

Alfalfa Site Selection

Jonathan Kubesch
Assistant Professor –
Forage, Animal Science

Alfalfa is a deep-rooted perennial legume that grows under a wide range of environmental conditions on sites where it is well adapted. Site selection is more important for alfalfa than for many other forages. Poorly established stands of tall fescue or bermudagrass can persist at low productivity levels and spread throughout a field over time. Alfalfa does not spread in a field if it is poorly established, and it does not persist well under poor management. However, with good management a field of alfalfa can produce high quality forage for 5-10 years.

Make a Field Inventory

Before planting alfalfa, an inventory of the field to be planted is essential. Many soil physical factors affect alfalfa production and maintenance. Information is needed on factors including soil texture, drainage (both surface and internal drainage), flood hazard, rooting depth, hardpans (soil layer that restricts rooting), stoniness, slope and fertility. For assistance in collecting this information, ask for help from the agent at the county Extension office.

Soil texture and drainage class, soil depth and field slope are natural properties that cannot be significantly changed, so soils must be selected to match the requirements for alfalfa. Low soil fertility can be improved for alfalfa production prior to planting with addition of limestone, fertilizer or animal manure.

Soil Texture/Drainage Class

Alfalfa grows well under a wide range of soil textures if no other conditions are limiting. Medium-textured soils such as loams, silt loams and sandy loams are ideal. Light-textured soils, such as coarse sands, are too drought prone for alfalfa. Heavy-textured soils, such as massive clays, are often too wet to support healthy roots. Also, winter heaving of plants is more common on clay soils.

Soils for alfalfa must have good surface and internal drainage. Alfalfa requires soils that have a drainage classification of well drained, moderately well drained or somewhat excessively well drained for optimum production and long stand persistence. Alfalfa will not persist in poorly drained soils. Fungi which cause root rot diseases thrive in wet soils and can cause excessive stand loss. Alfalfa roots are sensitive to low oxygen levels and will die if the soil is saturated or flooded for an extended period.

Soil color can give clues about the drainage of the site. Gray or mottled soil colors suggest poor drainage. Brown or red soil colors suggest good internal drainage. Information regarding soil depth and drainage class are provided in published county soil surveys. Soil survey manuals are available through the Natural Resources Conservation Service and contain aerial photographs and soil maps that show the locations of soils on a particular farm. Soil survey information is a valuable tool in assessing a site for alfalfa production.

*Arkansas Is
Our Campus*

Visit our web site at:
<https://www.uaex.uada.edu>

Alfalfa cannot tolerate prolonged flooding. Since alfalfa normally remains dormant from the end of November through February, very short-term flooding during these months will not likely damage the stand. Floods of any duration from March through October may not only damage the hay crop but can also drown the plants that are located in low places in the field where water remains too long. Debris left on the field after the water subsides also makes harvest more difficult.

Soil Depth

Alfalfa develops a deep root system and is best suited to deep soils so that the roots can extract nutrients and water from a large volume of soil. Alfalfa roots can penetrate deeper than 15 feet in unrestricted soils giving it excellent drought tolerance. Soils in which rooting depth is limited by a shallow hardpan, shallow bedrock or high water table are not well suited for alfalfa production.

Hardpans are hard layers in the soil that are strong barriers to the development of the alfalfa taproot. Roots may grow down to the hardpan, but no further. As a result, the potentially deep-rooted alfalfa becomes a shallow-rooted plant that is more susceptible to drought stress. Hardpans may be either natural or man-made. Natural pans, called “fragipans,” usually occur within 1 1/2 to 2 feet below the soil surface. Forage production is limited on fragipan soils because the shallow depth restricts rooting depth and available water. Man-made pans or “plow-pans” are caused by improper tillage and usually occur at plow depth. This type of layer can often be broken by deep tillage.

For alfalfa, soil depth should be at least 3 to 4 feet with no impermeable layers, hardpans or bedrock that restrict root growth within that zone. Alfalfa has a higher water requirement than many other forages. Soils which are less than 3 feet deep over hardpans or bedrock do not supply enough moisture during prolonged drought periods for good alfalfa stand survival. Alfalfa will grow well in rocky soils if the rock exists as fragments and does not form solid layers that inhibit rooting depth. Rocks on the soil surface can be removed during stand establishment or pushed into the soil surface with a heavy field roller.

Soil Fertility

After an acceptable site has been selected, soil fertility is the major key for establishing and maintaining productive and persistent alfalfa stands. Fields should be soil tested well in advance of planting so that fertilizer and lime can be applied to correct

deficiencies. Soil fertility must be adequate before the alfalfa is planted. Poor establishment and survival will result if alfalfa is planted in soil that is too low in fertility.

Soil fertility levels should be medium or higher for rapid and vigorous establishment. Target soil fertility levels for good establishment include a soil pH of at least 6.5, a soil test phosphorus level of at least 60 lbs per acre and a soil test potassium level of at least 250 lbs per acre. Fertilizer and limestone applications should be based on soil test recommendations and desired productivity levels. Commercial fertilizer or animal manure can be used to build soil nutrient levels before establishing alfalfa.

Limestone should be applied and preferably plowed in the soil at least six months in advance of planting to increase soil pH to acceptable levels. Incorporating limestone into the top six inches of soil allows it to reduce soil acidity more rapidly. This can be done during any previous crop rotation with annual forages or grain crops. Topdressed or surface applied limestone takes longer to neutralize soil acidity because it is exposed to less soil surface area. After the stand is established, lime and fertilizer can only be topdressed or surface applied.

Other Considerations

Field location will influence convenience of necessary management practices for alfalfa. Alfalfa can be harvested four to five times per year by grazing or hay harvest. Application of fertilizer, insecticide and herbicide will be necessary periodically. Selecting fields convenient for moving cattle or machinery will facilitate timely harvest and management. In addition, the site should be assessed for potential deer damage. Alfalfa is a preferred forage by deer and can work well in large food plots, but can be quickly grazed out in small food plots. In areas with high deer densities, small fields that are surrounded by woods and out of sight from everyday human activity tend to have greater feeding damage by deer than larger fields in more open areas.

Summary

For productive and persistent alfalfa production, consider these factors when selecting a site: adequate soil depth, good internal and surface drainage, correct soil texture, medium to high fertility and convenient field access for maintenance.

For assistance with alfalfa establishment or site selection, contact your nearest county Extension office.

Acknowledgement is given to Dr. John Jennings as the original authors on this publication.