

Onion: dry bulb onion on high organic soils

Planting

Plant seeds, transplants, or “sets” in April to early May. Choose deep, fertile soils and provide adequate drainage. Rotate onions with other vegetable crops. Onions work well in rotation with potatoes or carrots.

In the field

Rows: Direct-seeded onions are usually planted in paired rows, 16–24 inches apart.

Plants in row: 6–12/ft (120,000–160,000 seeds/a). For transplants, set 4–6 inches apart (60,000–100,000 plants/a).

In beds

Rows: 6–9 inches with 6–8 rows/bed.

Plants in row: 6–12/ft.

Lime and fertilizer

Lime: Use dolomitic limestone to maintain a pH of 5.4 or higher in organic soils and at least 5.6 in other soils.

Fertilizer rates: Apply P_2O_5 and K_2O according to soil test recommendations. Use annual nitrogen, P_2O_5 , and K_2O recommendations in table below. Take credits for previous legume crops and manure.

Application: Broadcast and work in before planting. For most efficient use of nitrogen, split recommended rate into two or more applications during the season.

Micronutrients: Onions need relatively high amounts of manganese, copper, zinc, and molybdenum. Use soil and plant analyses to check for deficiencies of these nutrients. Specific recommendations vary with fertilizer sources, soil, and method of application.

Annual nitrogen, phosphate, and potash recommendations for onion

Nitrogen		Phosphate and potash		
Organic matter (%)	Amount to apply (lb/a)	Yield goal (cwt/a)	Amount P_2O_5 to apply* (lb/a)	Amount K_2O to apply* (lb/a)
<2	150	400–600	60	130
2.0–9.9	140			
10–20	130			
>20	120			

*Amounts shown are for optimum (O) soil test levels. Apply 50% of this rate if soil test is high (H) and omit if soil test is excessively high (EH). If soil test is low (L) or very low (VL), increase rates according to soil test recommendations.

Disease control in onion

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Bacterial blight	copper hydroxide	0.67–1.0 pt Champ Formula II Flowable	0	Can aid in limiting spread of bacterial pathogens of onion. May cause phytotoxicity if rate is high, low sprayer volumes are used, and/or temperatures are high.
		0.75–1.5 lb Kocide 3000 1.5 lb Kocide 2000		
Downy mildew	acibenzolar-S-methyl	0.75–1.0 oz Actigard 50WG		For suppression of downy mildew. Do not apply on stressed plants. Can aid in virus and bacterial disease suppression.
	ametoctradin + dimethomorph	14.0 fl oz Zampro	0	Use no more than 42.0 fl oz/a per season. Do not make more than 2 sequential applications before alternating to a fungicide with a different mode of action.
	azoxystrobin	9.0–15.5 fl oz Quadris Flowable	0	Quadris and Cabrio belong to the Group 11 (strobilurin) fungicide category. Do not exceed 1 application of any of these products before alternating with a fungicide having a different mode of action. Do not exceed 4 applications of strobilurin fungicides per year.
	pyraclostrobin	12.0 oz Cabrio EG	7	
	azoxystrobin + chlorothalonil	2.4–3.7 pt Quadris Opti	14	Do not apply more than one foliar application without alternating to a fungicide with a different mode of action. See label for specifications on tank mixing.
	boscalid + pyraclostrobin	18.5 oz Coronet, Pristine WDG	7	Disease suppression only. Pristine belongs to Groups 7 and 11 fungicide categories. Do not exceed 1 application of Pristine before alternating to a labeled fungicide with a different mode of action. Do not exceed 4 applications of Pristine or other Group 11 fungicide per season. Do not exceed 111.0 oz/a Pristine per season.
	cymoxanil + famoxadone	8.0 oz Tanos	3	Alternate applications with fungicides of different modes of action for fungicide resistance management. Do not apply more than 84.0 oz/a per season Tanos.
	dimethomorph	6.0 oz Forum	0	Tank mix Forum with another fungicide active against downy mildew and having a different mode of action. Do not make more than 2 sequential applications of Forum before alternating to another effective fungicide. Do not make more than 5 applications or use more than 30.0 oz/a per season.
	fluazinam	1.0 pt Omega	7	Do not make more than 6 applications/a per year. Do not use with an adjuvant.
	fluopicolide	3.0–4.0 fl oz Presidio	2	Tank mix with a fungicide of a different mode of action for fungicide resistance management.
	fosetyl-al	2.0–3.0 lb Aliette WDG, Linebacker WDG	7	Begin applications when conditions favor disease development (high moisture and moderate temperatures). Repeat at 7- to 14-day intervals. If disease is already present, treat at 3.0 lb/a and repeat at 7-day intervals. Do not exceed seven sprays per year.
	mancozeb	1.6–2.4 qt Penncozeb 4FL	7	Consult labels for seasonal product limits. Do not apply to exposed bulbs. Spray every 7–10 days depending on weather conditions.
		2.4 qt Dithane F-45, Manzate Flowable	7	
2.0–3.0 lb Penncozeb 75DF, Penncozeb 80WP		7		
3.0 lb Dithane DF Rainshield, Koverall, Manzate Pro-Stick		7		
mancozeb + zoxamide	1.5–2.0 lb Gavel 75 DF	7	Do not apply to exposed bulbs. Do not make more than 8 applications/a per season.	

