

Grass/Chicory Mixed Pasture - Established Stand

Crop Highlights

- If not seeded together, chicory can be planted via no-till into grass stands if grazed heavily to lower competitiveness
- Spring and summer forage production from chicory: Penn State reports 50 to 70 lbs/acre/day production from April through Oct.
- Production is optimized under rotational grazing
- Stand life can be 5 to 7 years with rotational grazing
- Keep chicory from bolting in spring by grazing to a 1.5 inch stubble height and with rest periods of about 25 days

Yield Goal

A specific yield goal is not utilized for pastures. The goal of these recommendations is to ensure good pasture performance to meet the needs of livestock being grazed there.

Target pH: 5.8

Recommended Liming Source:

Table 1. Recommended type of lime as a function of soil test Ca and Mg concentrations.

Soil Test Levels	Recommended Lime Type
Soil Test Mg less than 50 FIVs	Dolomitic
Soil Test Mg between 50 and 100 FIVs AND LESS than Soil Test Ca	Dolomitic
Soil Test Mg greater than 100 FIVs	Calcitic
Soil Test Mg GREATER than 50 FIVs AND GREATER than Soil Test Ca	Calcitic

Nitrogen:

1. If forage growth is slow or inadequate for livestock needs, apply 40 - 60 lbs N/ac to encourage recovery and regrowth. Repeat application when needed. Do not apply more than 300 lbs N/ac per year.
2. Adjust the N application rate as productivity changes from one grazing cycle to the next and with expected weather conditions.
3. To promote deeper rooting, enhance winter survival and enhance spring recovery, apply 40-50 lbs N/ac between mid-October and mid-November.
4. If N **is applied** in mid-fall, a greenup N application should not be necessary. If growth is slow in the spring, a late April / early May application of 40-50 lbs N/ac will help push pasture growth.
5. If N **is not applied** in mid-fall, 40-60 lbs N/ac will be needed at the initiation of greenup to push early pasture growth.

Phosphorus

Table 2. Recommended phosphorus fertilizer rate to promote adequate pasture performance and productivity.

Fertilizer	UD FIVs										
	0	10	20	30	40	50	60	70	80	90	100
lbs P ₂ O ₅ /ac	120	100	90	70	60	50	40	20	0	0	0

1. If soil test P is “Low” (e.g., 25 FIVs or less), satisfactory growth is unlikely. The grazing manager should evaluate the stand density to decide if replanting is appropriate since broadcasting and plowing down the recommended rate of P₂O₅ will produce higher yields sooner than will topdress applications.
2. If soil test P is “Medium” or “Optimum” (e.g., 26 to 100 FIVs), topdress phosphorus after the first grazing cycle.
3. If soil test P is “Excessive” (e.g., P-FIV’s >100), the application of phosphorus in fertilizers or manures is NOT RECOMMENDED.

Potassium

Table 3. Recommended potassium fertilizer rate to promote adequate pasture performance and productivity.

Fertilizer	UD FIVs										
	0	10	20	30	40	50	60	70	80	90	100
lbs K ₂ O/ac	180	165	150	135	120	105	90	75	60	45	0

1. Topdress potash after the first grazing cycle.
2. Application rates of 120 lbs K₂O /ac or higher should be split into two treatments. Apply ½ of the recommended rate from mid-May to mid-June and the remainder in late August or September.

Magnesium

1. Magnesium is recommended when Soil Test Magnesium is less than 38 FIVs
2. If Soil Test Mg is less than 38 FIVs and lime is recommended, use dolomitic limestone.
3. If Soil Test Mg is less than 38 FIVs and lime is not needed, apply soluble Mg according to the rates in Table 4, below.

Table 4. Recommended application rates of soluble magnesium as a function of soil test Mg index value.

Soluble Mg	UD FIVs								
	0	5	10	15	20	25	30	35	40
lbs soluble Mg/ac	80	70	60	50	40	30	20	10	0

Sulfur

1. Monitor forage for sulfur deficiency or use ammonium sulfate as an N source to supply needed S.
2. If deficiency symptoms occur, contact your county agent for assistance with diagnosis and/or corrective recommendations.
3. Sulfate-S is available immediately for crop uptake immediately after application. If a reduced form of S is applied (e.g., thiosulfate or elemental S), allow adequate time for oxidation of the applied S to the sulfate form to occur.

Manganese

Manganese (Mn) needs are predicted by an Availability Index that includes M3 soil test Mn and soil pH. Interpretation is crop specific.

$$\text{MnAI} = 101.7 - (15.2 \times \text{soil pH}) + (2.11 \times \text{M3-Mn})$$

Where:

- MnAI = Mn availability index
- Soil pH = Soil pH measured in water (1:1 V:V)
- M3-Mn = Mehlich 3 soil test Mn in lbs/ac

Table 5. Interpretation of Mn availability index.

Mn Availability Index	Interpretation
Less than 12	Mn deficiency is possible. Monitor the crop for symptoms
12 or greater	Mn deficiency is unlikely.

- If Mn deficiency is predicted or was observed in the previous growing season, broadcast 20-40 lbs actual Mn/ac.
- Broadcast applications of acid forming fertilizers may correct Mn deficiency without the actual application of Mn in some cases, but may be less effective than applications of Mn.
- If Mn deficiency symptoms appear during the growing season or after an application of lime, a foliar application of 0.5 to 2.0 lbs/ac actual Mn as Mn sulfate or chelated Mn can alleviate the symptoms and restore yield potential. **Apply only when adequate growth is present to aid in adsorption of foliar Mn.**

Zinc

Zinc (Zn) deficiency is predicted by an Availability Index that includes not only M3 soil test Zn, but also soil pH and M3 soil test P.

Table 6. Interpretation of Zn availability index.

Soil Test Criteria	Interpretation
M3-Zn is less than 1.9 lbs/ac	Zn deficiency is predicted
M3-Zn is less than 3.1 lbs/ac AND soil pH is higher than 7.0	Zn deficiency is predicted
M3-Zn is less than 3.1 lbs/ac AND soil pH is 6.6 or higher AND M3-P is 100 FIVs or higher	Zn deficiency is predicted
M3-Zn is 3.2 lbs/ac or higher	Soil should be sufficient in Zn

If zinc deficiency is predicted by the availability index or was observed the previous year, one of the following treatments can be applied:

- Broadcast 10-12 lbs/ac actual Zn as Zn sulfate or Zn oxide. Broadcast applications should correct Zn deficiency for several years.
- Foliar application of 1 lb/ac actual Zn as Zn sulfate or Zn oxide or 0.5 lb/ac actual Zn as Zn chelate in 20 to 50 gallons of water. **Apply only when adequate growth is present to aid absorption of foliar Zn.** Application should be repeated if symptoms re-appear.

Boron

- Boron (B) deficiency is not usually observed in this crop. If B deficiency symptoms appear, contact your county agent for assistance with diagnosis and corrective recommendations.