

Mint

Wisconsin mint is grown on high organic or muck soils with high water tables or on fine-textured soils. Since mint is a shallow-rooted crop, irrigation is desirable.

Planting

Mint is grown as a vegetatively propagated perennial. New fields are planted in the spring with stolons dug from an existing planting known to be free of pathogens and perennial weeds with a digger similar to a potato digger. First-year plantings are known as “row mint,” as the stolons are planted in rows with special planters. One acre of well-established mint will usually yield enough stolons to plant 10–15 acres. Given good growing conditions, the stolons quickly spread, covering the entire field with plants. This solid stand, called “meadow mint,” contributes to the spread of disease and some perennial weed problems but is important in helping control soil erosion and annual weeds. Weeds, insects, and diseases can reduce quality and yield.

Mint is usually plowed shallow after the first killing frost to protect the crop from winterkill and to help control pests that might otherwise overwinter on the mint stubble. To maintain profitable production, short rotations of 3 years of mint should be followed by 3 years of another crop.

Lime and fertilizer

Lime: Use dolomitic limestone to maintain a pH of 5.6 or higher on organic soils and 5.8 on mineral soils.

Fertilizer rates: Apply 50 lb/a phosphate and 200 lb/a potash when soil tests P and K are in the optimum range. Optimum nitrogen rates may vary between soils, organic nutrients, and locations. Apply 100–150 lb N/a on mineral soils or 50–80 lb N/a on organic soils depending on muck depth, quality, and length of time the field has been farmed. At least some of the nitrogen should be applied prior to the rapid growth phase in May.

Application: Broadcast applications are commonly used.

Micronutrients: Mint has relatively low micronutrient requirements. It is unlikely that this crop will respond to micronutrient additions.

Harvest

Mint harvest in Wisconsin generally begins about mid-July. Mint fields are usually cut before the plants reach 10% of full bloom. Harvesting at a later growth stage can result in lower quality oil and lower yields. The cut hay is left in windrows for 24–36 hours, until mint leaves begin to dry. If the hay gets too dry, the leaves will shatter during pickup,

reducing yield. If too green when collected, the hay will require more time and energy to distill. Rain while the cut hay is still in the field can result in significant yield loss due to leaf loss and oil washed from the plants. The mint is chopped directly into custom-built distilling tubs. A typical mint tub holds hay from 0.75 to 1.25 acres of land. The hay is carried from the field in the distillation tubs to the mint still. There, steam is applied to the mint through a series of tubes located in the bottom of the tub. Boiler size, for supplying the steam, depends on the number of tubs that will be distilled at one time. As a general rule, 100 horsepower is required for each tub. The vaporized oil passes through a condenser where the oil and water condense for collection in the receiver. The temperature of the condensate leaving the condenser should be maintained at 110°F. The lighter oil floats on top of the water in the receiver and is periodically drained off into clean barrels. The distillation process takes about 1 hour per tub, depending on tub size, condition of the hay, and steam pressure. Improper distillation can result in yield loss, lower oil quality, and increased energy costs.

Annual nitrogen, phosphate, and potash recommendations for mint

Nitrogen		Phosphate and potash		
Organic matter (%)	Amount to apply (lb/a)	Yield goal (lb/a)	Amount P ₂ O ₅ to apply* (lb/a)	Amount K ₂ O to apply* (lb/a)
<2	120	35–55 (oil)	50	200
2.0–9.9	100			
10–20	80			
>20	50			

