 to 0.75	Will not control emerged weeds. Row middles only. To improve preemergence control of late emerging weeds. Apply after emergence when crop plants have reached the three to four true leaf stage of growth. Apply as a directed spray to soil between the rows. Will not control emerged weeds. Avoid contacting foliage as slight crop injury may occur. Set incorporation equipment to move treated soil around base of crop plants. Do not apply within 30 days of harvest.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 0.75 oz	0.024 to 0.036	Apply postemergence only after the crop has reached 3 to 5 true leaves but before first female flowers appear. Do not apply sooner than 14 days after transplanting. Controls many broadleaf weeds postemergence including cocklebur, galinsoga, smartweed, ragweed, wild radish, and pigweed. Use nonionic surfactant at 1 qt per 100 gal of spray solution with all postemergence applications. Do not apply within 30 days of harvesting.
	Broadleaf weeds	naptalam, MOA 19 (Alanap) 2 EC	4 to 8 qt	2 to 4	Apply postemergence before crop is ready to vine for preemergence control of late emerging weeds and suppression of pigweed and common lambsquarters 1 to 2 in. tall. Do not mix with crop oil.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use crop oil concentrate at up to 1 gal per 100 gal solution or a nonionic surfactant at 2 pt per 100 gal of spray solution. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L (various brands) 4 SL (various brands) 5 SL	11 to 32 oz 1 to 3 pt 0.8 to 2.4 pt	0.5 to 1.4 0.5 to 1.5 0.5 to 1.5	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses only	sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 14 days of harvest.
		clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	6 to 8 oz 9 to 16 oz	0.094 to 0.125 0.07 to 0.125	Control of emerged grasses. For Arrow, Clethodim, and Select, add 1 gal crop oil concentrate per 100 gal spray mix. For Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 14 days of harvest.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
EGGPLANT Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before transplanting as a broadcast or band treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply prior to transplanting of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a crop oil at up to 1 gal per 100 gal of spray solution or a nonionic surfactant at 2 pt per 100 gal of spray solution. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5 0.5 to 1.5 0.5 to 1.4	Apply to emerged weeds at least 3 days before seeding or transplanting. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. When applying Roundup before transplanting crops into plastic mulch, care must be taken to remove residues of this product from the plastic prior to transplanting. To prevent crop injury, residues can be removed by 0.5 in. natural rainfall or by applying water via a sprinkler system. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Apply preplant incorporated (1 in. incorporation is optimum) or preemergence after planting. With preemergence application, irrigate immediately after application. See label for more directions.
	Annual grasses and some broadleaf weeds including galinsoga, common ragweed, and smartweed	napropamide, MOA 15 (Devrinol) 50 DF	2 to 4 lb	1 to 2	Apply preplant and incorporate into the soil 1 to 2 in. using a rototiller or tandem disk. Shallow cultivations or irrigations will improve control. See label for replanting restrictions for small grains.
	Annual grasses and small-seeded broadleaf weeds	trifluralin, MOA 3 (Treflan HFP) 4 EC	1 pt	0.5	Apply and incorporate before transplanting. Avoid transplanting until temperatures have warmed in late spring. Eggplant tolerance to herbicide may be marginal.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 1 oz	0.024 to 0.048	Row middles only. Apply to row middles as a preemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 30 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.
EGGPLANT Postemergence	Annual grasses and small-seeded broadleaf weeds	DCPA, MOA 3 (Dacthal) W-75 (Dacthal) 6 F	8 to 10 lb 8 to 10 pt	6 to 7.5	To improve control of late emerging weeds. Apply over the top of transplants only between 4 and 6 wk after transplanting. Can also be applied after direct seeded plants are 4 to 6 in. tall. Will not control emerged weeds.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use crop oil concentrate at up to 1 gal per 100 gal solution or a nonionic surfactant at 2 pt per 100 gal of spray solution. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to .94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots or stems, exposed roots, or fruit of crop. Do not apply within 14 days of harvest.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 1 oz	0.024 to 0.048	Row middles only. Apply to row middles as a postemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 30 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.
	Contact kill of all green foliage	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 pt 2 pt	0.5	Row middles only. Apply in 20 gal spray mix as a shielded spray to emerged weeds between rows of eggplant. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix. Do not allow spray to contact crop or injury will result.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
EGGPLANT Postemergence (continued)	Annual and perennial grasses only	sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 20 days of harvest.
		clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	6 to 8 oz 9 to 16 oz	0.094 to 0.125 0.07 to 0.125	Apply postemergence for control of grasses. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt of nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperature. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 20 days of harvest.
GARLIC Preplant and Preemergence	Annual and perennial grass and broadleaf weeds	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5 0.5 to 1.5 0.5 to 1.4	Stale bed application. Apply to emerged weeds at least 3 days before planting. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
		paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.7 to 2.7 pt 2.5 to 4 pt	0.6 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence as a broadcast or band treatment over a preformed row. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix. Do not apply within 60 days of harvest.
	Annual grasses and small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Apply preplant incorporated (1 in. incorporation is optimum) or preemergence after planting. With preemergence application, irrigate immediately after application. See label for more directions.
		dimethenamid-P, MOA 15 (Outlook) 6 EC	12 to 21 oz	0.6 to 1	For preemergence weed control. Apply after crop has reached 2 true leaves until a minimum of 30 days before harvest. If applications are made to transplanted crop, DO NOT apply until transplants are in the ground and soil has settled around transplants with several days to recover.
		flumioxazin, MOA 14 (Chateau) 51 WDG	6 oz	0.188	For preemergence weed control. Apply prior to garlic and weed emergence. Application should be made within 3 days after planting garlic. Do not apply more than 6 oz per acre during a single growing season. Provides residual weed control.
	Annual broadleaf weeds	pendimethalin, MOA 3 (Prowl) 3.3 EC (Prowl H ₂ O) 3.8 AS	1.2 to 3.6 pt 1.5 to 3 pt	0.5 to 1.5 0.75 to 1.5	For preemergence weed control. Apply preemergence after planting but prior to weed and crop emergence or postemergence to garlic in the one- to five-true leaf stage. Prowl can be applied sequentially by applying preemergence followed by a post-emergence application. Do not apply within 45 days of harvest.
oxyfluorfen, MOA 14 (Galigan, Goal 2 XL) 2 E (GoalTender) 4 E		1 to 2 pt 1 to 2 pt	0.25 to 0.5 0.5 to 1	Transplanted dry bulb only. Apply as a single application immediately (within 2 days) after transplanting for preemergence control of weeds. See label for rates and instructions for use. Do not apply within 60 days of harvest. See label for seeded garlic.	
GARLIC Postemergence	Most annual broadleaf weeds	oxyfluorfen, MOA 14 (Galigan) 2 E (Goal 2 XL) 2 EC (GoalTender) 4 E	0.5 pt 0.5 pt 0.25 pt	0.12	Dry bulb only. May be used as a postemergence spray to both the weeds and crop after the garlic has at least two fully developed true leaves. Some injury to garlic may result. Injury will be more severe if the chemical is applied during cool, wet weather. Weeds should be in the two- to four-leaf stage for best results. Do not make more than four applications per year. Do not apply within 60 days of harvest.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
GARLIC Postemergence (continued)	Annual and perennial grasses only	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	6 to 16 oz 9 to 32 oz	0.09 to 0.25 0.07 to 0.25	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt of nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Do not apply Arrow, Clethodim, or Select on unusually hot and humid days. Do not apply within 45 days of harvest. Very effective in controlling annual bluegrass.
		fluzazifop, MOA 1 (Fusilade DX) 2 EC	6 to 16 oz	0.1 to 0.25	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 gal crop oil concentrate or 1 qt nonionic surfactant per 100 gal spray mix. Do not apply on days that are unusually hot and humid. Do not apply within 45 days of harvest.
		sethoxydim, MOA 1 (Poast) 1.5 EC	1 pt	0.2	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 30 days of harvest.