(continued)

Eggplant

Hops

Horse radish

Leafy greens

Melon

Mint

Onion

Disease control in onion *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Downy mildew <i>(cont.)</i>	mandipropamid	8.0 fl oz Revus	7	Do not make more than 2 consecutive applications before switching to another effective non-Group 40 fungicide. Do not exceed 32.0 fl oz/a of product per season.
	mefenoxam	2.5 lb Ridomil Gold Bravo	7 (dry bulb) 14 (green)	Spray at 14-day intervals when conditions are favorable for disease, alternating sprays with other protective fungicides. Limit of 4 applications on dry bulb onions and 3 applications on green onions.
		2.5 lb Ridomil Gold MZ	7 (dry bulb)	Spray at 14-day intervals when conditions are favorable for disease, alternating sprays with other protective fungicides. Use up to 4 applications on dry bulb onions.
	oxathiapiprolin	2.0–4.8 fl oz Orondis Ultra A	0	Make no more than 2 sequential applications before rotating to a fungicide with a different mode of action. Do not exceed 19.2 fl oz/a per year. Begin foliar applications prior to disease development and continue on a 5- to 10-day interval. Do not use Orondis Ultra A as a foliar application if you have already used Orondis Gold 200 on the soil at time of planting.
	phosphoric acid salts	2.0 qt Alude/100 gal water	0	Apply preventively and on a regular basis to manage disease.
		1.0–2.0 qt Fungi-Phite/30 gal water		Do not make more than 6 applications/a per year.
		1.0–4.0 qt K-Phite/20 gal water		
		2.5–3.75 pt Phostrol		Do not make more than 7 applications/a per season.
	potassium phosphite	1.0–3.0 qt Fosphite/100 gal water	0	Do not apply at intervals less than 3 days. Do not apply to heat- or moisture-stressed plants.
		4.0 pt ProPhyt		Make no more than 7 applications/a per year. Apply in 20.0–50.0 gal water.
potassium phosphite + tebuconazole	2.0–3.0 pt Viathon	7	Apply preventively. Apply no more than 6.0 pt/a per season.	
Fusarium basal rot	<i>Plant resistant varieties such as Fusario 24, Nugget, Hickory, and Nutmeg. Harvestmore has some tolerance to basal rot.</i>			
Leaf blight <i>(Botrytis)</i> and purple blotch <i>(Alternaria)</i>	azoxystrobin + chlorothalonil	1.6–3.2 pt Quadris Opti	14	Do not apply more than one foliar application without alternating to a fungicide with a different mode of action. See label for specifications on tank mixing.
	azoxystrobin + difenoconazole	12.0–14.0 fl oz Quadris Top	7	Quadris Top and Cabrio belong to the Group 11 (strobilurin) fungicide category. Do not exceed 1 application of Group 11 products before alternating with a fungicide having a different mode of action. Do not exceed 4 applications of strobilurin fungicides per year. Do not exceed 56.0 fl oz Quadris Top (dry bulb) and 72.0 oz/a Cabrio per season.
	pyraclostrobin	8.0–12.0 oz Cabrio EG	7	
	boscalid	6.8 oz Endura WDG	7	Endura belongs to the Group 7 (anilide) fungicide category. Do not exceed 2 sequential applications of Endura before alternating to a labeled fungicide with a different mode of action. Do not exceed 6 applications per season. Do not exceed 41.0 oz/a Endura per season. Note comments on Pristine below.

