

1952

## EC193 Revised 1952 Anhydrous Ammonia, A Good Nitrogen Fertilizer

M. D. Weldon

W. E. Ringler

Follow this and additional works at: <http://digitalcommons.unl.edu/extensionhist>

---

Weldon, M. D. and Ringler, W. E., "EC193 Revised 1952 Anhydrous Ammonia, A Good Nitrogen Fertilizer" (1952). *Historical Materials from University of Nebraska-Lincoln Extension*. 4472.  
<http://digitalcommons.unl.edu/extensionhist/4472>

This Article is brought to you for free and open access by the Extension at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Historical Materials from University of Nebraska-Lincoln Extension by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

1952

AGRI

S  
85

E7

#193

E.C. 193

(Revised)

## Anhydrous Ammonia

### A Good Nitrogen Fertilizer

M. D. Weldon and W. E. Ringler

#### What is Anhydrous (liquid) Ammonia?

#### How is it stored and transported?

Anhydrous ammonia is a concentrated nitrogenous fertilizer containing 82 per cent nitrogen. It is a gas at ordinary temperature and pressure. It is usually stored and shipped in strong tanks as a liquid under pressure. The pressure depends entirely upon the temperature. At minus 28° F., the pressure is atmospheric (14.7 lb. per sq. in.); at 32° F. it is 62 lb. per sq. in.; at 100° F. it is 212 lb. per sq. in.; at 124° F. it is 303 lb. per sq. in. The density at 70° F. is 38 lb. per cubic foot (5.1 lb. per gallon).

Ammonia is soluble in water and can be applied in irrigation water by releasing it into the water in the lateral. But it is usually applied by means of a special implement which injects the gas into the soil. When applied in this manner it is a good nitrogenous fertilizer for either irrigated or nonirrigated crops.

How is it used?

#### (1) By direct application to the soil.

Since anhydrous ammonia is a gas when under atmospheric pressure it must be placed into the soil. Field and row-type cultivators are both adaptable to ammonia injection with the supply tank mounted on the tractor or implement frame. Simple controls are available to meter the ammonia through flexible tubes to applicators mounted on the back edges of the shanks. These are lowered into the ground like a cultivator and as the tractor moves down the field, the ammonia is deposited at the base of each furrow and immediately covered to avoid loss to the atmosphere. The metering device can be set to apply nitrogen at any desired amount per acre. The supply tank on the tractor or implement is filled from a large storage tank on a truck or trailer.

UNIVERSITY OF NEBRASKA-LINCOLN



R02378 93622

UNIVER

A

ULTURE

RE

W. V. LAMBERT, DIRECTOR

RECEIVED

DEC 9 1970

COLLEGE OF AGRICULTURE



(2) By application in irrigation water.

Anhydrous ammonia will dissolve readily in water. It may thus be carried to the soil in irrigation water. For uniform application it is necessary first to run the water down the furrows until the water has reached the far end, then release the necessary amount of ammonia into the lateral in a short time (15 to 30 minutes), and shut off the flow of water in the furrows a few minutes after the ammonia supply is shut off.

Application through sprinkler systems is not recommended because the ammonia usually causes clogging of the nozzles with precipitated lime. Also there may be loss of ammonia into the air when this method is used.

In recent years anhydrous ammonia has been used successfully in California as a nitrogenous fertilizer applied in the irrigation water, and also as a direct application for a variety of crops. The direct application to the soil for cotton, corn and small grains is a successful practice in Mississippi. The chief advantage in the use of anhydrous ammonia seems to be the low cost of production compared with other nitrogen carriers. At present the costs involved in storage and handling may offset in large measure the advantages of the low production cost.

## **Experimental Results in Nebraska**

Field plot tests with anhydrous ammonia and other nitrogenous fertilizers indicate that it is generally as good as others, if applied properly, for corn, small grains, and brome grass. It may be expected to give good results on any crops which respond well to other nitrogenous fertilizers, as for example potatoes, sugarbeets, and the cool season grasses such as the wheatgrasses.

The time of application of anhydrous ammonia to corn has been tested for two years. The results are given in Outstate Testing Circulars 14 and 20. In 1950, application of ammonia before planting was fully equal to sidedressing with ammonium nitrate carrying an equal amount of nitrogen, and superior to sidedressing with ammonia when the corn was 5 to 30 inches high. But in 1951 the results seemed to favor sidedressing with ammonia, rather than preplanting application. This was especially true where the rate was 40 pounds of nitrogen per acre. For the 80 pound rate the time of application was less significant. In every case, regardless of the time of application, the increases in yield were profitable, ranging from 9 to 26 bushels for 40 pounds of nitrogen and 24 to 32 bushels for 80 pounds of nitrogen in the form of anhydrous ammonia.