GREENS (Collards, kale, mustard, and turnip greens or roots) Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.5 to 2.7 pt 2 to 4 pt	0.6 to 1	Collards and turnip only. Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence or transplanting as a broadcast or band treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5 0.5 to 1.5 0.5 to 1.4	Apply to emerged weeds before crop emergence. Do not feed crop residue to livestock for 8 weeks following treatment. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Also labeled for rape greens. Not labeled for turnip. Apply preplant or preemergence after planting. With preemergence application, irrigate immediately after application. See label for more directions.
		DCPA, MOA 3 (Dacthal) W-75 (Dacthal) 6 F	8 to 10 lb 8 to 10 pt	6 to 7.5	Also labeled for broccoli raab (raab, raab salad), mizuna, and hanover salad. Apply immediately after seeding. May also be incorporated.
		trifluralin, MOA 3 (Treflan HFP) 4 EC	1 to 1.5 pt	0.5 to 0.75	Apply preplant and incorporate into the soil 2 to 3 in. within 8 hr using a rototiller or tandem disk. Do not use if turnip roots are to be consumed.
GREENS Postemergence	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Broadleaf weeds including sowthistle clover, cocklebur, jimsonweed, and ragweed	clopyralid, MOA 4 (Stinger) 3 EC	0.3 to 0.5 pt	0.187	Kale, collards, mustard, turnip, mizuna, mustard spinach, and rape. Apply to crop when weeds are small and actively growing. Will control most legumes. For kale, collards, mustard, and turnip (roots), do not apply within 30 days of harvest. For turnip tops, do not apply within 15 days of harvest. Mustard green injury has been observed in some research trials.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to .94	Row middles only. Not labeled for turnip greens. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots or stems, exposed roots, or fruit of crop. Do not apply within 14 days of harvest.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
GREENS Postemergence (continued)	Annual and perennial grasses only	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC	6 to 8 oz	0.094 to 0.125 0.07 to 0.125	Apply postemergence for control of grasses. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 14 days of harvest of green crops. Do not apply within 30 days of harvest of turnips grown for roots.
		(Select Max) 1 EC	9 to 16 oz		
		sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	
LETTUCE Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emerges as a broadcast or band treatment over a preformed row. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray solution or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5 0.5 to 1.5 0.5 to 1.4	Apply to emerged weeds before crop emergence. Do not feed crop residue to livestock for 8 weeks following treatment. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	benefin, MOA 3 (Balan) 60 WDG	2 to 2.5 lb	1.2 to 1.5	Apply preplant and incorporate 2 to 3 in. deep with a rototiller or tandem disk before seeding or transplanting.
		bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Apply preplant incorporated (1 in. incorporation is optimum) or preemergence after planting. With preemergence application, irrigate immediately after application. See label for more directions.
	Most annual grasses and broadleaf weeds	pronamide, MOA 3 (Kerb) 50 WP	2 to 4 lb	1 to 2 lb	DO NOT APPLY TO LEAF LETTUCE. Can be used preplant or preemergence. Application can also be made postemergence to head lettuce but should be made before weed germination if possible or before weeds are beyond the two-leaf stage. Moisture is necessary to activate. Do not apply within 55 days of harvest. Make only one application per crop. Consult label for planting restrictions for rotational crops.
LETTUCE Postemergence	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Annual and perennial grasses only	sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Arrow, Clethodim, and Select are only registered for leaf lettuce. Consult manufacturer's label for specific rates and best times to treat. For sethoxydim, add 1 qt of crop oil concentrate per acre. Use of Poast or clethodim with crop oil may increase the likelihood of crop injury at high air temperatures. For Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray solution. With Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. Do not apply on days that are unusually hot and humid. Do not apply sethoxydim within 30 days of harvest on head lettuce or within 15 days of harvest on leaf lettuce. For clethodim, do not apply within 14 days of harvest.
clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC		6 to 8 oz 9 to 16 oz	0.09 to 0.125 0.07 to 0.125		

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
OKRA	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5 0.5 to 1.5 0.5 to 1.4	Apply to emerged weeds before crop emergence. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply prior to transplanting crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Annual grasses and small-seeded broadleaf weeds	trifluralin, MOA 3 (Treflan, Treflan HFP, Trifluralin, Trilin) 4 EC	1 to 2 pt	0.5 to 1	Apply preplant and incorporate into the soil 2 to 3 in. within 8 hr using a rototiller or tandem disk.
	Annual and perennial grasses only	sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.3 lb	Apply to emerged grasses. Do not apply to grasses or crops under stress. Do not apply on days that are unusually hot and humid. Do not apply within 14 days of harvest.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (various brands) 4SL (various brands) 5SL (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots or stems, exposed roots, or fruit of crop. Do not apply within 14 days of harvest.
ONIONS Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.7 to 2.7 pt 2.5 to 4 pt	0.65 to 1	Seeded onion only. Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence or transplanting as a broadcast or band treatment over a preformed row. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix. Do not apply within 60 days of harvest.
	Annual and perennial grass and broadleaf weeds	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5 0.5 to 1.5 0.5 to 1.4	Apply to emerged weeds before crop emergence. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Use on direct seeded onions only. Certain glyphosate formulations require the addition of surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 E	5 to 6 qt	5 to 6	Dry bulb only. Apply preplant incorporated (1 in. incorporation is optimum) or preemergence after planting. With preemergence application, irrigate immediately after application. See label for more directions.
		DCPA, MOA 3 (Dacthal) W-75 (Dacthal) 6 F	8 to 10 lb 8 to 10 pt	6 to 7.5	Dry bulb and green. Apply immediately after seeding or transplanting and/or at layby. See label for timing layby treatments.
	Annual broadleaf weeds	oxyfluorfen, MOA 14 (Galigan) 2 E (Goal 2 XL, OxiFlo) 2 EC (GoalTender) 4 E	1 to 2 pt 1 to 2 pt 1 pt	0.25 to 0.5 0.25 to 0.5 0.5	Transplanted dry bulb only. Apply as a single application immediately (within 2 days) after transplanting for preemergence control of weeds. See label for rates and instructions for use. Do not apply within 45 days of harvest.
	Most annual grasses and some broadleaf weeds	pendimethalin, MOA 3 (Prowl) 3.3 EC (Prowl) 3.8 AS	1.2 to 3.6 pt 1.5 to 2 pt	0.5 to 1.5 0.75 to 1.5	Dry bulb only. For preemergence weed control. MINERAL SOILS. Apply when onions have two to nine true leaves but prior to weed emergence. ALL SOILS. Do not apply within 45 days of harvest.
			(Prowl) 3.3 EC (Prowl) 3.8 AS	2.4 to 4.8 pt 4 pt	1 to 2 2
		dimethenamid-P, MOA 15 (Outlook) 6 EC	12 to 21 oz	0.6 to 1	Dry bulb only. For preemergence weed control. Apply after crop has reached 2 true leaves until a minimum of 30 days before harvest. If applications are made to transplanted crop, DO NOT apply until transplants are in the ground and soil has settled around transplants with several days to recover.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
ONIONS Postemergence	Most annual broadleaf weeds	oxyfluorfen, MOA 14 (Galigan) 2 E (Goal 2 XL) 2 EC (GoalTender) 4 E	0.5 pt 0.5 pt 0.25 pt	0.12	Dry bulb only. May be used as a postemergence spray to both the weeds and crop after the onions have at least two fully developed true leaves. Some injury to onions may result. Injury will be more severe if the chemical is applied during cool, wet weather. Weeds should be in the two- to four-leaf stage for best results. Do not make more than four applications per year. Do not apply within 45 days of harvest.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses only	fluazifop, MOA 1 (Fusilade DX) 2 EC	6 to 16 oz	0.1 to 0.25	Dry bulb only. Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 gal crop oil concentrate or 1 qt nonionic surfactant per 100 gal spray mix. Do not apply on days that are unusually hot and humid. Do not apply within 45 days of harvest.
		sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Dry bulb and green. Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 30 days of harvest.
		clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	6 to 16 oz 9 to 32 oz	0.09 to 0.25 0.07 to 0.25	Dry bulb only. Apply to emerged grasses. Consult the manufacturer's label for specific rates and best times to treat. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Do not apply Select on unusually hot and humid days. Do not apply within 45 days of harvest. Very effective in controlling annual bluegrass.