(continued)

Disease control in onion *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Leaf blight and purple blotch <i>(cont.)</i>	boscalid + pyraclostrobin	10.5–18.5 oz Pristine WDG	7	Pristine belongs to Groups 7 and 11 fungicide categories. Do not exceed 2 sequential applications of Pristine before alternating to a labeled fungicide with a different mode of action. Do not exceed 4 applications of Pristine or other Group 11 fungicide per season. Do not exceed 111.0 oz/a Pristine per season.
	chlorothalonil	1.0–3.0 pt Bravo Weather Stik, Echo 720, Equus 720	7	Do not exceed 15.0 lb ai/a chlorothalonil per season. Spray every 7–10 days during the growing season (more frequently during periods favoring the disease). You can alternate chlorothalonil with mancozeb. Do not use on Sweet Spanish onions. Excessive use can reduce yields.
		1.5–4.25 pt Bravo Zn, Echo Zn, Equus 500 Zn	7	
		0.875–1.625 lb Echo 90DF	7	
		0.9–2.7 lb Bravo Ultrex 82.5WDG, Equus DF	7	
	cyprodinil	10.0 oz Vangard WG	7	Do not apply more than 28.0 oz/a per plot per year of Vangard. Do not exceed 2 sequential applications of Vangard before alternating to a labeled fungicide with a different mode of action.
	cyprodinil + fludioxonil	11.0–14.0 oz Switch 62.5WG	7	Do not exceed 56.0 oz product per year per acre. Do not plant rotational crops other than strawberries or onions for 12 months following the last application.
	difenoconazole + cyprodinil	16.0–20.0 fl oz Inspire Super		For bulb onions, do not apply within 7 days of harvest. For green onions, do not apply within 14 days of harvest.
	fluazinam	1.0 pt Omega	7	Do not make more than 6 applications/a per year. Do not use with an adjuvant.
	fluxapyroxad + pyraclostrobin	4.0–11.0 fl oz Merivon	7	Also provides suppression of downy mildew. Controls Stemphylium and Botrytis at higher rates.
	iprodione	1.5 pt Iprodione 4L AG, Meteor, Nevado 4F, Rovral 4F	7	Spray every 7 days during the growing season (more often during periods favoring the disease).
	mancozeb	1.6–2.4 qt Penncozeb 4FL	7	Consult labels for seasonal product limits. Do not apply to exposed bulbs. Spray every 7–10 days depending on weather conditions. Mancozeb will also control downy mildew.
		2.4 qt Dithane F-45, Manzate Flowable	7	
2.0–3.0 lb Penncozeb 75DF, Penncozeb 80WP		7		
3.0 lb Dithane DF Rainshield, Manzate Pro-Stick		7		
penthiopyrad	16.0–24.0 fl oz Fontelis	3	Do not apply more than 72.0 fl oz/a per season. Make no more than 2 sequential applications before alternating to a fungicide with a different mode of action.	
pyrimethanil	18.0 fl oz Scala SC alone 9.0–18.0 fl oz Scala SC in tank mix	7	Scala belongs to the Group 9 fungicide category. Use the 9.0 fl oz rate of Scala in a tank mix with a broad-spectrum fungicide. Alternating the tank mix combination with a broad-spectrum fungicide is a resistance management strategy.	
zoxamide + mancozeb	1.5–2.0 lb Gavel 75 DF	7	Do not apply to exposed bulbs. Do not make more than 8 applications/a per year.	

