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Idaho Fertilizer Guide

Peppermint

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The following fertilizer guidelines are based on research conducted by land-grant universities in the Pacific Northwest including the University of Idaho. These suggested fertilizer rates are designed to produce above average yields if other factors are not limiting production. Thus, the fertilizer guide assumes use of good crop management practices.

The fertilizer rates will be accurate for a given field provided: (1) the soil samples represent the area to be fertilized and (2) the crop history information supplied is complete and accurate.

Nitrogen (N)

Adequate N throughout the season is necessary for maximum production of oil. Continuous N availability is important for maintaining active vegetative growth and continued development of new leaves. Plant stress because of N shortages can cause earlier maturity and reduced oil yield and quality.

Nitrogen rates on mint depend on many factors including previous crop, method of application, past fertilizer use, soil type, irrigation practices and carryover N as measured with a soil analysis.

Soil Test N — Nitrogen needs can be determined using soil samples collected in the early spring. Table 1 gives recommended N fertilizer rates based on soil test values. The values represent the sum of nitrate and ammonium nitrogen in 1-foot increments to a depth of 24 inches or the effective rooting depth (multiply ppm × 4 to give pounds N/acre).

Table 1. Nitrogen fertilizer rates based on soil test.

Total soil test N (ppm)	Nitrogen application*
(0 to 24 inch depth)	(lb N/acre)
0	300
10	240
20	180
30	120
40	80
50	40
60	0

*Add 15 pounds N for each ton of grain straw plowed under. Straw yields can range from 3 to 6 tons per acre.

Previous Crop — Nitrogen fertilizer rates can be estimated for new mint stands based on previous cropping history. The incorporation of various crop residues during soil preparation for transplanted roots results in large differences in the amount of N available to mint during the first year of the stand. Crop residues differ in their N contents, the rate at which N is released during decomposition and the total amounts of N incorporated as previous crop residues. Table 2 gives N fertilizer rates based solely on previous crop residues.

Table 2. Nitrogen fertilizer rates for new stands based on previous crop.

Previous crop	N application
	(lb N/acre)
Grain (straw plowed)	240
Grain (straw removed)	180
Row crop	140
Beans, peas, alfalfa stubble	100
Green manure legumes	80

Fig. 1. Peppermint plants from soil that is, from left, low in N, moderate in N and high in N.

22

Fig. 2. Peppermint field studies designed to determine most effective N rates.

N Application — Split N applications are used more effectively by mint crops than single early-season applications. For maximum effectiveness, one-fourth to one-third of the total N required should be applied early in the spring with the remaining N applied from mid-May to late June. Excessive N rates applied within 3 to 4 weeks of maturity tend to reduce oil quality.

The incorporation of spring topdressed ammonical nitrogen fertilizers can increase the effectiveness of the N application. Using a rotary corrugator to reestablish old or to make new corrugates provides an excellent opportunity to incorporate topdressed fertilizers.

Nitrogen applied in May or early June can be topdressed with conventional spreaders with little permanent plant damage. A pipe, small pole or chain dragged behind the spreader will reduce the chance of foliage being burned as a result of dry fertilizer particles caught in the leaf axials of the plant. Avoid topdressing dry fertilizers when the leaves are wet with dew or rain.

Nitrogen applied in irrigation water can also be effective in supplying N to mint during the season. The uniformity of N application is no better than the uniformity of water application. Under furrow irrigation, maximum effectiveness is obtained when N is added during the first portion of the set and shut off as soon as the water reaches the end of the field. Adding N during the entire set results in considerable loss of N in the runoff. Nitrogen applied through sprinkler irrigation systems represents the greatest potential for uniform N application in irrigation water.

Fall regrowth can be enhanced with light fertilizer N applications (20 to 40 lb/acre) if available N is low at harvest. Vigorous fall regrowth, in turn, promotes more vigorous growth in the spring.

Phosphorus (P)

Adequate P is important for normal growth and development of mint crops. Mint crops, however, do not have large requirements for P. Soil tests can be useful indicators of the need for P. Table 3 gives P application rates for mint based on soil tests.

Table 3. Phosphorus fertilizer rate based on soil test.

P soil test* (ppm) Depth of sampling	P application (lb/acre)	
(0 to 12 inches)	(P_2O_5)	(P**)
2	295	130
4	204	90
6	159	70
8	114	50
10	68	30
over 10	0	0

*$NaHCO_3$ extraction

**Phosphorus is expressed as both the oxide and elemental forms:

$P_2O_5 \times 0.44 = P$ or $P \times 2.29 = P_2O_5$

Potassium (K)

Mint crops use high amounts of K. Potassium fertilization causes marked increases in growth when soil test readings are low. Table 4 gives K fertilizer rates based on soil tests.

Table 4. Potassium fertilizer rate based on soil tests.

K soil test	K application (lb/acre)	
(ppm)*	(K_2O)	(K**)
30	240	200
60	192	160
90	144	120
120	96	80
over 120	0	0

*$NaHCO_3$ extraction

**Potassium is expressed as both the oxide and elemental form:

$K_2O \times 0.83 = K$ or $K \times 1.20 = K_2O$

Sulfur (S)

Mint growth responses to S applications have not been fully evaluated in Idaho. Most irrigation waters in Idaho's mint growing areas contain adequate S to meet the needs of mint crops. Exceptions would include sites irrigated with well waters that test very low in S and which have not received recent (within 5 years) applications of sulfur-containing fertilizers or amendments. Soils testing less than 10 ppm sulfate sulfur should receive 20 to 40 pounds of S.

Micronutrients (Fe, Mn, Cu, Zn)

Growth responses to micronutrient applications of iron (Fe), manganese (Mn), copper (Cu), zinc (Zn) or boron (B) are not expected to occur in Idaho. Possible exceptions are Fe and Zn on severely scraped or eroded soils.

General Comments

1. The effectiveness of N fertilization and irrigation water management are closely related. Light, frequent irrigations are necessary. However, excessive watering can cause leaching of N beyond root systems thereby reducing N available to the plant.

2. Phosphorus and potassium applications as indicated by soil tests should be incorporated during seedbed preparation for root planting. Applications on established stands can be topdressed although any opportunity to incorporate these materials when recorrugating, disking or plowing should be taken advantage of.

3. Soil testing for P or K should be practiced within 3 years of the last application.

4. Plant analysis is a useful means of determining the effectiveness of a fertilization program. Nitrate concentrations in stem tissues measuring below 8,000 ppm during June indicate the need for additional N.

5. The concentration of soil and fertilizer salts in the centers of beds can be sufficient to cause damage to the plant. This is generally indicated by necrotic leaf margins. Salt concentrations can be reduced by wetting every other furrow and alternating the furrow watered each set. Establishing new corrugates in the centers of old beds can also aid in reducing salt concentrations by dispersing the buildup that occurred the previous season.

6. Fertilizer applications are most effective when good disease, insect and weed control are obtained.

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