PEAS, GREEN Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence as a broadcast or band treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply prior to planting or emergence of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Annual and perennial grass and broadleaf weeds	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before crop emergence. Do not feed crop residue to livestock for 8 weeks following treatment. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	pendimethalin, MOA 3 (Prowl H ₂ O) 3.8 AS	1.5 to 3 pt	0.75 to 1.5	Southern peas and snap beans only. Apply preplant and incorporate into the soil 2 to 3 in. using a power driven rototiller or by cross disking. DO NOT APPLY AFTER SEEDING.
	Annual grasses and small-seeded broadleaf weeds	trifluralin, MOA 3 (Treflan HFP) 4 EC (Trifluralin) 4 EC (Trifluralin HF) 4 EC (Trilin) 4 EC	1 to 1.5 pt	0.5 to 0.75	Apply preplant and incorporate to a depth of 2 to 3 in. within 8 hr with a rototiller or tandem disk.
	Annual grasses and broadleaf weeds	clomazone, MOA 13 (Command) 3ME	0.4 to 0.67 pt	0.15 to 0.25	Apply to the soil surface immediately after seeding. Offers weak control of pigweed. See label for further instruction. Limited research has been done on this product in this crop in North Carolina.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
PEAS, GREEN Preplant and Preemergence (continued)	Annual grasses, small-seeded broadleaf weeds, and suppression of yellow nutsedge	S-metolachlor, MOA 15 (Dual Magnum) 7.62 EC (Dual II Magnum) 7.64 EC	1 to 2 pt	0.95 to 1.91	Apply to soil surface immediately after seeding. Shallow cultivations will improve control. See label for specific rate.
	Annual broadleaf weeds including morningglory, pigweed, smartweed, and purslane	imazethapyr, MOA 2 (Pursuit) 70 DG	Up to 1.08 oz	Up to 0.047	English peas only. Apply preplant incorporated or to soil surface immediately after planting.
PEAS, GREEN Postemergence	Annual broadleaf weeds and yellow nutsedge	bentazon, MOA 6 (Basagran) 4 SL	1 to 2 pt	0.5 to 1	Apply overtop of peas when weeds are small and peas have at least three pairs of leaves (four nodes). DO NOT ADD CROP OIL CONCENTRATE TO SPRAY MIX. Do not apply within 10 days of harvest. Do not apply when peas are in bloom.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See Label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots or stems, exposed roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses	sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. With sethoxydim, add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast or Assure II may increase the likelihood of crop injury at high air temperatures. With quizalofop, add 1 gal oil concentrate or 1 qt nonionic surfactant per 100 gal spray. Do not apply Poast or Assure II on days that are unusually hot and humid. Do not apply sethoxydim within 15 days or Assure within 30 days of harvest.
		quizalofop p-ethyl, MOA 1 (Assure II or Targa) .88 EC	6 to 12 oz	0.04 to 0.08	
	Annual broadleaf weeds including morningglory, pigweed, smartweed, and purslane	imazethapyr, MOA 2 (Pursuit) 70 DG	Up to 1.08 oz	Up to 0.047	English peas only. Apply postemergence to 1- to 3-in. weeds (one to four leaves) when peas are at least 3 in. high but prior to five nodes. Add nonionic surfactant at 2 pt per 100 gal of spray mix.
PEAS, SOUTHERN (cowpeas, blackeyed peas) Preplant or Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray solution to emerged weeds before crop emergence as a broadcast or band treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	Up to 2 oz	Up to 0.031	Apply prior to planting or emergence of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See Label for rate. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before crop emergence. Do not feed crop residue to livestock for 8 weeks following treatment. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	pendimethalin, MOA 3 (Prowl H ₂ O) 3.8 AS	1.5 to 3 pt	0.75 to 1.5	NOT LABELED IN BLACKEYED PEAS. Apply preplant and incorporate into the soil 2 to 3 in. using a power driven rototiller or by cross disking. DO NOT APPLY AFTER SEEDING.
		trifluralin, MOA 3 (Treflan HFP) 4 EC (Trifluralin) 4 EC (Trifluralin HF) 4 EC (Trilin) 4 EC	1 to 2 pt	0.5 to 1	Apply preplant and incorporate into the soil 2 to 3 in. deep within 8 hr with a rototiller or tandem disk.
	Annual grasses and broadleaf weeds	clomazone, MOA 13 (Command) 3ME	0.4 to 0.67 pt	0.15 to 0.25	Apply to the soil surface immediately after seeding. Offers weak control of pigweed. See label for further instruction. Limited research has been done on this product in this crop in North Carolina.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
PEAS, SOUTHERN (cowpeas, blackeyed peas) Preplant or Preemergence (continued)	Annual grasses, small-seeded broadleaf weeds, and suppression of yellow nutsedge	S-metolachlor, MOA 15 (Dual Magnum) 7.62 EC (Dual II Magnum) 7.64 EC	1 to 2 pt	0.95 to 1.91	Apply to soil surface immediately after planting. Shallow cultivations will improve control. May also be soil incorporated before planting.
	Annual grasses and broadleaf weeds including morningglory, pigweed, smartweed, and purslane	imazethapyr, MOA 2 (Pursuit) 70 DG	Up to 1.44 oz	Up to 0.063	Apply preemergence or preplant incorporated. See label for rate for specific pea species.
PEAS, SOUTHERN Postemergence	Annual broadleaf weeds and yellow nutsedge	bentazon, MOA 6 (Basagran) 4 SL	1 to 2 pt	0.5 to 1	Apply overtop of peas when weeds are small and peas have at least three pairs of leaves (four nodes). DO NOT ADD CROP OIL CONCENTRATE TO SPRAY MIX. Do not apply within 30 days of harvest. Do not apply when peas are in bloom.
	Annual broadleaf weeds including morningglory, pigweed, smartweed, and purslane	imazethapyr, MOA 2 (Pursuit) 70 DG	Up to 1.44 oz	Up to 0.063	Southern peas and certain dry peas. Apply postemergence to 1- to 3-in. weeds (one to four leaves) when peas are at least 3 in. in height but prior to five nodes and flowering. Add nonionic surfactant at 2 pt per 100 gal of spray mixture with all postemergence applications. Do not apply within 30 days of harvest. See label for rate for specific pea species.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses	quizalofop p-ethyl, MOA 1 (Assure II or Targa) .88 EC	6 to 12 oz	0.04 to 0.08	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. With sethoxydim, add 1 qt of crop oil concentrate per acre. With quizalofop, add 1 gal oil concentrate or 1 qt nonionic surfactant per 100 gal spray. Adding crop oil to Assure II or Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Assure II or Poast on days that are unusually hot and humid. With sethoxydim, do not apply within 15 days and 30 days of harvest for succulent and dry peas, respectively. With quizalofop, do not apply within 30 days of harvest of dry Southern peas.
		sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	
clethodim, MOA 1 (Select Max) 1 EC		9 to 16 oz	0.07 to 0.125 lb		
PEPPERS Preemergence	Most annual and perennial weeds	methyl bromide	various	240	Inject into the soil 4 to 6 in. deep and cover with tarp immediately. Soil moisture should be near field capacity and soil temperature should be at least 50°F at the treatment depth. Allow 2 weeks after application before seeding or transplanting. If plastic tarp is removed, disking before planting will facilitate aeration.