*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 mint

Disease	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Mint stolon decay	<i>Early spring tillage hastens soil warming, which creates unfavorable conditions for disease development. Clipping the regrowth before plowdown in the fall reduces later losses to stolon decay. Application of fungicides for control is not feasible at this time.</i>			
Rust, powdery mildew	azoxystrobin	6.0–15.5 fl oz Aframe, AzoxyStar, Equation, Quadris Flowable, Satori, Willowood Azoxy 2SC	7	Equation, Quadris Flowable, Satori, Quilt, and Headline belong to the Group 11 (strobilurin) fungicide category. Do not apply more than one foliar spray of any strobilurin product before alternating with a fungicide having a different mode of action. Do not exceed 3 applications of strobilurin fungicides per year. Do not exceed 1.44 qt/a Quadris or Satori, or 48.0 fl oz/a Headline per season.
	azoxystrobin + propiconazole	14.0 fl oz Quilt, Willowood AzoxyProp Xtra	30	
	pyraclostrobin	9.0–12.0 fl oz Headline	14	
	chlorothalonil	1.2 lb Bravo Ultrex 82.5WDG, Equus DF 1.38 pt Bravo Weather Stik, Echo 720, Equus 720 1.2 lb Echo 90DF	80 80 80	Do not feed fresh or extracted mint hay from treated fields to livestock. Plow in the fall to bury leaf and stem tissue.
	myclobutanil	4.0–5.0 oz Rally 40WSP	30	Treat in early spring when plants break dormancy and continue applications on a 14- to 21-day schedule. Do not apply more than 15.0 oz/a product (0.375 lb ai/a) per season.
	propiconazole	4.0 fl oz AmTide Propiconazole 41.8% EC, Bumper ES, Fitness, Propicure 3.6F, PropiMax EC, Shar-Shield PPZ, Tide Propiconazole 41.8% EC, Tilt, Topaz, Willowood Propicon 3.6EC	30	Do not apply more than 78.0 fl oz/a per season.
Verticillium wilt	<i>Ideally, mint plantings should be kept in production for no longer than 4–6 years. Rotate to nonsusceptible crops for as long as possible between mint crops. The following cultivars are listed in order of increasing susceptibility: Native Spearmint, Scotch Spearmint, Murray Mitcham and Todd Mitcham Peppermint, and Black Mitcham Peppermint.</i>			

Insect control in mint

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Armyworms, cutworms, and loopers	<i>Many species of armyworms, cutworms, and loopers may occur together in the field. Small larvae may be collected in sweep net samples. Estimate larger instars by inspecting the soil surface (one square foot) after vigorously shaking the foliage in the area. Use the total number of all foliage-feeding worms to determine if treatment is necessary. Thresholds vary from 1.5 to 3.0 larvae/sq ft.</i>			
	0.5–1.0 lb acephate	16.0 oz Acephate 97UP	14	Do not apply more than 2.66 lb/a of formulated product per season. Do not feed or graze on treated areas.
	1.0–1.33 lb acephate	Orthene 97	14	Do not apply more than 2.66 lb/a.
	0.5–2.0 lb <i>Bacillus thuringiensis</i> subsp. <i>aizawai</i>	XenTari	0	Treat when larvae are young. Use another type of product to control older larvae.
	<i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i>	Biobit WP, DiPel DF, Gut Buster BT, Javelin WG	0	See label for rate. Treat when larvae are young.
	1.0–2.0 lb <i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i>	Lepinox WDG	0	Treat early instar larvae before noticeable feeding damage occurs. Repeat as needed.

*Restricted-use pesticide.

(continued)

