



Climate and Soil Considerations Guide to Farming in New York State

#2

Revised
11/26/08

Important Considerations when Looking for Land

Climate

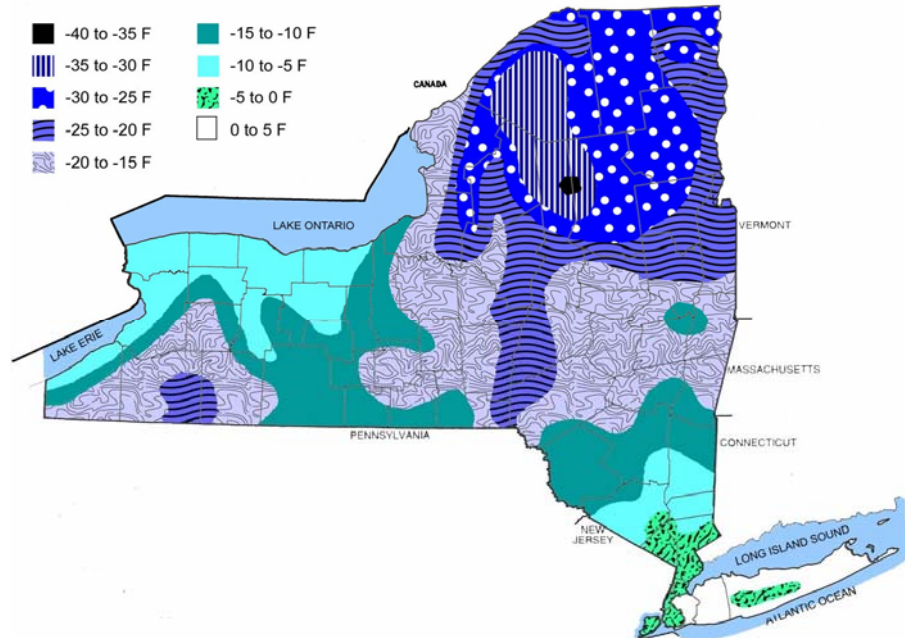
New York State’s climate is very diverse. It is not uncommon that just 10 miles away, you could move from one microclimate to a completely different one. For example, precipitation is double the state average in the Tug Hill Plateau region and the recommended winter hardiness level changes from -5°F to -40 °F in a 100-mile distance as you travel from Wayne County to the Adirondacks.

For information about the climate in a particular area of NYS, check the Northeast Regional Climate Center website:

www.nrcc.cornell.edu/index.html or call 607-255-1751.

Climatic factors that impact crop growth include: minimum temperatures, hardiness, frost-free dates, growing degree-days, precipitation, air drainage, and wind exposure. You can learn more about these factors on the NY Beginning Farmer website at <http://beginningfarmers.cce.cornell.edu> - look at Unit 3 of the lessons, “Evaluating Land and Facilities”

USDA Hardiness Zones



Sources: Cornell Gardening Resources, <http://www.cce.cornell.edu/programs/hort/gardening/weather/images/zonelg.jpg>. U.S. Bureau of the Census, 2002 Census of Agriculture.

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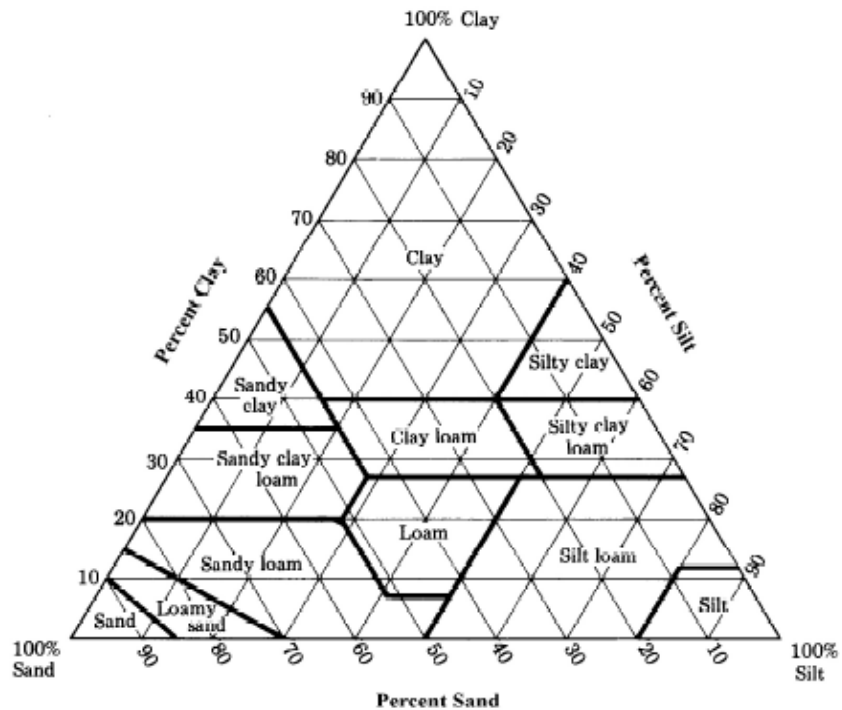
Cornell University
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Soil Considerations

Soils vary in their properties and influence what crops will grow. Important soil characteristics include: texture (the percent of sand, silt or clay particles that make up the soil as depicted in the chart); pH (acidity or alkalinity of the soil); fertility (nutrients available for crop growth); and drainage. Select the best soil possible for high value specialty and agronomic crops; for hay or pasture, soil quality is slightly less critical.