	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal of spray mix per acre to emerged weeds before transplanting as a broadcast or band treatment over a preformed row. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply prior to transplanting of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a crop oil at up to 1 gal per 100 gal of spray solution or a nonionic surfactant at 2 pt per 100 gal of spray solution. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
PEPPERS Preemergence (continued)	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds at least 3 days before seeding or transplanting. When applying Roundup before transplanting crops into plastic mulch, care must be taken to remove residues of this product from the plastic prior to transplanting. To prevent crop injury, residues can be removed by 0.5 in. natural rainfall or by applying water via a sprinkler system. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for specific weeds. Certain glyphosate formulations require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Apply preplant incorporated (1 in. incorporation is optimum) or preemergence. With preemergence application, irrigate immediately after application. See label for more directions.
	Annual grasses and small-seeded broadleaf weeds	clomazone, MOA 13 (Command) 3 ME	0.67 to 2.67 pt	0.25 to 1	Not labeled for banana pepper. Apply preplant before transplanting. Weak on pigweed. SEE LABEL FOR INSTRUCTIONS ON USE.
		napropamide, MOA 15 (Devrinol) 50 DF (Devrinol) 2 EC	2 to 4 lb 2 to 4 qt	1 to 2	Bare ground: Can be used on direct-seeded and transplanted peppers. See label for instructions on use. Plasticulture: In-row. Apply to a weed-free soil before laying plastic mulch. Soils should be well worked yet moist enough to permit a thorough incorporation to a depth of 2 inches. Incorporate on the same day as applied using equipment that will result in uniform incorporation of the herbicide to the desired depth. Then apply plastic mulch. If weed pressure is from small seeded annuals, apply to the surface of the bed immediately in front of the laying of plastic mulch. If soil is dry, water or sprinkler irrigate with sufficient water to wet to a depth of 2 to 4 inches before covering with plastic mulch. Apply the plastic mulch over the treated soil the same day. Between rows. Apply to a weed-free soil surface between rows of plastic. Apply Devrinol within 24 hours of rainfall, or mechanically incorporate or irrigate Devrinol into the soil to a depth of 1 to 2 inches within 24 hours of application.
		pendimethalin, MOA 3 (Prowl H ₂ O) 3.8	1 to 3 pt	0.5 to 1.5	May be applied in chili pepper, cooking pepper, pimento, and sweet pepper. Do not apply more than 3 pt per acre per season. See label for specific use rate for your soil type. Emerged weeds will not be controlled. Avoid direct contact with pepper foliage or stems. Do not apply within 70 days of harvest. See label for further instructions and precautions. Between rows. Can be applied as a post-directed spray on the soil at the base of the plant beneath plants and between rows. In-row. May be applied as a broadcast preplant incorporated surface application prior to transplanting peppers. Do not apply Prowl H ₂ O to the bed if using plasticulture production system.
	Broadleaf weeds and a few annual grasses	trifluralin, MOA 3 (Treflan, Treflan HFP, Trifluralin HF, Triilin) 4 EC	1 to 2 pt	0.5 to 1	Apply pretransplant, and incorporate to a depth of 2 to 3 in. within 8 hr with a rototiller or tandem disk.
		oxyfluorfen, MOA 14 (Goal) 2XL	Up to 2 pt	0.5 lb	Plasticulture only. Apply to soil surface of pre-formed beds at least 30 days prior to transplanting crop for control of many broadleaf weeds including Carolina geranium and cutleaf eveningprimrose. While incorporation is not necessary, it may result in less crop injury. Plastic mulch can be applied anytime after application but best results are likely if applied soon after application.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sanda) 75 DG	0.5 to 1 oz	0.024 to 0.048 lb	Row middles only. Apply to row middles as a preemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 30 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.
PEPPERS Postemergence	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
PEPPERS Postemergence (continued)	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 1 oz	0.024 to 0.048 lb	Row middles only. Apply to row middles as a postemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 30 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.
	Contact kill of all green foliage	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 pt 2 pt	0.5	Row middles only. Apply in a minimum of 20 gal spray mix per acre as a shielded spray to emerged weeds between rows of peppers. Use a nonionic surfactant at a rate of 16 oz per 100 gal spray mix.
	Annual and perennial grasses only	sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 7 days of harvest.
		clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	6 to 8 oz 9 to 16 oz	0.094 to 0.125 0.07 to 0.125	Apply postemergence to control grasses. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 20 days of harvest.
POTATOES, IRISH Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	0.7 to 1.3 pt 1 to 2 pt	0.26 to 0.5 0.25 to 0.5	Apply in a minimum of 20 gal spray mix per acre to emerged weeds up to ground cracking before crop emergence. May be used instead of the drag-off operation to kill emerged weeds before the application of preemergence herbicides. This procedure should help to provide excellent control of all annual weeds. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply prior to planting or emergence of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before crop emergence. Do not feed crop residue to livestock for 8 weeks following treatment. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	pendimethalin, MOA 3 (Prowl) 3.3 EC (Prowl H ₂ O) 3.8 AS	1.8 to 3.6 pt 1.5 to 3 pt	0.75 to 1.5 0.75 to 1.5	Apply just after planting or drag-off to weed-free soil before crop emerges or from emergence until crop reaches 6 in. tall.
	Annual grasses and small-seeded broadleaf weeds, plus yellow nutsedge suppression	S-metolachlor, MOA 15 (Dual Magnum) 7.62 EC (Dual II Magnum) 7.64 EC	1 to 2 pt	0.95 to 1.91	Apply just after planting or drag-off to weed-free soil before crop emerges. Dual Magnum can also be applied at lay-by for control of late season weeds. See label for further instruction.
		dimethenamid-P, MOA 15 (Outlook) 6 EC	12 to 21 oz	0.6 to 1	Apply just after planting or drag-off to weed-free soil before crop emerges. See label for further instruction.
	Annual grasses, most broadleaf weeds, plus yellow and purple nutsedge suppression	EPTC, MOA 8 (Eptam) 7 EC	3.5 pt	3	Apply preplant and incorporate into the soil 2 to 3 in. with a rototiller or tandem disk. The variety "Superior" has been shown to be sensitive to Eptam. See label for specific methods of incorporation.
	Most annual broadleaf weeds and some annual grasses	flumioxazin, MOA 14 (Chateau) 51 WDG	1.5 oz	0.047	Apply immediately after hilling. A minimum of 2 in. of soil must cover the vegetative portion of the potato plant at the time of application of Chateau. Do NOT apply to emerged potatoes. DO NOT incorporate Chateau or weed control will be reduced. Can be tank mixed with burndown herbicides if weeds are present at application. See label for further instructions.
linuron, MOA 7 (Lorox DF) 50 WDG		1.5 to 3 lb	0.75 to 1.5	Apply just after planting or drag-off or hilling but before crop emerges. If emerged weeds are present, add 1 pt surfactant for each 25 gal spray mixture. Weeds may be up to 3 in. tall at time of application.	

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
POTATOES, IRISH Preplant and Preemergence (continued)		metribuzin, MOA 5 (TriCor DF or Sencor DF) 75 WDG	0.3 to 1.3 lb	0.23 to 1	Apply just after planting or drag-off but before crop emerges. Weeds may be emerged at time of application. On sand soils or sensitive varieties, do not exceed 0.67 lb per acre. See label for list of sensitive varieties.
		rimsulfuron, MOA 2 (Matrix) 25 WDG	1 to 1.5 oz	0.016 to 0.023	Apply after drag-off or hilling but before potatoes and weeds emerge. If emerged weeds are present, add surfactant. See label for rate. Can be tank mixed with Eptam, Prowl, Sencor, Lorox, or Dual Magnum. See label for further instructions.