Experiments on sugarbeets at the Scotts Bluff Station in 1951 showed that anhydrous ammonia put into the soil prior to planting gave results equal to the application of ammonium nitrate at block-

ing and thinning time. Three rates of application were tried on a soil seriously deficient in available nitrogen. The rates were 40, 80, and 120 pounds of nitrogen per acre. The 40 and 80 pound rates produced profitable increases in yield of beets; the 120 pound rate produced no greater yield of beets than the 80 pound rate.

For potatoes, anhydrous ammonia is probably most effective if applied before planting, or during the first tillage operation after planting. The rate of application should be 40 to 80 pounds of nitrogen per acre.

For small grains, injection of ammonia into the soil before planting seems to be most satisfactory. For wheat, spring application before the 15th to 20th of April has given good results. The applicator shanks cause little if any damage to the crop unless the soil is too wet or too dry. If the ground is dry or cracked it is advisable to use a treader or roller after injecting the ammonia. The distance between applicator shanks should be 12 to 14 inches.

For bromegrass, injection of anhydrous ammonia under the sod in October gives highest yields of hay, pasturage, and seed. For hay or spring pasture, application in March is about 75% as effective as in October. Spring application for seed production is NOT very effective.

#### Recommendations for corn

Rate: Use 40 to 80 pounds of nitrogen per acre on non-irrigated land, 40 to 120 pounds under irrigation.

Time: Before planting or listing, or sidedressing when corn is 5 to 30 inches high.

Method: Special implement to place the ammonia in bands 12 to 30 inches apart and 4 to 6 inches deep. When used as sidedressing, ammonia may be placed on one or both sides of the row, at least 8 to 10 inches away, and 4 to 6 inches deep.

#### Recommendations for sugarbeets and potatoes

Rate: 40 to 80 pounds of nitrogen per acre.

Time: Shortly before planting or at the first tillage operation after planting.

Method: Special implement to place the ammonia in bands 16 to 20 inches apart and 4 to 6 inches deep.

Phosphate: Where soil is deficient in available phosphorus as well as nitrogen, best results are obtained by applying



both. Superphosphate or mixed fertilizer containing phosphate should be drilled or disked in before planting at the rate of 60 to 100 pounds of available phosphate ( $P_2O_5$ ) per acre.

### Recommendations for small grains

Rate: 30 to 40 pounds of nitrogen per acre.

Time: Just before planting or within a few weeks before planting. For wheat, early spring application (before the wheat is 6 inches tall) is also effective.

Method: Special implement to place the ammonia in bands 12 to 14 inches apart and 4 to 6 inches deep.

Phosphate: Where small grains respond to both nitrogen and phosphate, best results are obtained by applying both. Superphosphate should be drilled in with the seed at a rate to supply 20 to 40 pounds of available phosphate ( $P_2O_5$ ) per acre, or disked in before seeding at about twice this rate, and anhydrous ammonia applied as recommended above.

### Recommendations for brome grass.

Rate: For seed production, 40 to 80 pounds of nitrogen per acre. For hay or pasture, 60 to 100 pounds.

Time: September, October, or November.

Method: Special implement to place the ammonia in the soil in bands 12 to 14 inches apart and 4 to 6 inches deep.

Depth and method of application to all crops should be such as to insure no immediate loss of ammonia to the air. In many cases it may be necessary to run a disk, shovel, or other device immediately behind each shank, in order to cover the ammonia and prevent loss.

For additional information on the use of fertilizers, see the following circulars:

EC 175, Soil Fertility Practices

EC 194, Which Nitrogen Fertilizer Shall I Use?

CC 105, Fertilizer Recommendations for Eastern Nebraska

CC 106, Fertilizer Recommendations for Central Nebraska

CC 107, Fertilizer Recommendations for Western Nebraska

CC 108, Fertilizer Recommendations for Irrigated Land In  
Nebraska

Outstate Testing Circular 10, Results with Fertilizers on Wheat and  
Rye

Outstate Testing Circular 13, Results with Fertilizers on Spring  
Grains

Outstate Testing Circulars 14 and 20, Results with Fertilizers on  
Corn