(continued)

Eggplant

Hops

Horse radish

Leafy greens

Melon

Mint

Onion

Disease control in onion *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Neck rot	<i>Plant varieties that mature properly so neck tissues dry before storage; undercut and windrow onions until inside neck tissues are dry before topping and storing. Forced heated air at 93–95°F for 5 days at the beginning of the storage period may help.</i>			
Pink root	<i>Long rotation with unrelated crops and use good crop management to promote healthy plant growth.</i>			
Purple blotch	azoxystrobin	6.0–12.0 fl oz Aframe, Quadris Flowable, Satori	0	Quadris, Satori, and Cabrio belong to the strobilurin group of fungicides. Do not exceed 1 application of these products before alternating with a fungicide having a different mode of action. Do not exceed 4 applications of strobilurin fungicides per year. Do not exceed 2.88 qt/a Quadris or Satori, or 72.0 oz/a Cabrio per season.
	pyraclostrobin	8.0–12.0 oz Cabrio EG	7	
	azoxystrobin + propiconazole	14.0–27.5 fl oz Quilt	14 (dry bulb) 0 (green)	Do not apply more than 55.3 fl oz/a per season of Quilt.
	cymoxanil + famoxadone	8.0 oz Tanos	3	Alternate applications with fungicides of different modes of action for fungicide resistance management. Do not apply more than 84.0 oz/a per season Tanos.
	propiconazole	4.0–8.0 fl oz AmTide Propiconazole 41.8% EC, Bumper 41.8 EC, Fitness, Propicure 3.6F, PropiMax EC, Tilt, Topaz <i>or</i>	0 (green onions) 14 (dry bulb)	Do not apply more than 16.0 fl oz/a per season. Use a wetting agent for optimum control.
		2.0–4.0 fl oz AmTide Propiconazole 41.8% EC, Bumper 41.8 EC, Fitness, Propicure 3.6F, PropiMax EC, Tilt, Topaz, with tank-mix partner		
	tebuconazole	4.0–6.0 fl oz Folicur 3.6 F, Monsoon, Onset 3.6L, Orius 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol, Toledo	7	Do not exceed 12.0 fl oz/a per season. To optimize result, apply preventively.
Purple blotch and downy mildew	azoxystrobin + propiconazole	<i>purple blotch</i> : 14.0–21.0 fl oz Quilt Xcel	0 (green onions)	Do not apply more than 56.0 fl oz/a of Quilt Xcel per crop. Mixing with products formulated as an EC may result in phytotoxicity.
		<i>downy mildew</i> : 17.5–26.0 fl oz Quilt Xcel	14 (dry bulb onions)	
	chlorothalonil + cymoxanil	<i>dry bulb</i> : 1.6–2.4 pt Ariston	7	For enhanced control of purple blotch, tank mix with chlorothalonil.
		<i>bunching & green onions</i> : 2.0–2.4 pt Ariston	14	
	copper hydroxide	1.3 pt Champ Formula 2	0	May be useful to reduce losses to bacterial infections during periods of wet weather.
		2.6 pt Kocide LF 2.4F	0	
		0.75–1.5 lb Kocide 3000	0	
		2.0 lb Kocide 101 77WP, DF	0	
	fenamidone	5.5 fl oz Reason 500 SC	7	Reason belongs to the Group 11 (strobilurin) fungicide category. Do not exceed 1 application of any strobilurin products before alternating with a fungicide having a different mode of action. Do not exceed 4 applications of strobilurin fungicides per year. Do not exceed 22.0 fl oz/a Reason per season. Allow 30 days after the last application before rotating to wheat and 1 year for all other crops.