	Yellow and purple nutsedge	EPTC, MOA 8 (Eptam) 7 EC	3.5 pt	3	For late season preemergence nutsedge control, apply and incorporate as a directed spray to the soil on both sides of the crop row.
POTATOES, IRISH Postemergence	Most annual broadleaf weeds and some annual grasses	metribuzin, MOA 5 (TriCor DF or Sencor DF) 75 WDG	0.33 to 0.67 lb	0.25 to 0.5	Do not use on early maturing smooth-skinned white or red-skinned varieties. Apply only if there have been at least three successive days of sunny weather before application. Treat before weeds are 1 in. tall. Treatment may cause some chlorosis or minor necrosis. Do not apply within 60 days of harvest.
		rimsulfuron, MOA 2 (Matrix) 25 WDG	1 to 1.5 oz	0.016 to 0.023	Apply to young actively growing weeds after crop emergence but before the crop exceeds 14 in. tall. More effective on small weeds. Add nonionic surfactant at 1 to 2 pt per 100 gal water. Can be tank mixed with Eptam or Sencor or some foliar fungicides. See label for further instructions.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses only	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC	6 to 8 oz 9 to 32 oz	0.094 to 0.125 0.07 to 0.25	Apply postemergence for control of grasses. With Arrow, Clethodim, or Select, add 1 qt crop oil concentrate per acre. With Select Max, nonionic surfactant of 2 pt per 100 gal spray mixture can be used instead of crop oil concentrate. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 30 days of harvest.
sethoxydim, MOA 1 (Poast) 1.5 EC		1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply on days that are unusually hot and humid. Do not apply within 30 days of harvest.	
PUMPKINS Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence or transplanting as a band or broadcast treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting or treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray solution or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Not registered for use on seeded crop. Apply prior to transplanting crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds at least 3 days before seeding or transplanting. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
PUMPKINS Preplant and Preemergence (continued)	Annual grasses and some small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Apply preplant and incorporate into the soil 1 to 2 in. (1 in. incorporation is optimum) with a rototiller or tandem disk, or apply to the soil surface after seeding and follow with irrigation. Check replant restrictions for small grains on label. See label for use rate if Prefar 4 EC is used.
		ethalfuralin, MOA 3 (Curbit) 3 EC	3 to 4.5 pt	1.1 to 1.7	Apply to the soil surface immediately after seeding. DO NOT SOIL INCORPORATE. May also be used as a BANDED spray between rows of pumpkin. See label for timing. Shallow cultivation, irrigation, or rainfall within 5 days is needed for good weed control. Do not use under mulches, row covers, or hot caps. Under conditions of unusually cold or wet soil and air temperatures, crop stunting or injury may occur. Crop injury can occur if seeding depth is too shallow.
	Annual grasses and broadleaf weeds	ethalfuralin, MOA 3 + clomazone, MOA 13 (Strategy) 2.1 L	2 to 6 pt	0.4 to 1.2 + 0.125 to 0.375	Apply to the soil surface immediately after crop seeding for preemergence control of weeds. DO NOT APPLY PRIOR TO PLANTING CROP. DO NOT SOIL INCORPORATE. May also be used as a banded treatment between rows after crop emergence or transplanting.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sanda) 75 DG	0.5 to 1 oz	0.024 to 0.048 lb	Row middles only. Apply to row middles as a preemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 30 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.
PUMPKINS Postemergence	Annual grasses and some small-seeded broadleaf weeds	trifluralin, MOA 3 (Treflan, Treflan HFP) 4EC	1 to 1.5 pt	0.5 to 0.75	Row middles only. To improve preemergence control of late emerging weeds. Apply after emergence when crop plants have reached the three to four true leaf stage of growth. Apply as a directed spray to soil between the rows. Avoid contacting foliage as slight crop injury may occur. Set incorporation equipment to move treated soil around base of crop plants. Do not apply within 30 days of harvest.
	Annual and perennial grasses only	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC	6 to 8 oz	0.094 to 0.125	Apply postemergence for control of grasses. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt of nonionic surfactant per 100 gal spray mixture. Adding crop oil concentrate may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 14 days of harvest.
		(Select Max) 1 EC	9 to 16 oz	0.07 to 0.125	
		sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Crop oil may increase the likelihood of crop injury at high temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 14 days of harvest.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sanda) 75 DG	0.5 to 1 oz	0.024 to 0.048 lb	Row middles only. Apply to row middles as a postemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 30 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
RADISH	Annual and perennial grass and broadleaf weeds	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup Weather Max) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before planting. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations may require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and broadleaf weeds	trifluralin, MOA 3 (Treflan, Treflan HFP, Trifluralin Trifluralin HF, Triilin) 4 EC	1 to 1.5 pt	0.5 to 0.75	Apply preplant and incorporate immediately after application for preemergence weed control. Low rate should be used on coarse-textured soil.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Annual and perennial grasses	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	6 to 8 oz 9 to 16 oz	0.94 to 0.125 0.07 to 0.125	Apply postemergence to emerged grasses. See label for rates for specific grasses. With Arrow, Clethodim, or Select, add crop oil concentrate at 1 gal per 100 gal of spray solution. With Select Max, add nonionic surfactant at 2 pt per 100 gal spray mixture. Do not spray within 15 days of harvest.
SPINACH Preemergence	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 1.5 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before crop emergence. Do not feed residue to livestock for 8 weeks. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and broadleaf weeds	cyclohexylethylthio-carbamate, MOA 3 (Ro-Neet) 6E	2 qt	3	Use on sandy mineral soils only. Read label for further instructions.
SPINACH Postemergence	Broadleaf weeds including sowthistle clover, cocklebur, jimsonweed, and ragweed	clopyralid, MOA 4 (Stinger) 3 EC	0.17 to 0.33 pt	0.0625 to 0.125 lb	Apply to spinach in the 2- to 5-leaf stage when weeds are small and actively growing. Will control most legumes. See label for more precautions. Do not apply within 21 days of harvest.
	Broadleaf weeds	phenmedipham, MOA 6 (Spin-aid) 1.3 EC	3 to 6 pt	0.5 to 1	For processing spinach only. Do not use when expected high temperatures will be above 75°F. For best results, spray when weeds are in the two-leaf stage. Use the 6-pt rate only on well-established crops that are not under stress. Do not apply within 40 days of harvest. Spinach plants must have more than six true leaves.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Annual and perennial grasses only	sethoxydim, MOA 1 (Poast) 1.5 EC clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	1 to 1.5 pt 6 to 8 oz 9 to 16 oz	0.2 to 0.3 0.094 to 0.125 0.07 to 0.125	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. For sethoxydim, add 1 qt of crop oil concentrate per acre. For Arrow, Clethodim, or Select, add 1 gal of crop oil concentrate per 100 gal spray solution. For Select Max, add nonionic surfactant at 2 pt per 100 gal of spray mixture. Adding crop oil to Poast or Select may increase the likelihood of crop injury at high air temperatures. Do not apply Poast, Arrow, Clethodim, or Select on days that are unusually hot and humid. Do not apply sethoxydim within 15 days of harvest or clethodim within 14 days of harvest.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
SQUASH Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before transplanting or crop emergence as a band or broadcast treatment over a preformed row. Use sufficient water to give thorough coverage. Row should be formed several days ahead of planting or treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply prior to transplanting crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds at least 3 days before seeding or transplanting. When applying Roundup before transplanting crops into plastic mulch, care must be taken to remove residues of this product from the plastic prior to transplanting. To prevent crop injury, residues can be removed by 0.5 in. natural rainfall or by applying water via a sprinkler system. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses and small-seeded broadleaf weeds	bensulide, MOA 8 (Prefar) 4 EC	5 to 6 qt	5 to 6	Apply preplant and incorporate into the soil 1 to 2 in. (1 in. incorporation is optimum) with a rototiller or tandem disk, or apply to the soil surface after seeding and follow by irrigation. Check replant restrictions for small grains on label.
