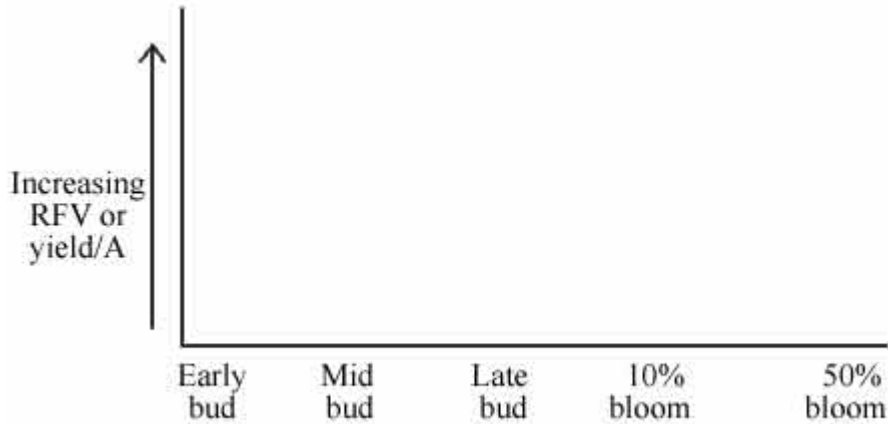


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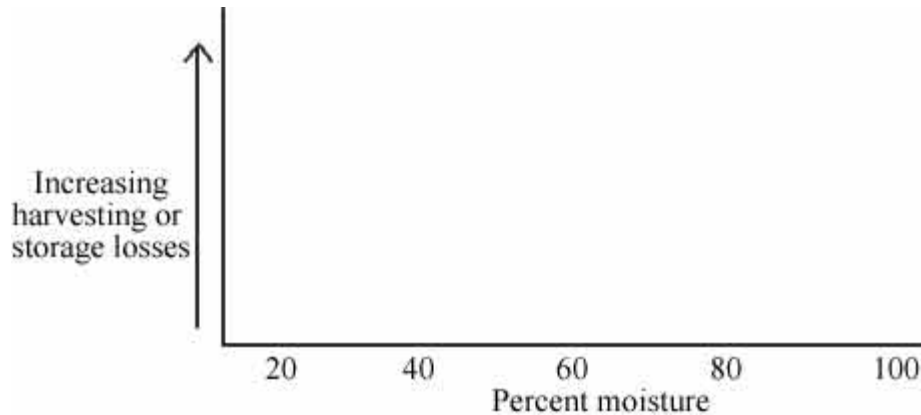
- 5 1. In the figure below, show how forage quality (RFV) and forage yield are affected by maturity in a typical first and third harvest (be sure to indicate which RFV or yield line is first harvest and which is third).



- 2 2. What is the primary factor that causes the quality differences that you just drew in the previous figure and is the reason that the recommended maturity stage has changed in reason years (HINT: I do not mean any quality component)?
- 4 3. Maturity stage as given in the previous graph is not used in the PEAQ or mean stage by count systems. These systems considers only five maturity stages (list) **and** indicate how they are different.
- 2 4. What are the limitations to PEAQ system?
- 4 5. Some producers in the Central and Western North Dakota take their first alfalfa harvest about July 1 to July 10 and then comment that they generally do not get a second hay harvest. Give three reasons why these producers are seeing this type of response (assume normal rainfall for the area, not drought).
- 2 6. (True or False) The net assimilation rate in alfalfa decreases with increasing maturity while the LAI increases with increasing maturity.

- 2 7. (True or False) High-quality compared to low-quality haylage reduced purchased feed cost by greater than \$30,000/year in a 120-cow dairy herd in Wisconsin studies.
- 2 8. (True or False) Prime hay (RFV=166) has commanded more than \$45/ton higher price than No. 2 hay (RFV-114) in Minnesota quality-tested hay markets.
2. 9. (True or False) Over wintering residue, which ranges from 0.4 to 0.8 tons/a on good producing stands when no fall harvest is taken, is quite low in forage quality, and if you are a cash hay producer, the residue should be removed in the spring to allow production of better quality forage.
- 1 10. These two cultivars of alfalfa can be used to increase the harvest window for producers that have large acreage to cover _____.
- 2 11. (True or False) The recommended harvest stage for the first harvest of clear-seeded alfalfa is 20 to 40% bloom since height is relatively short and the crown tissue will develop faster.
- 2 12. (True or False) Alfalfa producers often find 4-year-old stands to be more productive than the first year of the stand; yet, if annual moisture differences were removed, forage yields decrease with increasing stand age.
- 2 13. (True or False) Forage yield of alfalfa will decrease with stand age even in good moisture years when annual moisture differences are removed.
- 2 14. (True or False) Dr. Brun in the Soils Department found soil water under an alfalfa stand in the Dickinson area to be totally depleted in about 3 years.
- 2 15. (True or False) Since water utilization under dryland stands is a major reason to recommend discontinuing a stand after 3 to 4 years of production, there is little reason to rotate irrigated stands since the water can be supplied.