Egplant

Hops

Horse radish

Leafy greens

Melon

Mint

Onion

Insect control in mint *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Armyworms, cutworms, and loopers <i>(cont.)</i>	chlordantraniliprole	3.5–7.5 fl oz Coragen	3	Do not make more than 4 applications per crop season and allow at least 14 days between applications. Do not apply more than 15.4 fl oz/a Coragen per season.
	1.0–2.0 lb chlorpyrifos	*Lorsban Advanced	90	Use the lower rate when larvae are less than 3/4 inch long, and the higher rate when larger. The long interval to harvest for this product limits its use to very early season applications.
	0.065 lb indoxacarb	3.5 oz Avaunt 30DG	7	The minimum interval between applications is 5 days. Do not apply more than 24.0 oz/a Avaunt (0.44 lb ai/a) per crop.
	0.675–0.9 lb methomyl	*Lannate LV, SP	14	Do not apply more than 1.8 lb ai/a.
	pyrethrin	1.0–2.0 pt Pyrenone E.C.	0	
	0.031–0.093 lb spinetoram	4.0–12.0 oz Radiant SC	7	Do not apply more than 60.5 oz/a Radiant (0.48 lb ai/a) per crop and do not make more than 4 applications per crop. Must wait at least 4 days before repeating applications.
	spinosad	4.0–10.0 fl oz Entrust SC	7	Apply when small larvae appear. Treat larger larvae at higher rate or re-treat. Do not exceed 29.0 oz/a or 4 applications per year.
Floridotarsonemus mite	<i>Determine mite populations from bud samples. Examine at least 20 buds per field at several sites throughout the field. Open each bud and examine a single leaf surface with a 10–15X hand lens. Count the number of adult (brown) mites. Treatment is recommended if there is an average of more than one mite per bud.</i>			
	0.05–0.1 lb fenpyroximate	1.0–2.0 pt Fujimite 5EC	1	Apply Fujimite in 25–50 gallons of water to ensure uniform coverage and canopy penetration. Do not exceed 2.0 pt/a per year.
	2.25 lb propargite	Omite 6E, Comite	14	Apply in large volume of water and high pressure for good penetration. Apply up to 2 applications at 7- to 10-day intervals.
Mint aphid	<i>No treatment thresholds have been established, but relative populations can be estimated from sweep net samples taken when sampling for other pests. Damage occurs only when aphids are so numerous that leaves are coated with honeydew.</i>			
	0.5–1.0 lb acephate	16.0 oz Acephate 97UP	14	Do not apply more than 2.66 lb/a of formulated product per season. Do not feed or graze on treated areas.
	1.0 lb acephate	Orthene 97	14	Do not apply more than 2.66 lb/a.
	0.7–1.0 lb malathion	Malathion	7	
	pyrethrin	1.0–2.0 pt Pyrenone E.C.	0	May be combined with other insecticides.
	thiamethoxam	1.5–3.0 oz Actara 25WDG	7	Apply every 14 days as needed. Do not exceed 8.0 oz/a per season.
Mint flea beetle	<i>Direct control measures at adults since no materials are registered for larval control. Adults emerge in late July (1100 DD, soil temperature at 6-inch depth, 40°F base) and begin laying eggs 2 weeks later. Treat before egg laying when adults are present if the following thresholds are exceeded: (1) larval damage—stunting, purpling in June—is visible; (2) no larval damage is visible, but more than 25 adults/100 sweeps are collected in standing mint; or (3) fewer than 25 adults/100 sweeps are present in standing mint, but more than 25/100 sweeps are collected from stubble after harvest.</i>			
	0.7–1.0 lb malathion	Malathion	7	
	0.675–0.9 lb methomyl	*Lannate LV, SP	14	Do not apply more than 1.8 lb ai/a.
	thiamethoxam	1.5–3.0 oz Actara 25WDG	7	Apply every 14 days as needed. Do not exceed 8.0 oz/a per season.

*Restricted-use pesticide.

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Insect control in mint *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Two-spotted spider mite	<i>Determine mite populations from leaf samples. Examine a total of 45 leaves (15 leaves each from the bottom, middle, and top of the canopy) at several locations throughout the field. For each 30 acres, monitor 15 individual field sites. Classify the leaves as "infested" (5 or more mites) or "uninfested" (fewer than 5 mites). Treat if 18 or more of the leaves in the 45-leaf sample at each site are "infested."</i>			
	0.009–0.014 lb abamectin	8.0–12.0 oz *Agri-Mek 0.15EC	28	Treat when mites first appear and have exceeded thresholds.
	0.375–0.75 lb bifenazate	0.75–1.5 lb Acramite 50WS	7	Apply Acramite in at least 50 gallons of water to ensure uniform coverage and canopy penetration. Do not apply more than once per year.
	0.438–0.625 lb dicofol	1.75–2.5 pt Dicofol 4E	30	Do not make more than 1 application of Dicofol per crop per year.
	0.05–0.1 lb fenpyroximate	1.0–2.0 pt Fujimite 5EC	1	Apply Fujimite in 25–50 gallons of water to ensure uniform coverage and canopy penetration. Do not exceed 2.0 pt/a per year.
	1.5–2.25 lb propargite	Omite 6E, Comite	14	Do not apply more than twice per year. Most effective when temperatures are above 70°F.