		ethalfuralin, MOA 3 (Curbit) 3 EC	1.5 to 2 pt 3 to 4.5 pt	0.56 to .75 1.1 to 1.7	For squash grown on bare ground only. Apply to the soil surface immediately after seeding. Do not soil incorporate. Seed must be covered with soil to prevent crop injury. For coarse-textured soils, use lowest rate of rate range. Shallow cultivation, irrigation, or rainfall within 5 days is needed for good weed control. If weather is unusually cold or soil wet and cold, crop stunting or injury may occur. Crop injury can also occur if seeding depth is too shallow. See label for further precautions and instruction. For squash grown on plastic only. Apply to the soil surface between the rows of black plastic immediately after seeding or transplanting. Do not use under mulches, row covers, or hot caps. Do not apply prior to planting or over plastic. See label for further instruction.
	Annual grasses and broadleaf weeds	ethalfuralin, MOA 3 + clomazone, 13 (Strategy) 2.1 L	2 to 6 pt	0.4 to 1.2 + 0.125 to 0.375	Apply to the soil surface immediately after crop seeding for preemergence control of weeds. DO NOT APPLY PRIOR TO PLANTING CROP. DO NOT SOIL INCORPORATE. May also be used as a banded treatment between rows after crop emergence or transplanting.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 1 oz	0.024 to 0.048 lb	Row middles only. Apply to row middles as preemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 30 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.
SQUASH Postemergence	Annual grasses and small-seeded broadleaf weeds	trifluralin, MOA 3 (Treflan, Treflan HFP) 4EC	1 to 1.5 pt	0.5 to 0.75	Row middles only. To improve preemergence control of late emerging weeds. Apply after emergence when crop plants have reached the three to four true leaf stage of growth. Apply as a directed spray to soil between the rows. Avoid contacting foliage as slight crop injury may occur. Set incorporation equipment to move treated soil around base of crop plants. Do not apply within 30 days of harvest. Will not control emerged weeds.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
SQUASH Postemergence (continued)	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 1 oz	0.024 to 0.048 lb	Row middles only. Apply to row middles as postemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 30 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.
	Annual and perennial grasses only	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	6 to 8 oz 9 to 16 oz	0.094 to 0.125 0.07 to 0.125	Apply postemergence for control of grasses. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt of nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 14 days of harvest.
		sethoxydim, MOA 1 (Poast)1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 14 days of harvest.
SWEETPOTATO Preplant and Preemergence	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds before transplanting. Do not feed crop residue to livestock for 8 weeks following treatment. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations may require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual broadleaf weeds including pigweed	flumioxazin, MOA 14 (Valor) 51 WDG	3 oz	0.094	Apply 2 to 5 days prior to transplanting crop for control of many annual broadleaf weeds and annual sedges. Movement of soil during transplanting should not occur or reduced weed control may result. Do not use on greenhouse-grown transplants. Do not apply postemergence or serious crop injury will occur. Do not use on transplants harvested more than 2 days prior to transplanting. Do not use on transplant propagation beds. See label for instruction on use.
	Annual grasses and broadleaf weeds	clomazone, MOA 13 (Command) 3 ME	up to 2 pt	up to 0.75	Posttransplant. Apply within 5 days after transplanting for preemergence control. Weak on pigweed. See label for preharvest interval and other instructions and precautions.
DCPA, MOA 3 (Dacthal) W-75 (Dacthal) 6 F		8 to 10 lb 8 to 10 pt	6 to 7.5	Apply to the soil surface immediately after transplanting. May also be applied at layby for preemergence weed control late in the growing season. Applying herbicide in bands over row will reduce cost. Do not apply in plant beds or crop injury will occur.	
napropamide, MOA 15 (Devrinol) 50 DF		2 to 4 lb	1 to 2	PLANT BEDS. Apply to the soil surface after sweetpotato roots are covered with soil but prior to soil cracking and sweetpotato plant emergence. Does not control emerged weeds. Check label for more information. PRODUCTION FIELDS. Apply to the soil surface immediately after transplanting. If rainfall does not occur within 24 hr, shallow incorporate or irrigate with sufficient water to wet the soil to a depth of 2 to 4 in. Check label for more information.	
SWEETPOTATO Postemergence	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (Roundup WeatherMax) 5.5 L	11 to 22 oz	0.5 to 0.94	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
SWEETPOTATO Postemergence (continued)	Annual and perennial grasses only	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	6 to 16 oz 9 to 32 oz	0.094 to 0.25 0.07 to 0.25	Apply postemergence for control of grasses. For Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. For Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 30 days of harvest.
		fluazifop, MOA 1 (Fusilade DX) 2 EC	6 to 16 oz	0.1 to 0.25	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate or 1 qt nonionic surfactant per 100 gal spray mix. Do not apply Fusilade on days that are unusually hot and humid. Do not apply within 55 days of harvest.
		sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 30 days of harvest.
TOMATOES Preplant and Preemergence	Most annual and perennial weeds	methyl bromide	various	240	Inject into the soil 4 to 6 in. deep and cover with tarp immediately. Soil moisture should be near field capacity and soil temperature should be at least 50°F at the treatment depth. Allow 2 weeks after application before seeding or transplanting. If plastic tarp is removed, disking before planting will facilitate aeration.
	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before transplanting as a broadcast or band treatment over a preformed row. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Not registered for seeded crop. Apply prior to transplanting of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sanda) 75 DG	0.5 to 1 oz	0.024 to 0.048	For preemergence application, apply no sooner than 14 days after transplanting. For pretransplant application under plastic mulch, apply to pre-formed bed just prior to plastic mulch application and delay transplanting at least 7 days. Early season application will give postemergence and preemergence control. The 1 oz rate is for preemergence and postemergence control in row middles. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution. Do not apply within 30 days of harvest.
	Yellow nutsedge, annual grasses, and broadleaf weeds	S-metolachlor, MOA 15 (Dual MAGNUM) 7.62 EC	1 to 2 pt	0.95 to 1.50 lb	Apply preplant or postdirected to transplants after the first settling rain or irrigation. In plasticulture, apply to pre-formed beds just prior to applying plastic mulch. Minimize contact with crop. Do not apply within 90 days of harvest. Also registered for use in row middles, and in seeded crop. See label for further instructions.
