

Module 3: Nitrogen Cycling, Testing, and Fertilizer Recommendations

SELF-STUDY EXAMINATION—ROCKY MOUNTAIN CCA

4449-3 QUIZ

DIRECTIONS

1. Clearly mark an “X” next to the best answer to each question. Complete evaluation form and registration form.
2. Tear out this page and place in envelope along with a \$20 check (processing fee) payable to the American Society of Agronomy (or fill out credit card information). Payment in U.S. funds only.
3. Mail self-study exam and fee to: ASA c/o CCA Self-Study Exam, 677 S. Segoe Road, Madison, WI 53711.

A passing exam score (70%) is worth 2 Rocky Mountain CEU in **nutrient management**.

QUESTIONS

1. Why might it be beneficial to a crop to have ammonium rather than nitrate as the major form of available N?
 a. Ammonium makes the leaves greener. c. Ammonium is more mobile.
 b. Ammonium is less likely to leach. d. Nitrate is toxic to the plant.
2. How much N would you expect 3 t/ac of timothy to remove, based on Table 2?
 a. 28 lb/ac b. 56 lb/ac c. 108 lb/ac d. 112 lb/ac
3. The conversion from ammonium to nitrate is known as
 a. mineralization b. N fixation c. nitrification d. denitrification
4. The conversion of nitrate to nitrogen gas is known as
 a. N₂ fixation b. desorption c. denitrification d. immobilization
5. The conversion of nitrogen gas to plant available N is known as
 a. N₂ fixation b. desorption c. denitrification d. immobilization
6. The conversion of organic N to available N is known as
 a. N₂ fixation b. desorption c. mineralization d. immobilization
7. The conversion of available N to organic N is known as
 a. N₂ fixation b. desorption c. denitrification d. immobilization
8. Nitrification occurs fastest under which of the following conditions?
 a. Water logged soils, pH 8 c. Water logged soils, pH 6
 b. Aerobic soils, pH 8 d. Aerobic soils, pH 6
9. Denitrification amounts are highest under which of the following conditions?
 a. Consistently aerobic c. Oscillating between aerobic, waterlogged
 b. Consistently waterlogged d. Semi-arid, tilled soils
10. What conditions will minimize ammonia volatilization following a urea application?
 a. Warm soils, incorporated c. Warm soils, broadcast
 b. Cool soils, incorporated d. Cool soils, broadcast
11. Why is ammonia volatilization generally believed to be low in Montana and Wyoming?
 a. well buffered soils/cool temperatures c. urea is generally incorporated
 b. high pH soils/cool temperatures d. MAP is main N source in MT and WY
12. If the soil carbon was 2.0% and total soil nitrogen was 0.1%, how much additional N, at a minimum, would be needed to immediately have N available for plant uptake?
 a. 0.1% b. 0.05% c. 0.02% d. 0%
13. What happens to available N after applying a high C:N (>30:1) organic material?
 a. It goes up and then down c. It drops quickly to near 0, and then increases
 b. It increases gradually d. No change
14. Why might fertilizing legumes with more than approximately 40 lb N/ac not be advantageous?
 a. It inhibits P uptake c. It inhibits nitrification
 b. It results in excessive denitrification d. It inhibits biological N₂ fixation

15. N fertilization of an alfalfa-grass stand will generally favor
 a. Alfalfa b. Grass c. Deep rooted forbs d. Shallow rooted forbs
16. What two cropping systems may increase nitrate leaching based on Bauder's (1993) study?
 a. No till and summer fallow c. Minimum till and manure application
 b. Conventional tillage and summer fallow d. Conventional tillage and crop rotation
17. How much NO₃-N (in lb/acre) is in a 3 foot soil profile that has 5 ppm NO₃-N in the top 6 inches, and 2 ppm NO₃-N from 6-36 inches?
 a. 7 b. 20 c. 30 d. 40
18. Using Table 6, how much fertilizer N should be recommended for a soil containing 20 lb NO₃-N/acre if spring wheat is grown that has a yield potential of 60 bu/acre?
 a. 168 lb/acre b. 198 lb/acre c. 230 lb/acre d. 238 lb/acre
19. How much anhydrous ammonia (82-0-0) should be applied if the N fertilizer recommendation is 100 lb N/acre?
 a. 82 lb/acre b. 100 lb/acre c. 118 lb/acre d. 122 lb/acre
20. If the producer's goal is to produce 50 bu/acre of **winter wheat** with 14% protein, how much N should be applied assuming the soil has essentially no residual NO₃-N?
 a. 118 lb/acre b. 146 lb/acre c. 150 lb/acre d. 160 lb/acre

SELF STUDY EVALUATION FORM: Nutrient Management Module 3

Rating Scale: 1 = Strongly Disagree 5 = Strongly Agree

Information presented will be useful in my daily crop advising activities:	1	2	3	4	5
Information was organized and logical:	1	2	3	4	5
Graphics/tables were appropriate and enhanced my learning:	1	2	3	4	5
I was stimulated to think how to use and apply the information presented:	1	2	3	4	5
The article addressed the stated competency area and performance objective(s)	1	2	3	4	5

Briefly explain any "1" ratings:

Topics you would like to see addressed in future self-study materials:

SELF-STUDY EXAM REGISTRATION FORM-FOR ROCKY MOUNTAIN CCA CREDIT

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A \$2.00 Processing Fee will be added to all credit card charges.

I certify that I alone completed this self-study course and recognize that an ethics violation may revoke my CCA status.

Signature of Registrant as it appears on Code of Ethics

Date