

100,000 TONS OF HAY

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Fig. 1. Oats grown for hay on upland soils in Clark County respond to the application of nitrogen. The application of nitrogen resulted in a yield of 8,233 pounds of hay to the acre. The yield without fertilizer was 2,641 pounds per acre. Similar results were obtained on many other upland soils of Western Washington.

About one hundred thousand acres of small grain hay is planted annually¹ in western Washington. The average yield is less than 1¾ tons per acre².

(1)-(2)—1935 census.

This indicates that the yield on much of the acreage must be very low. Surveys have shown that at least three fourths of the plantings are made on the hill soils throughout western Washington. Studies have shown that the poorest yields of oats, wheat, or other grain hays are usually obtained on these upland soils. The cereals are planted either in the spring or in the fall. Oats, wheat and other grains planted on these soils grow very slowly in the spring. The leaves usually have the yellow color characteristic of nitrogen deficiency. On the better drier bottom soils and on the fertilized hill soils these conditions do not develop.

Pot culture studies and field trials have shown that this yellow condition is definitely due to nitrogen deficiency and that it can be corrected by moderate applications of inorganic nitrogen fertilizer. The response obtained from applications of nitrogen to fall planted oats on Lauren sandy loam (Fig. 1) in Clark County are given as an indication of the responses that are obtained from the application of nitrogen to grain hays on much of the hill land throughout western Washington. The yield from the check plot in these trials which had received no fertilizer was 2,641 pounds of oat hay per acre. Plots that received one hundred pounds of sodium nitrate yielded 4,530 pounds per acre, plots that received 200 pounds of sodium nitrate, 8,233 pounds, and plots that received 300 pounds of sodium nitrate, 7,822 pounds per acre. Similar results have been obtained on other upland soils, such as the Melbourne, the Olympic, the Salkum, the Everett, the Alderwood, the Whatcom soil and numerous others found in this area.

These trials have indicated that applications of from thirty to forty pounds per acre of actual nitrogen will produce the most economical response. It has been possible, in these trials, to obtain from one to more than a two ton increase in yields of oat hay at a fertilizer cost of approximately two to five dollars.

Broadcast application of approximately 200 pounds of sodium nitrate or its nitrogen equivalent in other inorganic carriers is recommended for soils on which the oats or other grains show the yellowing and dwarfing due to nitrogen deficiency. The application should be made when the plants have started active growth in the spring and before they are more than eight to ten inches tall to be most effective. The best responses will be obtained from fall planted or early spring sown grain hay.

Applications of nitrogen are not recommended for oats or other cereals that have developed large green leaves and good growth early in the season. Little response can be expected if the soil has been well manured. Lodging of the grain may also result from the presence of excessive supplies of available nitrogen.

The use of inorganic nitrogen fertilizer in this manner should in no way alter a good soil management program which may include efficient use of barnyard manure, the use of green manure crops, and the use of other fertilizers that may result in a response in crop growth.

Studies to date have been only with fertilizers containing nitrate-nitrogen. There is a possibility that ammonia and other forms of nitrogen might not become available rapidly enough during the cool wet weather in March or April to bring about increased stooling which is partially responsible for the increased yields resulting from nitrogen applications.

Studies are underway to check the relative value of the several forms of nitrogen fertilizers for cereal hays when applied early in the spring.

RECOMMENDATIONS

1. Apply 200 lbs. of sodium or calcium nitrate or 100 lbs. of ammonium nitrate to slow-growing grain showing yellow or yellow green leaves shortly after growth starts in the spring.
2. Nitrogen should not be added to soils where grains grown for hay are dark green in color or on soils high in nitrogen or when heavy applications of manures have been made, as an excess of nitrogen may cause lodging.
3. The fertilizer should be added shortly after new spring growth starts and before the grain hay crop is eight inches tall.
4. The fertilizer may be broadcast by hand, with a wheel barrow fertilizer distributor, a "cyclone" grass seeder, with a fertilizer distributor or with other broadcasting equipment. When grain drills are used it may be necessary to lengthen the clutch throw-out rod to put the machine into gear while the discs are still out of the soil.
5. The use of inorganic nitrogen in this manner should in no way alter a good soil management program which includes the use of barnyard and green manures and the use of other fertilizers or soil amendments.

Published and distributed in furtherance of the
Acts of May 8 and June 30, 1914 by the State
College of Washington, Extension Service, J. C.
Knott, Director, and the U. S. Department of
Agriculture co-operating.

4-25-45-5m-81574