	Annual grasses and broadleaf weeds, including jimsonweed, common ragweed, smartweed, and velvetleaf	metribuzin, MOA 5 (TriCor DF) 75 WDG (Metri) 4 F	0.33 to 0.67 lb 0.5 to 1 pt	0.25 to 0.5	Apply to soil surface and incorporate 2 to 4 in. deep before transplanting. See label for instructions. Can be applied with trifluralin.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
TOMATOES Preplant and Preemergence (continued)	Annual grasses and small-seeded broadleaf weeds	napropamide, MOA 15 (Devrinol) 50 DF	2 to 4 lb	1 to 2	Bare ground: Apply preplant and incorporate into the soil 1 to 2 in. as soon as possible with a rototiller or tandem disk. Can be used on direct-seeded or transplanted tomatoes. See label for instructions on use. Plasticulture: Apply preplant and incorporate into the soil 1 to 2 in. as soon as possible with a rototiller or tandem disk. May be applied prior to laying plastic or between plastic if irrigation is available. In-row: Apply to a weed-free soil before laying plastic mulch. Soil should be well worked yet moist enough to permit a thorough incorporation to a depth of 2 inches. Incorporate on the same day as applied using equipment that will result in uniform incorporation of the herbicide to the desired depth. Then lay plastic mulch. If weed pressure is from small seeded annuals, apply to the surface of the bed immediately in front of the laying of plastic mulch. If soil is dry, water or sprinkle irrigate with sufficient water to wet to a depth of 2 to 4 inches before covering with plastic mulch. Apply the plastic mulch over the treated soil the same day. Between rows: Apply to a weed-free soil between the rows of plastic. Apply Devrinol within 24 hours of rainfall, or mechanically incorporate or irrigate Devrinol into the soil to a depth of 1 to 2 inches within 24 hours of application.
		pendimethalin, MOA 3 (Prowl H ₂ O) 3.8	1 to 3 pt	0.5 to 1.5	Do not apply more than 3 pt per acre per season. See label for specific use rate for your soil type. Emerged weeds will not be controlled. Avoid direct contact with tomato foliage or stems. Do not apply within 70 days of harvest. See label for further instructions and precautions. Between rows. Can be applied as a post-directed spray on the soil at the base of the plant, beneath plants, and between rows. In-row. May be applied as a broadcast preplant incorporated surface application prior to transplanting tomatoes. Do not apply Prowl H ₂ O to the bed if using plasticulture production system.
		trifluralin, MOA 3 (Treflan HFP) 4 EC (Trifluralin) 4 EC (Trifluralin HF) 4 EC (Trilin) 4 EC	1 pt	0.5	Apply pretransplant and incorporate into the soil 2 to 3 in. within 8 hr using a rototiller or tandem disk.
	Broadleaf weeds and a few annual grasses	oxyfluorfen, MOA 14 (Goal) 2 XL	Up to 2 pints	0.5 lb	Plasticulture only. Apply to soil surface of pre-formed beds at least 30 days prior to transplanting crop for control of many broadleaf weeds including Carolina geranium and cutleaf eveningprimrose. While incorporation is not necessary, it may result in less crop injury. Plastic mulch can be applied anytime after application but best results are likely if applied soon after application.
TOMATOES Postemergence	Annual grasses and broadleaf weeds, including cocklebur, common ragweed, smartweed, and velvetleaf	trifluralin, MOA 3 (Trifluralin) 4 EC + metribuzin, MOA 5 (Sencor DF) 75 WDG	1 pt + 0.33 to 0.67 lb	0.5 + 0.25 to 0.5	Apply pretransplant and incorporate to a depth of 2 to 3 in. within 8 hr, using a rototiller or tandem disk. See label for further instructions.
	Annual grasses and small-seeded broadleaf weeds	DCPA, MOA 3 (Dacthal) W-75 (Dacthal) 6 F	8 to 10 lb 8 to 10 pt	6 to 7.5	Apply over the top of transplants only between 4 to 6 wk after transplanting to improve preemergence control of late emerging weeds. Will not control emerged weeds.
TOMATOES Postemergence	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 1 oz	0.024 to 0.048 lb	For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution. Some weeds, such as nutsedge, may require two applications of Sandea; if a second application is needed, spot-treat only weed-infested areas. Do not apply within 30 days of harvest. See label for further instructions.
	Annual grasses and broadleaf weeds, including cocklebur, common ragweed, smartweed, velvetleaf, jimsonweed, yellow nutsedge, and morningglory	metribuzin, MOA 5 (TriCor DF or Sencor DF) 75 WDG	0.33 to 1.33 lb	0.25 to 1	Use either as a broadcast or directed spray but do not exceed 0.5 lb a.i. with a broadcast spray. Do not apply within 7 days of harvest. Do not exceed 1 lb a.i. per year. Do not apply as a broadcast spray unless 3 sunny days precede application.
	Annual grasses and small-seeded broadleaf weeds	DCPA, MOA 3 (Dacthal) W-75 (Dacthal) 6 F	8 to 10 lb 8 to 10 pt	6 to 7.5	Apply over the top of transplants only between 4 to 6 wk after transplanting to improve preemergence control of late emerging weeds. Will not control emerged weeds.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
TOMATOES Postemergence (continued)	Contact kill of all green foliage	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 pt 2 pt	0.47	Row middles only. Apply in a minimum of 20 gal spray mix per acre as a shielded spray to emerged weeds between rows of tomatoes. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix. Do not apply within 30 days of harvest.
	Most broadleaf weeds including wild radish, common purslane, redroot and smooth pigweed	rimsulfuron, MOA 2 (Matrix) 25 WDG	1 to 2 oz	0.25 to 0.5 oz	Apply in tomatoes after the crop has at least two true leaves and weeds are small (1 in. or less) and actively growing. Add nonionic surfactant at 1 qt per 100 gal of spray solution. Do not apply within 45 days of tomato harvest. See label for further instruction.
	Yellow nutsedge, morningglory, common cocklebur, common lambsquarters, and other broadleaf weeds	trifloxysulfuron-sodium, MOA 2 (Envoke) 75 DG	0.1 to 0.2 oz	0.0047 to 0.0094	In row. Apply post-directed to tomato grown on plastic for control of nutsedge and certain broadleaf weeds. Crop should be transplanted at least 14 days prior to application. The application should be made prior to fruit set and at least 45 days prior to harvest. Use nonionic surfactant at 1 qt per 100 gal spray solution with all applications. Row middles. Apply for control of nutsedge and certain broadleaf weeds. Crop should be transplanted at least 14 days prior to application. Use nonionic surfactant at 1 qt per 100 gal spray solution with all applications. See label for information on registered tank mixes. Tank mixtures with Select or Poast may reduce grass control. See label for more information.
	Annual and perennial grasses only		clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC (Select Max) 1 EC	6 to 16 fl oz 9 to 32 oz	0.094 to 0.25 0.07 to 0.25
sethoxydim, MOA 1 (Poast) 1.5 EC			1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 20 days of harvest.
WATERMELONS Preplant and Preemergence	Contact kill of all green foliage. Stale bed application.	paraquat, MOA 22 (Firestorm) 3 SL (Gramoxone Inteon) 2 SL	1.3 to 2.7 pt 2 to 4 pt	0.5 to 1	Apply in a minimum of 20 gal spray mix per acre to emerged weeds before crop emergence or transplanting as a broadcast or band treatment over a preformed row. Row should be formed several days ahead of planting and treating to allow maximum weed emergence. Plant with a minimum of soil movement for best results. Use a nonionic surfactant at a rate of 16 to 32 oz per 100 gal spray mix or 1 gal approved crop oil concentrate per 100 gal spray mix.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Not registered for seeded crop. Apply prior to transplanting of crop for control of emerged weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grasses. Can be tank mixed with other registered burndown herbicides.
	Annual and perennial grass and broadleaf weeds. Stale bed application.	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	1 to 3 pt 0.8 to 2.4 pt 11 to 32 oz	0.5 to 1.5	Apply to emerged weeds at least 3 days before seeding or transplanting. When applying Roundup before transplanting crops into plastic mulch, care must be taken to remove residues of this product from the plastic prior to transplanting. To prevent crop injury, residues can be removed by 0.5 in. natural rainfall or by applying water via a sprinkler system. Perennial weeds may require higher rates of glyphosate. Consult the manufacturer's label for rates for specific weeds. Certain glyphosate formulations require the addition of a surfactant. Adding nonionic surfactant to glyphosate formulated with nonionic surfactant may result in reduced weed control.
	Annual grasses	bensulide, MOA 8 (Prefer) 4 E	5 to 6 qt	5 to 6	Apply preplant and incorporate into the soil 1 to 2 in. (1 in. incorporation is optimum) with a rototiller or tandem disk, or apply to the soil surface after seeding and follow with irrigation. Check replant restrictions for small grains on label.
