

Determining Mechanical Manure Application Rates on BEEF Pastures

For pastures where there will be grazing AND mechanical manure application, use the following procedure:

1. Determine if the rate is based on Nitrogen (Soil Test P <200 ppm) or Phosphorus (Soil Test >200 ppm or no soil test).
2. Find the “Grass Hay” crop under the appropriate Nitrogen Based or Crop Phosphorus Removal Based table for Solid Beef manure.
3. Find the lowest yield group for Grass Hay across the top of the table.
4. Find the application management that corresponds to when the manure will be mechanically applied in the left column of the table under “Manure Application Method”. Choose “Spring No Incorporation” for spring and summer applications, “Fall” for fall applications, or “Winter With Cover Crop” for winter applications.
5. Where these intersect is the maximum total manure that can be applied in ton/A. (See the example below)
6. Determine the manure deposited by grazing beef cattle as follows: (Use the calculation worksheet attached and see the example below)
 - a. Determine the number of days that beef cows, calves, or steers) typically are on pasture for “Less than 8 hours, 8-16 hours, or more than 16 hours per day”.
 - This does not have to be exact but try to be within ± 10 days.
 - This does not have to add up to 365 days if there are days when the cattle are not on pasture.
 - If the cows, calves, or steers are on separate pasture or if pastures have different stocking management, do this calculation for each of those pastures.
 - b. Multiply the days in each category times the “Tons” factor for that category.
 - c. Multiply that answer by the number of cattle on the pasture in that group.
 - d. Sum up the totals for the categories.
 - e. Determine the number of acres in the pasture.
 - f. Divide the total manure applied by grazing animals by the acres to determine the amount of manure applied per acre by the grazing animals.
 - g. Subtract this from the total maximum allowable manure application in 5 above to determine the ton/A of manure that can be applied in addition to what is applied by the grazing animals.

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Calculation Worksheet

| | Tons | X | Days on Pasture | X | Number of Animals | = | Tons of Manure from Grazing |
|--|-------|---|-----------------|---|-------------------|---|-----------------------------|
| CALF | | | | | | | |
| Less than 8 Hours | 0.005 | X | | X | | = | |
| 8-16 Hours | 0.009 | X | | X | | = | |
| Over 16 Hours | 0.014 | X | | X | | = | |
| COW/BULL | | | | | | | |
| Less than 8 Hours | 0.021 | X | | X | | = | |
| 8-16 Hours | 0.042 | X | | X | | = | |
| Over 16 Hours | 0.063 | X | | X | | = | |
| FINISHING STEER | | | | | | | |
| Less than 8 Hours | 0.010 | X | | X | | = | |
| 8-16 Hours | 0.021 | X | | X | | = | |
| Over 16 Hours | 0.031 | X | | X | | = | |
| Total Manure Applied by Grazing Animals (ton) | | | | | | = | |
| <i>Add the amounts calculated above</i> | | | | | | | |
| Acres in the Pasture | | | | | | = | |
| Manure Applied per Acre by Grazing Animals (ton/A) | | | | | | = | |
| <i>Divide the total manure applied by grazing animals by the acres in the pasture</i> | | | | | | | |
| Maximum Allowable Rate (ton/A) | | | | | | = | |
| <i>From MMM Rates Table for solid beef manure</i> | | | | | | | |
| Allowable Mechanical Manure Application Rate (ton/A) | | | | | | = | |
| <i>Difference between the manure applied by grazing animals and the maximum allowable rate</i> | | | | | | | |

Mechanical Manure Application Rates on Beef Pastures Example

25 acres of pasture, 25 beef cows are grazed for 8 months for more than 16 hours per day and for 4 months for 8-16 hours per day. 23 calves are grazed for 8 months for more than 16 hours per day. The soil test for the pastures is 120 ppm P which means the Nitrogen Based Rate tables can be used. Manure from the barn is to be spread on the pastures in either the spring or the fall.

Determining the allowable manure application rates from the tables.

The chart maximum N based application of beef manure to a "Grass Hay" (pasture) applied in the spring or fall is 30 ton/A.

Beef Cow/Calf – Nitrogen Based Manure Application Rates

| Grass Hay Manure Application Method | Yield Groups (ton/A) | | | | | | | | For each Ton/A less than the rate in the table, apply lbs. N fertilizer listed below. |
|--|----------------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|---|
| | 3-4 | | 4.1-5 | | 5.1-6 | | 6.1-7 | | |
| | Manure ton/A | Fert N lb/A | Manure ton/A | Fert N lb/A | Manure ton/A | Fert N lb/A | Manure ton/A | Fert N lb/A | |
| Spring Incorporation within 1 day | 20 | 0 | 25 | 0 | 30 | 0 | 30 | 165 | 6 |
| Spring Incorporation within 1 week | 30 | 0 | 30 | 25 | 30 | 55 | 30 | 215 | 4 |
| Spring No Incorporation | 30 | 45 | 30 | 75 | 30 | 105 | 30 | 265 | 2 |
| Fall | 30 | 45 | 30 | 75 | 30 | 105 | 30 | 265 | 2 |
| Winter with cover crop | 20 | 20 | 20 | 50 | 20 | 80 | 20 | 240 | 4 |
| Winter No cover crop | 20 | 65 | 20 | 95 | 20 | 125 | 20 | 285 | 2 |

Determining the amount of manure deposited by the beef animals on pasture and the amount of manure that could be applied in addition to this.

| | Tons | X | Days on Pasture | X | Number of Animals | = | Tons of Manure from Grazing |
|---|-------|---|-----------------|---|-------------------|---|-----------------------------|
| CALF | | | | | | | |
| Less than 8 Hours | 0.005 | X | | X | | = | |
| 8-16 Hours | 0.009 | X | 240 | X | 23 | = | 50 |
| Over 16 Hours | 0.014 | X | | X | | = | |
| COW/BULL | | | | | | | |
| Less than 8 Hours | 0.021 | X | | X | | = | |
| 8-16 Hours | 0.042 | X | 120 | X | 25 | = | 126 |
| Over 16 Hours | 0.063 | X | 240 | X | 25 | = | 378 |
| FINISHING STEER | | | | | | | |
| Less than 8 Hours | 0.010 | X | | X | | = | |
| 8-16 Hours | 0.021 | X | | X | | = | |
| Over 16 Hours | 0.031 | X | | X | | = | |
| Total Manure Applied by Grazing Animals (ton) <i>Add the amounts calculated above</i> | | | | | | = | 554 |
| Acres in the Pasture | | | | | | = | 25 |
| Manure Applied per Acre by Grazing Animals (ton/A) <i>Divide the total manure applied by grazing animals by the acres in the pasture</i> | | | | | | = | 22 |
| Maximum Allowable Rate (ton/A) <i>From MMM Rates Table for solid beef manure</i> | | | | | | = | 30 |
| Allowable Mechanical Manure Application Rate (ton/A) <i>Difference between the manure applied by grazing animals and the maximum allowable rate</i> | | | | | | = | 8 |

In this example, the difference, up to 8 ton/A of beef manure can be applied in addition to what the beef animals deposit while grazing.