Developing an understanding of the basics of soil physiology and the factors that affect plant fertility is essential for successful agricultural production.



What is soil?

In addition to air, water, and nutrients, soils provide mechanical support to growing plants. There are four major components to soil: minerals, organic matter, water, and air. The approximate composition of a soil for optimum plant growth would have the solid space made up of 45% mineral and 5% organic matter, and the remainder would have roughly 25% water and 25% air. The water and air would be contained within the pore spaces of the soil.

Soil Texture

Soil texture refers to the size of mineral particles, specifically the relative proportion of various size groups in a given soil. This property helps determine the nutrient-supplying ability of soil solids and the supply of water and air that support plant life.

Soil texture is divided into three parts--sand, silt and clay--based on particle size. Silt and clay soils impart a fine texture and slow water and air movement. They also have high water holding capacity due to the higher percentage of pore spaces. These are referred to as heavy soils, with clay being the heavier of the two. Clay is also the primary plant nutrient-holding mechanism in the soil.

Soil textural names are how we refer to and identify our soils. Sandy to gravelly soils are referred to as lighter soils, as water moves through more rapidly than the heavier soils, and they have lower water holding capacities. Sandy soils contain 70% or more sand by weight. Clay soils have at least 40% clay and may have names like sandy clay or silty clay. Loamy soils possess the desirable qualities of sand and clay without exhibiting the undesirable characteristics of extreme looseness, low water holding capacity and slow water and air movement. Some examples would be clay loam, sand loam, silt loam, and silty clay loam.





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Soil pH

Soil pH is used as a measure of its relative alkalinity or acidity. Soil test results for pH are based on a pH scale where 7.0 is neutral, above 7.0 is alkaline and below 7.0 is acidic.

Soil pH is critical to health plant growth. It directly affects the availability of the essential nutrients to plants. It is important to know the optimum pH for the plants to be grown. Soil pH also affects the adaptability of plants in a given soil. Most agricultural plants prefer a slightly acidic pH of 6.4. However there are exceptions so be familiar with the pH and nutritional needs of all the crops to be grown.

The addition of any liming (alkalinizing) or acidifying materials should always be based on the results of a reliable soil test. Over-application of either can lead to crop injury.

Soil Organic Fraction

A good, loamy soil contains about one-half pore space (air and water) and one-half solid material. Of this one-half solid material, 90% is composed of minerals (bits or rock). The remaining 10% is the organic fraction. The influence of this small part of the soil on the soil's ability to support plant growth is significant.

The soil's organic fraction is dynamic and is always undergoing a process of change. The organic fraction consists of living organisms, plant and animal residues, and plant roots. Adequate levels benefit soil in many ways including; improved physical condition, increased water infiltration, improved soil tilth, decreased erosion losses, enhanced nutrient availability and retention for plants.

Soil Compaction and Depth

Fine textured soils are more easily compacted than lighter soils, especially when they are wet. Compaction reduces pore spaces that hold air and water. Plant growth in compacted soils will be significantly reduced. Operating equipment on wet soils can create problems in a field for an entire season or longer.

Sometimes a soil is referred to as being deep or shallow. Soil depth can be defined as that depth of soil material favorable for plant root penetration. Deep, well-drained soils of desirable texture and structure are favorable for plant growth. Shallow, poorly drained soils are very restrictive to plant growth.

Soil Testing Services

The Cornell Nutrient Analysis Laboratory (soon to be AgriOne Services) will test soil for nutrients and pH and indicate amounts of lime and fertilizer needed. Soil samples can be taken to your county extension office where you will fill out forms and pay for the testing. Results will be mailed in approximately 2 weeks. To contact the lab call 607-255-4540 or check: www.css.cornell.edu/soiltest/newindex.asp

Soil Maps

To learn about the soil types on your property, a useful tool available in almost all NY counties is the **USDA-NRCS Soil Survey** that consists of soil maps and descriptions of soil characteristics and capabilities. You can find a copy of the Soil Survey at county offices of USDA-NRCS, Soil and Water District, or Cornell Cooperative Extension. Maps can also be viewed online at: <http://websoilsurvey.nrcs.usda.gov>