	Broadleaf weeds, including cocklebur, jimsonweed, ragweed, smartweed, and velvetleaf	naptalam, MOA 19 (Alanap) 2 EC	4 to 8 qt	2 to 4	Seeded crop. Apply to the soil surface immediately after planting. Control will not be good if rainfall or irrigation does not occur within 5 days. Transplanted crop. Apply as postemergence spray immediately after transplanting. Do NOT apply over or under mulch.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
WATERMELONS Preplant and Preemergence (continued)	Annual grasses and broadleaf weeds, including cocklebur, jimsonweed, ragweed, smartweed, and velvetleaf	bensulide, MOA 8 (Prefar) 4 E + naptalam, MOA 19 (Alanap) 2 EC	4 to 6 qt + 4 to 8 qt	4 to 6 + 2 to 4	Apply preplant and incorporate into the soil 0.5 to 1 in. before planting. Irrigation or rainfall within 5 days will greatly improve control. Check replant restrictions for small grains on Prefar label. Deep incorporation will lead to reduced weed control.
	Annual grasses and broadleaf weeds	clomazone, MOA 13 (Command) 3 ME	0.4 to 0.67 pt	0.15 to 0.25	Apply immediately after seeding, or just prior to transplanting with transplanted crop. Roots of transplants must be below the chemical barrier when planting. Offers weak control of pigweed. See label for further instructions.
	Annual grasses and some small-seeded broadleaf weeds	ethalfuralin, MOA 3 (Curbit) 3 EC	3 to 4.5 pt	1.1 to 1.7	Apply to the soil surface immediately after seeding. DO NOT SOIL INCORPORATE. May also be used as a BANDED spray BETWEEN rows of plastic mulch. See label for timing. Shallow cultivation, irrigation, or rainfall within 5 days is needed for good weed control. Do not use under mulches, row covers, or hot caps. Under conditions of unusually cold or wet soil and air temperatures, crop stunting or injury may occur. Crop injury can occur if seeding depth is too shallow.
	Annual grasses and broadleaf weeds	ethalfuralin, MOA 3 + clomazone, MOA 13 (Strategy) 2.1 L	2 to 6 pt	0.4 to 1.2 + 0.125 to 0.375	Apply to the soil surface immediately after crop seeding for preemergence control of weeds. DO NOT APPLY PRIOR TO PLANTING. DO NOT SOIL INCORPORATE. May also be used as a banded treatment between rows after crop emergence or transplanting.
	Broadleaf weeds	terbacil, MOA 5 (Sinbar) 80 WP	2 to 4 oz	0.1 to 0.2	Apply after seeding but before crop emerges, or prior to transplanting crop. With plasticulture, Sinbar may be applied preemergence under plastic mulch or to row middles. May be applied over plastic mulch prior to transplanting, or prior to punching holes into the plastic mulch for transplanting. Sinbar must be washed off the surface of the plastic mulch with a minimum of 0.5 in. of rainfall or irrigation prior to punching transplant holes or transplanting watermelon. Do not apply within 70 days of harvest. See label for further instructions.
	Yellow and purple nutsedge suppression, pigweed and ragweed control	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 0.75 oz	0.024 to 0.036	Bareground. Apply after seeding but before cracking or prior to transplanting crop. Plasticulture. Application may be made to preformed beds prior to laying plastic. If application is made prior to planting, wait 7 days after application to seed or transplant. Stunting may occur but should be short lived with no negative effects on yield or maturity in favorable growing conditions. SEE LABEL FOR INFORMATION ON ROTATION RESTRICTIONS AND OTHER RESTRICTIONS.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sandea) 75 DG	0.5 to 1 oz	0.024 to 0.048 lb	Row middles only. Apply to row middles as a preemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 57 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.
WATERMELONS Postemergence	Annual grasses and some small-seeded broadleaf weeds	trifluralin, MOA 3 (Treflan HFP, Trifluralin, Trifluralin HF) 4EC	1 to 2 pt	0.5 to 0.75	Row middles only. To improve preemergence control of late emerging weeds. Apply after emergence when crop plants have reached the three to four true leaf stage of growth. Apply as a directed spray to soil between the rows. Avoid contacting foliage as slight crop injury may occur. Set incorporation equipment to move treated soil around base of crop plants. Do not apply within 60 days of harvest. Will not control emerged weeds.
		DCPA, MOA 3 (Dacthal) W-75 (Dacthal), 6 F	8 to 10 lb 8 to 10 pt	6 to 7.5	Not labeled for transplanted crop. To improve preemergence control of late emerging weeds. Apply only when crop has four to five true leaves, is well-established, and growing conditions are favorable. Will not control emerged weeds. Incorporation not recommended.
	Broadleaf weeds	naptalam, MOA 19 (Alanap) 2 EC	4 to 8 qt	2 to 4	Apply postemergence before crop is ready to vine for preemergence control of late emerging weeds and suppression of pigweed and common lambsquarters 1 to 2 in. tall. Do not mix with crop oil.

TABLE 8-17. CHEMICAL WEED CONTROL IN VEGETABLE CROPS

Crop	Weed	Herbicide, Mode of Action Code* and Formulation	Amount of Formulation Per Acre	Pounds Active Ingredient Per Acre	Precautions and Remarks
WATERMELONS Postemergence (continued)	Annual and perennial grasses only	clethodim, MOA 1 (Arrow, Clethodim, Select) 2 EC	6 to 8 oz	0.094 to 0.125 0.07 to 0.125	Apply postemergence for control of grasses. With Arrow, Clethodim, or Select, add 1 gal crop oil concentrate per 100 gal spray mix. With Select Max, add 2 pt nonionic surfactant per 100 gal spray mixture. Adding crop oil may increase the likelihood of crop injury at high air temperatures. Very effective in controlling annual bluegrass. Apply to actively growing grasses not under drought stress. Do not apply within 14 days of harvest.
		(Select Max) 1 EC	9 to 16 oz		
		sethoxydim, MOA 1 (Poast) 1.5 EC	1 to 1.5 pt	0.2 to 0.3	Apply to emerged grasses. Consult manufacturer's label for specific rates and best times to treat. Add 1 qt of crop oil concentrate per acre. Adding crop oil to Poast may increase the likelihood of crop injury at high air temperatures. Do not apply Poast on days that are unusually hot and humid. Do not apply within 14 days of harvest.
	Most broadleaf weeds	carfentrazone-ethyl, MOA 14 (Aim) 1.9 EW or 2 EC	up to 2 oz	up to 0.031	Apply post-directed using hooded sprayers for control of emerged weeds. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 in. tall or rosettes less than 3 in. across. Use a nonionic surfactant or crop oil with Aim. See label for rate. Coverage is essential for good weed control. Does not control grass weeds. Can be tank mixed with other registered herbicides.
	Most emerged weeds	glyphosate, MOA 9 (various brands) 4 SL (various brands) 5 SL (Roundup WeatherMax) 5.5 L	11 to 32 oz 1 to 3 pt 0.8 to 2.4 pt	0.5 to 1.5	Row middles only. Apply as a hooded spray in row middles, as shielded spray in row middles, as wiper applications in row middles, or post harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed, roots, or fruit of crop. Do not apply within 14 days of harvest.
	Yellow and purple nutsedge and broadleaf weeds	halosulfuron-methyl, MOA 2 (Sanda) 75 DG	0.5 to 1 oz	0.024 to 0.048	Row middles only. Apply to row middles as a postemergence spray. In plasticulture, do not allow spray to contact plastic. Early season application will give postemergence and preemergence control. Do not apply within 57 days of harvest. For postemergence applications, use nonionic surfactant at 1 qt per 100 gal of spray solution.

* Mode of action (MOA) code developed by the Weed Science Society of America. See Section 8-11, Herbicide Resistance Management, for details.