- 5 16. In the following graph, show how harvesting and storage losses change with changing moisture content (be sure the losses that occur at 15% moisture content accurately reflects expected losses). There should be two line on the graph, one for harvesting and one for storage losses.



- 2 17. (True or False) Harvesting, storage, and feeding losses of loose stacks has been estimated at nearly 60%.
- 2 18. (True or False) The cost of constructing inside storage for alfalfa hay can be recouped by saving generated from reduced storage losses when alfalfa sells for around \$80/ton.
- 2 19. (True or False) Forage yield of alfalfa cut at a 5-inch stubble height averaged about 1.9 tons/acre less than at the 1-inch stubble height as a mean across two locations, two cutting systems, three years, and three varieties (the most recent test) with about half the loss in the first harvest.
- 2 20. (True or False) The increased quality of the hay with increasing stubble height is great enough for cash hay and dairy producers to consider leaving some yield in the field to increase forage quality.
- 2 21. (True or False) Alfalfa growth in the spring and fall can survive freezing temperatures in the low 20's, but can be killed at 26 to 27°F at early bud stage.
- 3 22. The three types of winter injury/winter kill that can occur to alfalfa are _____, _____, and _____.
- 2 23. How can you determine if winter kill has occurred on an alfalfa field prior to the field greening up?

- 2 24. (True or False) Stand age and fall management are the two most important factors that producers can control to reduce winter injury/kill after the cultivar has been chosen.
- 2 25. (True or False) Carrington irrigated data where the last harvest was taken during September or October, data from the University of Minnesota, and other sites in the region suggest that a fall harvest has little effect on alfalfa stands that are harvested on a three-cut system.
- 4 26. Fall harvest is recommended when the following six items are met:
- 2 27. Alfalfa is a very heavy user of potassium and will remove (a. 6, b. 12, c. 25, d. 50, e. 75, f. 100)lb/acre/ton of forage produced. Phosphorus removal per ton is_____ (same choices).
- 6 28. In class I listed 13 reasons why alfalfa yields are less than their potential (some of the previous questions related to these). List twelve
- 3 29. Why should Norgold sweetclover be used over the more widely grown yellow-flowered sweetclover for hay and what is the major disadvantage of Norgold compared to the yellow-flowered sweetclover?
- 2 30. The recommended harvest stage for sweetclover to obtain the quality of late-bud alfalfa hay is at this growth stage_____, but little goes up at this stage. Why?
- 1 31. What herbicide is cleared for application to sweetclover for weed control?
- 5 32. Sweetclover naturally contains this compound _____ that imparts a bitter taste to the grazing animal. The sweetclover bleeding disease is caused when the compound you just listed under goes this process_____, which converts it to_____, the toxic component. What is the best methods to prevent this disease?

- 1 33. This insect pest of sweetclover other than grasshoppers that can be a problem is_____.
- 1 34. The most common species of red clover (not variety) grown in Minnesota is_____.
- 1 35. The recommended harvesting stage for red clover is_____to equal the quality of late-bud alfalfa.
- 1 36. The *Trifolium* spp. that has the greatest acreage in the world is _____.
- 2 37. (True or False) The Canadians found that applying a *Rhizobium* inoculant to the oat seed was a more effective technique than applying the same inoculant to alfalfa when oat was used as a companion crop.
- 2 38. (True or False) Steve Zwinger at Carrington found that peat-based inoculants generally were less effective than the liquid or clay-based inoculants in pea used for seed.
- 2 39. Explain how a grass in a grass-legume mixture obtains nitrogen from the legume.
- 5 40. How much nitrogen will potentially be available to the following cereal crop if you are plowing out a 4-year-old alfalfa stand that has a good stand and about 10 inches of growth or 0.9 tons/acre plowed down. First give the assumptions that you must make to make the calculation (3 points) and then determine the amount of N (2 points).
- 2 41. (True or False) Soil compaction from the heavy harvesting equipment and loads of hay is a major problem in the Red River Valley and is the reason that South Dakota State University has recommended light tillage to offset the compaction.

Upon my honor, I have neither given or received aid in taking this exam_____.

[Quiz 3 answers](#)