



Grass Species Selection in the Northeast

In the Northeast, grass species selection is strongly influenced by soil conditions. Selecting forage species that are best suited to a particular soil type and forage use provides the most efficient land use. In NY forage species may be selected using a web-based program based on potential yield, intended forage use, and soil type (<http://forages.org>).

Get a good start

Perennial forage management starts with matching species to a given site. Proper forage species selection is an important management decision that can affect the profitability of farms. Selecting the appropriate perennial forage species that will persist on a given site is the first step in effective nutrient management planning. Traditional publications cannot provide specific guidelines for species selection that adequately address the variation in yield and persistence due to soils.

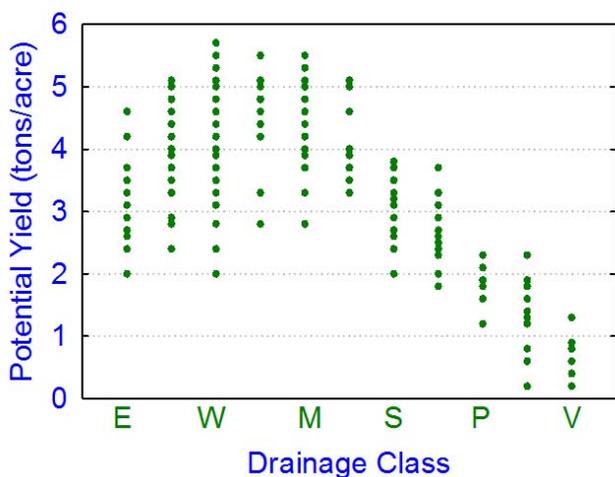


Figure 1. Orchardgrass yield potential on 640 NY soil types. Drainage classes are exceptionally well drained (E) to very poorly drained (V).

Species Selection Tool

Yield estimates for grasses initially were derived from an available database of corn yields for each soil type, while legume yield were based on a database of alfalfa yield for

each soil type. All available data on actual yields of forage species on specific soil types also was used to assist in construction of the yield database.

Forage species uses in the program include both pasture and stored feed for different livestock classes as well as soil conservation uses. A database was developed that contains potential yields for over 30 species and over 40 species mixtures on each of 612 agricultural soil types in New York State. The database has potential forage yields based on native soil drainage as well as yields for optimal artificial drainage.

Potential yields are modified by the program based on soil pH and the optimal pH range for each forage species. Species are recommended based on potential yield, intended forage use and soil type. The program also provides pasture yield distributions, a summary of species traits and potential corn grain and silage yields for a selected soil type.

A subroutine using basic soil characteristics and location (zip code) allows the program to estimate the soil type, if the soil type is not known. The subroutine was developed by Shaw Reid for use in the Cornell Nutrient Analysis Laboratory, and is based on a statewide map of soil associations and soils descriptions for New York State. If the subroutine estimation turns out not to be the exact soil actually present, it will most likely be a soil with very similar characteristics and yield potential.

Advantages of a Web-based Tool

Some programs provide varietal comparisons for field trials, but do not compare species over all environments. Program results combine the knowledge and experience of forage and soil experts. Every soil/species yield estimate is included in the database. This means information can be modified to incorporate the individual characteristics of each soil series.

This method is more refined than any predictive relationship that could be derived between species yield and specific soil properties. This type of database structure can duplicate expert knowledge more accurately and is likely more accurate and consistent than the individual advice of a soil or forage expert.

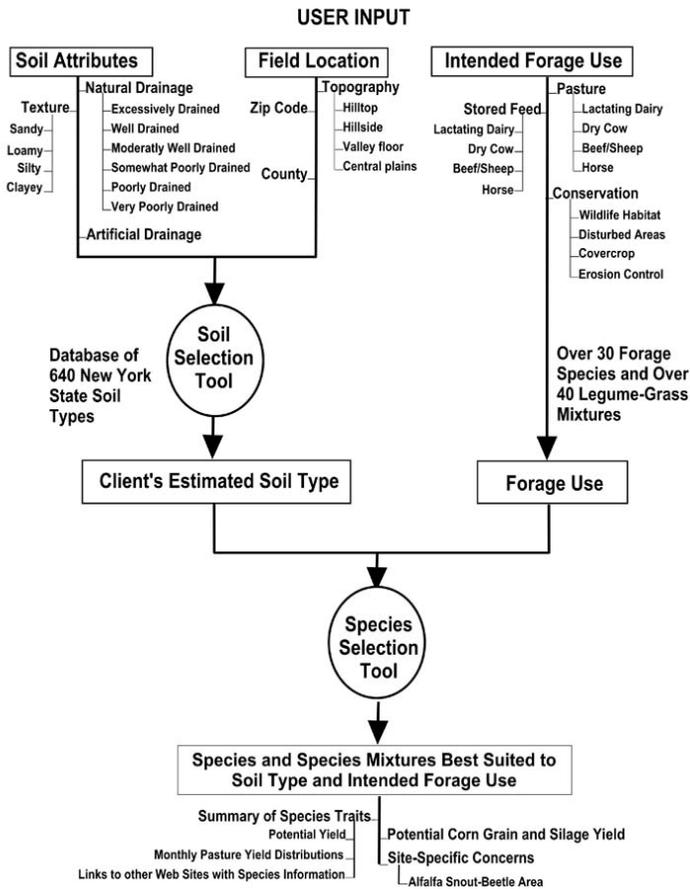


Figure 2. Flow diagram for species selection tool.

Any program results that appear unreasonable to experts can be easily corrected. Database entries can be adjusted for each species/soil combination without affecting other estimates because each combination is explicitly listed independently in the database. Similarly, species response to pH range or other yield corrections can be modified for each individual crop.

Concepts initially developed for dairy forage systems have been expanded to include species selection for horse pasture and soil conservation uses. Inclusion of these added functions expand the clientele served, and only

required simple additions to the species database tables.

Penn State Tool with Aerial Maps

The program was modified to fit Pennsylvania soils and a graphical version was created. This allows a user to select a county and township on a map, and then zoom down to identify individual fields on aerial photos. The aerial photos are linked to soils maps, and soils information is used by the selection program.

Summary

The species selection tool is not a model, but is method to transfer expert advice based on individual knowledge as well as field trials. Databases such as this can be much larger than found in typical extension publications and can give more specific suggestions. Computer-based species selection agrees with current published guidelines.

Although the soil type and species yield relationships will not apply directly to other regions of the world, this method could be used to create similar species selection programs for other regions.

Additional Resources

- 2011 Cornell Guide for Integrated Field Crops Management. Electronically accessible at: <http://ipmguidelines.org/Fieldcrops/>.
- Species selection NY: <http://forages.org>
- Species selection PA: http://www.forages.psu.edu/selection_tool/index.html

Disclaimer

This information sheet reflects the current (and past) authors' best effort to interpret a complex body of scientific research, and to translate this into practical management options. Following the guidance provided in this information sheet does not assure compliance with any applicable law, rule, regulation or standard, or the achievement of particular discharge levels from agricultural land.

For more information



Cornell University
Cooperative Extension

Grass Management Manual
<http://forages.org>

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