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Disease control in onion *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Purple blotch and downy mildew <i>(cont.)</i>	fluxapyroxad + pyraclostrobin	<i>purple blotch</i> : 4.0–11.0 fl oz Merivon <i>downy mildew</i> : 8.0–11.0 fl oz Merivon	7	Do not make more than 3 applications per season. Maximum allowable use of product per acre per season is 33.0 fl oz. Also registered for control of Stemphylium and Botrytis of onion.
	mancozeb + copper hydroxide	2.5 lb ManKocide	7	Do not apply to exposed bulbs. For best disease management results, apply preventively every 7 days.
	potassium phosphite	4.0 pt ProPhyt	0	Apply preventively in 20.0-50.0 gal water/a at 7- to 14-day intervals. Make no more than 7 applications per season.
	potassium phosphite + tebuconazole	2.0–3.0 pt Viathon	7	Use preventively. Follow resistance management guidelines.
	zoxamide + chlorothalonil	30.0 fl oz Zing	7	Also controls Botrytis. Do not allow spray to contact bulbs. Do not make more than 8 applications per acre per year.
Smut	carboxin/thiram	Pro-Gro seed treatment		While there is no Wisconsin label for treating seed, it is legal to purchase and plant pretreated seed.
	mancozeb	2.4 qt Dithane F-45, Manzate Flowable, Penncozeb 4FL 3.0 lb Dithane DF Rainshield, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP	7 7	Apply as a furrow drench when planting seeds. Use 75–125 gal water/a.
Stemphylium	azoxystrobin	6.0–12.0 fl oz Equation SC, Trevo	0	Apply preventively when conditions favor infection. Do not apply more than 92.3 fl oz/a per season.
	azoxystrobin + difenoconazole	12.0–14.0 fl oz Quadris Top	7	For dry bulb onions do not apply more than 56.0 fl oz/a per season of Quadris Top. For green onions do not apply more than 42.0 fl oz /a per season.
	boscalid + pyraclostrobin	10.5–18.5 oz Pristine	7	Do not make more than 6 applications per year. Do not apply more than 111.0 oz/a per year.
	cyprodinil + difenoconazole	16.0–20.0 fl oz Inspire Super	14 (green onions) 7 (bulb onions)	Begin applications prior to disease onset. Follow resistance management guidelines.
	cyprodinil + fludioxonil	11.0–14.0 oz Switch 62.5WG		Follow resistance management guidelines.
	fluopyram + pyrimethanil	16.0–27.0 fl oz Luna Tranquility		Apply at critical times for disease control. Supplemental label expires on 3/02/19.
	fluopyram + tebuconazole	12.8 fl oz Luna Experience	7	Do not apply more than 25.6 fl oz/a per year. Follow resistance management guidelines.
	fluxapyroxad + pyraclostrobin	5.5–11.0 fl oz Merivon	7	Make no more than 3 applications per season.
	iprodione	1.5 pt Meteor, Nevada 4F, Rovral 4F	7	Do not make more than 5 applications per season.
	penthiopyrad	16.0–24.0 fl oz Fontelis	3	Make no more than 2 sequential applications before switching to a fungicide of a different mode of action.
Tipburn	<i>This is not a disease but a condition that can result from high concentrations of ozone in the air—often associated with thunderstorms.</i>			

Eggplant

Hops

Horse radish

Leafy greens

Melon

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Onion

Scouting calendar for insect pests of onion

April			May			June			July			August			September		
early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late
			Onion maggots						Onion maggots					Onion maggots			
						Onion thrips											

Insect control in onion

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Maggot	<i>A preventive treatment at planting is usually necessary; foliar treatments to suppress adults are usually not successful. Continuous planting of onions on the same ground increases onion maggot problems. Rotate with other crops to reduce populations. Destroy cull piles and crop debris to prevent onion maggot buildup.</i>			
Maggot— furrow treatments	chlorpyrifos	*Lorsban Advanced, Lorsban 15G		Apply Lorsban Advanced in furrow. Use minimum of 40 gal drench/a. Direct seeded; bulb onions only. Do not exceed 1 application of Lorsban 15G per year.
	cyromazine	6.6 lb Trigard OMC, 75%OMC/100 lb seed	60	Section 18 registration. Seed treatment in California only. Trigard has limited activity against seed corn maggot.
	2.0–4.0 lb diazinon ^a	several formulations		Apply diazinon in furrow. Use minimum of 40 gal drench/a. Direct seeded; bulb onions only.
Maggot— foliar treatments	0.5 lb diazinon ^a	several formulations	10	
	0.0075–0.0125 lb gamma-cyhalothrin	1.92–3.84 oz *Proaxis	14	Apply every 5 days as needed. Do not apply more than 1.92 pt/a (0.12 lb ai/a) per season.
	0.015–0.025 lb lambda-cyhalothrin	0.96–1.6 fl oz *Warrior II	14	Do not exceed 0.24 lb ai/a per season. Do not feed treated foliage to animals.
	0.1–0.3 lb permethrin	*Ambush	1	Several formulations; see label for rate. Do not exceed 2.4 lb ai/a per season.
	spinosad	3.0–6.0 fl oz Entrust SC	1	Apply to small larvae. Do not exceed 29.0 fl oz/a Entrust SC or 5 applications per year.
	zeta-cypermethrin	2.24–4.0 oz *Mustang Maxx	7	Apply every 7 days as needed. Use higher rates as populations escalate to avoid rescue treatments. Do not exceed 20.0 oz/a Mustang Maxx per year.
Thrips	<i>Treat when there are seven or more thrips per plant. Tolerant varieties such as El Charo, Snow White, Vega, White Keeper, and Zapotec can handle more than 45 thrips per plant. Direct the spray down the center of the plants. Thrips populations in other states have shown resistance to several organophosphate insecticides; spray only when necessary and alternate two or more materials each season to minimize potential for resistance.</i>			