*Restricted-use pesticide.

Weed control in mint

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Annual weeds	0.5 lb clomazone	1.3 pt Command 3ME	84	For suppression and control of annual grasses and broadleaves, make a single broadcast application to the soil before weeds emerge and before mint plants begin any new growth. Strictly follow all precautions and restrictions on the label to minimize offsite movement and carryover. Read and understand the vegetable disclaimer section of the label —the end user assumes all liability for failure to perform and crop injury resulting from use of this product.
	flumioxazin	Chateau SW	80	The label states that Chateau cannot be applied before November 25 or after March 1, limiting its use in Wisconsin. Apply only to dormant established meadow mint. See label for additional restrictions and instructions prior to use.
	0.71–1.9 lb pendimethalin	1.5–4.0 pt Prowl H2O (based on soil texture—see label)	90	Make a single application to dormant established mint before weed emergence. Do not apply to mint during the first year of establishment or to mint that has broken dormancy.
	0.14–0.375 lb sulfentrazone	4.5–12.0 oz Spartan 4F		Apply Spartan to dormant mint following cultivation and before mint emergence. Rate is based on soil texture and organic matter. Split applications may be used for preemergent sequential control of winter and summer annuals. May be applied before crop emergence to newly planted mint, but application should be reduced 25%. Do not apply more than 12.0 oz/a per 12-month period. Rainfall or irrigation after application is required for herbicide activation. See label for weeds controlled and other precautions.

*Restricted-use pesticide.

(continued)

Eggplant

Hops

Horse radish

Leafy greens

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Weed control in mint *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Annual weeds <i>(cont.)</i>	labeled rates: 0.8–1.6 lb terbacil recommended rates <i>(see note in Remarks)</i> : 0.125–0.25 lb terbacil	labeled rates: 1.0–2.0 lb Sinbar WDG recommended rates <i>(see note in Remarks)</i> : 0.16–0.3 lb Sinbar WDG	60	Preemergence: Apply before weeds and mint emerge, after last cultivation. Postemergence: Apply before broadleaves are 2 inches tall and before grasses are 1 inch tall. Do not exceed 2.0 lb/a per season. Do not plant to crops other than mint within 2 years after last application. Note: <i>Wisconsin recommends using less than 0.5 lb/a of Sinbar per year due to its long residual activity. Low rates may give inadequate weed control.</i>
	trifluralin	several manufacturers		Controls annual grasses and some broadleaf weeds, but is weak on wild mustard, smartweed, common ragweed, velvetleaf, and black nightshade. Rate varies depending on soil texture and organic matter. Follow recommended soil preparation, application, and incorporation procedures. Must be incorporated. See the label for plantback restrictions. Ineffective on peat and muck soils.
Germinating annuals	1.0–1.5 lb oxyfluorfen	4.0–6.0 pt Goal 2XL 2.0–3.0 pt GoalTender		Apply Goal only to mint grown on muck soils with at least 20% organic matter. Make one preemergence application in the spring after the last tillage operation before new mint growth emerges. May cause temporary stunting of mint. See label for application timing in new mint.
Emerged weeds	glyphosate	several manufacturers and formulations	7	See manufacturer's label to assure that the formulation is labeled for spot treatment in mint. Use handheld equipment to direct the spray solution. The spray will kill all plants it contacts. Do not treat more than 1/10 of any acre at any time. Treatment may be repeated at 30-day intervals.
	*paraquat <i>(rate varies by label)</i>	several manufacturers and formulations		Apply to dormant mint before emergence. May be mixed with Sinbar. Always add crop oil concentrate or non-ionic surfactant to spray mixture. Follow precautions on the label.
Emerged grasses	0.068–0.24 lb clethodim	9.0–32.0 oz Select Max	21	Apply to actively growing grasses. Repeat treatments may be made at 14-day intervals up to the maximum annual use rate. Do not cultivate grasses within 7 days before or after application. Include appropriate surfactant as required by product label. Do not apply if rain is expected within 1 hour.
	0.094–0.25 lb clethodim	6.0–16.0 oz Select 2EC	21	
	0.034–0.08 lb quizalofop	5.0–12.0 oz Assure II or Targa	30	Apply postemergence to actively growing grasses. Add COC or NIS to spray mixture. Do not make more than 2 applications per season. Wait a minimum of 24 hours following application before applying a post broadleaf herbicide. Do not apply Assure II or Targa following a post broadleaf herbicide until grass plants begin to develop new leaves. See label for maximum annual use rate.
	0.094–0.47 lb sethoxydim	0.5–2.5 pt Poast	20	Apply postemergence to actively growing grasses. Include 1.0 pt/a Dash HC or 1.0 qt/a crop oil concentrate. Do not apply more than 5.0 pt/a Poast or make more than 2 applications per season. Do not apply if rain is expected within 1 hour.

