



Red clover field, Lake Park, Minn., July 2011.  
(NDSU photo)



Yellow sweetclover (right) at Streeter, N.D. (NDSU photo)



Alsike clover, Streeter, N.D. (NDSU photo)



Birdsfoot trefoil, Streeter, N.D. (NDSU photo)

# Fertilizing Alsike Clover, Birdsfoot Trefoil, Red Clover and Sweetclover in North Dakota

David W. Franzen, Soil Science Specialist, NDSU Extension Service  
Marisol Berti, Professor, NDSU Department of Plant Sciences

The acreage of alfalfa grown for hay and forage in North Dakota far outstrips that of clover. Once a common forage crop in North Dakota's early statehood (Smith, 1916), alfalfa yield and alfalfa stand persistence have made alfalfa the main legume forage in the region.

In state acreage estimates, clover is implied in the category 'other hay' fields which are not directly seeded to alfalfa. These 'clover' fields usually have low stand density related to repeated reseeding of clover in much older stands. The reported acreage of individual clover field seeding in 2016 was 5,937 acres of sweetclover, 203 acres of white clover, 201 acres of red clover and 53 acres of subterranean clover, according to the North Dakota Farm Service Agency.

The most modern use of clovers is for the production of specific honeys, such as "clover honey."

The most important component of successful clover production is a pH greater than 6. If the pH is less than 6, the soil should be limed so that establishment pH to at least 6 inches in depth is greater than 6. Generally, a loam soil with 3 percent organic matter would require about 1½ tons of 100 percent calcium carbonate-equivalent liming material to increase the soil test pH 0.5 point.

## Nitrogen

Clovers require no supplemental nitrogen (N) if they are inoculated properly. The following are the required bacterial strains needed to ensure proper inoculation:

- Alsike clover – *Rhizobium trifolii*
- Birdsfoot trefoil – *Rhizobium loti*
- Red clover – *Rhizobium trifolii*
- Yellow/white sweetclover – *Rhizobium melloti*

If clovers are seeded and the forage removed as hay, the following recommendations for nutrient replacement should be followed.

## Phosphorus (P)

If establishment soil test P levels are below 10 parts per million (ppm) (Olsen test), apply 60 pounds of P<sub>2</sub>O<sub>5</sub> per acre at seeding. Thereafter, apply 10 pounds of P<sub>2</sub>O<sub>5</sub> per ton of hay removed annually.

## Potassium (K)

If establishment soil test K levels are below 150 ppm, apply 60 pounds of K<sub>2</sub>O per acre at seeding. Thereafter, apply 50 pounds of K<sub>2</sub>O per ton of hay removed.

## Sulfur (S)

If the soil is particularly sandy, organic matter is low and seasonal rainfall has been high, application of 10 pounds of S per acre as a sulfate source of S may be beneficial at establishment.

No good diagnostic soil test is available for S. If the stand has yellowing leaves near the tops of plants, comparing a plant sample from the affected area with a sample taken from an area with normal tops may be diagnostic of an S deficiency.

## References

Smith, D.C. 1916. 19 Years Clover Growing in North Dakota. Library of Congress, Washington, D.C.  
<https://archive.org/details/19yearsclovergro00smit>

NDSU Extension does not endorse commercial products or companies even though reference may be made to tradenames, trademarks or service names. NDSU encourages you to use and share this content, but please do so under the conditions of our Creative Commons license. You may copy, distribute, transmit and adapt this work as long as you give full attribution, don't use the work for commercial purposes and share your resulting work similarly. For more information, visit [www.ag.ndsu.edu/agcomm/creative-commons](http://www.ag.ndsu.edu/agcomm/creative-commons).

For more information on this and other topics, see [www.ag.ndsu.edu](http://www.ag.ndsu.edu)

County commissions, North Dakota State University and U.S. Department of Agriculture cooperating. NDSU does not discriminate in its programs and activities on the basis of age, color, gender expression/identity, genetic information, marital status, national origin, participation in lawful off-campus activity, physical or mental disability, pregnancy, public assistance status, race, religion, sex, sexual orientation, spousal relationship to current employee, or veteran status, as applicable. Direct inquiries to Vice Provost for Title IX/ADA Coordinator, Old Main 201, NDSU Main Campus, 701-231-7708, [ndsu.eoaa@ndsu.edu](mailto:ndsu.eoaa@ndsu.edu). This publication will be made available in alternative formats for people with disabilities upon request, 701-231-7881. web-2017, web-2-23