*Restricted-use pesticide.

(continued)

^aSome onion maggots in other midwestern states have shown resistance to diazinon. Use a different insecticide if satisfactory control has not been obtained in recent years.

Insect control in onion *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Thrips <i>(cont.)</i>	abamectin	8.0–16.0 fl oz *Agri-Mek 0.15 EC, *Epi-Mek 0.15 EC	30	Add a non-ionic type activator or wetting agent and do not use a binder sticker. Apply when pests reach or exceed established thresholds. Do not apply more than 48.0 fl oz/a Agri-Mek 0.15 EC or Epi-Mek 0.15 EC per crop season and allow at least 7 days between applications.
		1.75–3.5 fl oz *Agri-Mek SC	30	To avoid illegal residues, Agri-Mek SC must be mixed with a non-ionic activator type wetting agent and do not use a binder sticker. Apply when pests reach or exceed established thresholds. Do not apply more than 10.25 fl oz/a Agri-Mek SC per crop season and allow at least 7 days between applications.
	0.094–0.15 lb acetamiprid	2.1–3.4 oz Assail 70WP	7	Do not exceed 4 applications or 13.7 oz/a of product per crop season.
		5.0–8.0 oz Assail 30 SG	7	Do not exceed 4 applications or 32.0 oz/a of product per crop season.
	0.088–0.133 lb cyantraniliprole <i>(soil)</i>	13.5–20.5 fl oz Verimark	—	Minimum application interval between treatments is 5 days. Do not apply more than 0.4 lb ai/a cyantraniliprole-containing products per crop whether applied as soil or foliar applications. The pH of the application solution should be adjusted to between pH 4 and 6.
	0.04–0.10 lb cypermethrin	2.0–5.0 fl oz *Ammo EC	7	
	0.018–0.028 lb deltamethrin	1.5–2.4 fl oz *Delta Gold	1	Apply every 5 days as needed. Do not exceed 9.6 fl oz/a per season.
	0.5 lb diazinon ^a	several formulations	14	Do not exceed 3 applications per season.
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 oz *Proaxis	14	Apply every 5 days as needed. Do not apply more than 2.88 pt/a (0.18 lb ai/a) per season.
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	14	Do not exceed 0.24 lb ai/a per season. Do not feed treated foliage to animals.
	1.0–1.6 lb malathion	several formulations	3–7	
	0.45–0.9 lb methomyl	1.5–3.0 pt *Lannate LV 0.5–1.0 lb *Lannate SP	7	
	0.25–0.5 lb methyl parathion	0.5–1.0 pt *Methyl Parathion, EC	15	Do not apply when onions bloom.
	0.25–0.5 lb oxamyl	1.0–2.0 pt *Vydate L	14	Vydate L has a 24c label for thrips and suppression of aster leafhopper as a foliar spray. Higher rates may be applied at planting for stubby root nematode control.
	0.15–0.3 lb permethrin	*Ambush	1	Several formulations; see label for rate. Do not apply more than 2.0 lb ai/a per season.
0.047–0.078 lb spinetoram	6.0–10.0 oz Radiant SC	1	Do not apply more than 30.0 oz/a Radiant (0.234 lb ai/a) per crop and do not make more than 5 applications per crop.	
spinosad	4.0–8.0 fl oz Entrust SC	1	Treat every 4 days as needed. Do not exceed 29.0 fl oz per year.	
zeta-cypermethrin	2.88–4.0 oz *Mustang Maxx	7	Apply every 7 days as needed. Use higher rates as populations escalate to avoid rescue treatments. Do not exceed 20.0 oz/a Mustang Maxx per year.	