*Restricted-use pesticide.

(continued)

Weed control in mint *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Emerged annual broadleaves, some perennials	1.0–2.0 lb bentazon	several manufacturers and formulations	varies by label	Apply early postemergence when weeds are small and actively growing. May cause leaf burn under some conditions, but the mint will generally outgrow this condition within 10 days.
	0.125–0.38 lb acid equivalent clopyralid	0.33–1.0 pt Stinger	45	Controls specific annual and perennial weeds. Apply early postemergence to actively growing annuals before they send up a flower stalk. For Canada thistle, apply when most basal leaves are formed but before bud stage. May cause temporary injury, but should not reduce oil yields. Read label carefully for follow crop restrictions. Do not make aerial applications.
	0.25–0.5 lb acid equivalent MCPB	1.0–2.0 pt/a Thistrol	40	Apply postemergence for suppression of field bindweed and several broadleaf weeds. Do not apply after mint exceeds 6 inches in height or oil yield may be reduced. Mint may be discolored or twisted following application. Fall applications may be made for control of winter annual weeds. Do not use this product if minor crop injury is unacceptable.
Emerged annual broadleaves	0.25–0.38 lb bromoxynil	<i>labeled rates:</i> 1.0–1.5 pt bromoxynil 2EC formulation 0.5–0.75 pt bromoxynil 4EC formulation <i>recommended rates (see note in Remarks):</i> 2.0–4.0 oz bromoxynil 2EC formulation 1.0–2.0 oz bromoxynil 4EC formulation	70	Apply postemergence to actively growing weed seedlings before weeds have more than four leaves, are 2 inches in height, or are 1 inch in diameter, whichever comes first. See label for list of susceptible weeds. Do not apply in spring or to newly planted mint. Bromoxynil can cause temporary stunting and discoloration of the mint. Bromoxynil may cause unacceptable injury if temperatures exceed 70°F following application, if mint is under stress, or if mint has been treated with Sinbar. Do not apply more than 6.0 pt/a bromoxynil 2EC or 3.0 pt/a bromoxynil 4EC per season or by aerial application. Under Wisconsin conditions, using the label rate may result in unacceptable mint injury. Previous experience suggests that 2.0–4.0 oz/a bromoxynil 2EC or 1.0–2.0 oz/a bromoxynil 4EC may be more appropriate.

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