*Restricted-use pesticide.

^aSome onion maggots in other midwestern states have shown resistance to diazinon. Use a different insecticide if satisfactory control has not been obtained in recent years.

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Weed control in dry bulb onion

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Annual weeds	0.25–0.375 lb bromoxynil	1.0–1.5 pt bromoxynil 2EC 0.5–0.75 pt bromoxynil 4EC		Preemergence use restricted to muck soils only. Apply at least 3–4 days prior to emergence. Rainfall or irrigation within 2 days following preemergence application or 3 days prior to crop emergence may result in unacceptable crop injury—do not irrigate during this time. Do not apply more than 1.5 pt/a bromoxynil 2EC or 0.75 pt/a bromoxynil 4EC per growing season.
	0.56–0.98 lb dimethenamid-P	<i>coarse soils:</i> 12.0–18.0 fl oz Outlook <i>medium- and fine-textured soils:</i> 14.0–21.0 fl oz Outlook	30	For use in direct seeded and transplanted dry bulb onions. Apply only after onion has reached the two-true-leaf stage. Applications to transplants should be delayed several days until soil has settled around the plants. Do not exceed 21.0 fl oz/a in a growing season and allow at least 14 days between applications.
	0.5–1.0 lb ethofumesate	<i>preemergence, coarse soils:</i> 1.0 pt Ethotron SC or Nortron SC <i>preemergence, medium and fine soils:</i> 2.0 pt Ethotron SC or Nortron SC <i>postemergence:</i> 1.0 pt Ethotron SC or Nortron SC	30	Controls selected broadleaf and grass weeds and suppresses yellow and purple nutsedge in dry bulb onions. Maximum number of applications and seasonal use rate varies by application timing and soil type. Do not use on muck or peat soils.
	0.06 lb flumioxazin	2.0 oz Chateau SW	45	Apply to transplanted dry bulb onions between the two- and six-leaf stage, or to seeded dry bulb onion between the three- and six-leaf stage. Do not apply more than 2.0 oz/a Chateau SW per application or more than 3.0 oz/a per season. Do not make a sequential application within 14 days of the first application. Do not apply with any type of adjuvant. Consult label for additional instructions on micro-rate application, soil limitations, and tank-mix limitations.
	0.25–0.5 lb oxyfluorfen	1.0–2.0 pt Goal 2XL 0.5–1.0 pt GoalTender	45	Pretransplant application: Transplanted onions only. Apply as a broadcast or band application after completion of tillage operations and prior to transplanting. If less than 0.5 lb ai/a oxyfluorfen is used pretransplant, postemergence applications may be made, up to the seasonal maximum of 0.5 lb ai/a oxyfluorfen. Post-transplant: An application of up to 0.5 lb ai/a oxyfluorfen may be made within 2 days of transplanting. If less than 0.5 lb ai/a oxyfluorfen is applied, a second application can be made 2 or more weeks after transplanting. Do not exceed a seasonal maximum of 0.5 lb ai/a oxyfluorfen.

*Restricted-use pesticide.

(continued)

Eggplant

Hops

Horseradish

Leafy greens

Melon

Mint

Onion

Weed control in dry bulb onion *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Annual weeds <i>(cont.)</i>	trifluralin	several manufacturers	60	Spray and incorporate between onion rows. Avoid covering onions with treated soil during incorporation as injury may occur. Do not apply as a preplant or preemergence treatment. Controls annual grasses and some broadleaf weeds, but is weak on wild mustard, smartweed, common ragweed, velvetleaf, and black nightshade. Rate varies with soil texture and organic matter. Follow recommended soil preparation, application, and incorporation procedures. Must be incorporated within 24 hours. See label for plantback restrictions. Ineffective on peat and muck soils.
Annual grasses	5.0–6.0 lb bensulide	5.0–6.0 qt Prefar 4E		Apply preplant or preemergence. Application instructions on label. Use on mineral soils only.
Annual grasses and some broad-leaves	4.5–10.5 lb DCPA	6.0–14.0 pt Dacthal FL 6.0–14.0 lb Dacthal W-75		Make preemergence applications to weed-free soil at seeding or transplanting and/or at layby. See label for rate limitations when used on sandy soils. Ineffective on muck soils.
	glyphosate	several manufacturers and formulations		See label to assure that the formulation is labeled for this crop and for specific instructions. Crop contact will result in severe injury or death. If weeds have been mowed or tilled, do not treat until they have resumed active growth and reached the recommended stage on the label. Unless otherwise stated, allow 7 or more days before tilling treated fields. Do not tank mix with soil-residual herbicides unless otherwise specified.
	*paraquat <i>(rate varies by label)</i>	several manufacturers and formulations, not all are registered for this use	60	Treat when a maximum number of grasses and broadleaves have emerged, but before the crop has emerged. In preplant and preemergence (to the crop) uses, do not apply to soils lacking clay minerals (i.e., muck, pure sand). Always add crop oil concentrate or non-ionic surfactant to the spray mixture. Follow precautions on the label.
	0.71–1.9 lb pendimethalin	1.5–4.0 pt Prowl H ₂ O	45	For use in direct-seeded and transplanted dry bulb onions. Rate depends on soil texture, classification, organic matter and herbicide formulation. May be applied sequentially on muck soils. See label for additional instructions and restrictions.
	0.74–2.0 lb pendimethalin	1.8–4.8 pt Psrowl 3.3 EC	45	
Emerged grasses	0.068–0.24 lb clethodim	9.0–32.0 oz Select Max	45	Make postemergence applications when actively growing grasses are in the size ranges specified on the label. Do not apply more than 0.5 lb ai/a clethodim in one crop season. Include appropriate surfactant as required by product label. Requires a 1-hour rain-free period.
	0.094–0.25 lb clethodim	6.0–16.0 fl oz Select 2EC	45	
	0.13–0.38 lb fluazifop-P-butyl	0.5–1.5 pt Fusilade DX	45	Make postemergence applications to actively growing grasses in the size ranges specified on the label. Always add to the spray volume 1% crop oil concentrate or 0.25% non-ionic surfactant. Multiple applications may be made to control late germinating grasses, but do not exceed 3.0 pt/a Fusilade DX per crop season.

*Restricted-use pesticide.

(continued)

Eggplant

Hops

Horse radish

Leafy greens

Melon

Mint

Onion

Weed control in dry bulb onion *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Emerged grasses <i>(cont.)</i>	0.094–0.28 lb sethoxydim	0.5–1.5 pt Poast	30	Make postemergence applications to actively growing grasses. Check label grass size ranges and wild proso millet or rescue treatment rates. Do not exceed 4.5 pt/a Poast per crop season. Always add 2.0 pt/a of crop oil concentrate.
Emerged annual broad-leaves	0.25–0.375 lb bromoxynil	1.0–1.5 pt bromoxynil 2EC 0.5–0.75 pt bromoxynil 4EC		Apply when onions are in the two- to five-true-leaf stage and weeds are less than 2 inches tall—younger or older onions may be injured. Do not exceed 1.5 pt/a bromoxynil 2EC or 0.75 pt/a bromoxynil 4EC per growing season. Apply in at least 50 gal water/a to avoid crop injury; do not add surfactant. Apply when soil and onion leaves are dry. Do not treat onions damaged by insects or blowing sand.
	<i>dry bulb onions only:</i> 0.12 lb oxyfluorfen	0.5 pt Goal 2XL 0.25 pt GoalTender	45	For seeded onions, apply postemergence when onions have at least two true leaves and weeds are in the two- to four-leaf stage. Do not exceed 0.5 lb ai/a oxyfluorfen per season. Do not apply when onion plants are stressed. Do not mix with pesticides, oils, surfactants, or fertilizers. Check the label for application to transplanted onions.

*Restricted-use pesticide.

Eggplant

Hops

Horseradish

Leafy greens

Melon

Mint

Onion