UNIVERSITY OF FLORIDA
EXTENSION
Institute of Food and Agricultural Sciences

CIR938

Estimation of Bermudagrass Production in Florida [1]

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Introduction

Bermudagrass is grown extensively in Florida for pasture and hay. Numerous studies have been conducted. Jeffers (1955) compared the response of Coastal bermuda and Pensacola bahia to applied N and water availability. Ruelke and Prine (1971) compared the response of several warm season grasses, including Coastal bertnuda, to applied N. More recently, Rhoads and Stanley (1989) evaluated the response to applied N and S. Mathematical models have been developed to relate dry matter production (Overman et al., 1988; Overman et al., 1990a) and crude protein (Overman and Wilkinson, 1990) to management practices.

This publication provides graphical and tabular estimates of production (harvested dry matter and crude protein) in relation to management factors (applied N, harvest interval, and rainfall conditions). Results are drawn from more detailed analysis presented elsewhere (Overman et al., 1990b) and based upon field studies with various soil types (Red Bay sandy loam, Scranton loamy sand, and Dothan loamy sand). The reader is referred to cited articles for more details of the studies and analysis. Results here are given in English units. This article is a companion to one on bahiagrass (Overman et al., 1989).

Results

A graphical format is used to present the most information in limited space. Figure 1 shows annual dry matter yields (tons/acre) in relation to applied N (lb/acre), harvest interval (weeks) and moisture conditions (optimum season vs. dry season). Figure 2 shows crude protein (%) in relation to applied N and harvest interval. Figure 3 shows cumulative dry matter production over the season for a harvest interval (dt) of 6 weeks, applied N of 100 lb/acre and 200 lb/acre, and optimum and dry seasons.

Estimates are also shown in Table 1 for a harvest interval of 6 weeks (a reasonable interval for hay production).

Example

The graphical procedure is now illustrated. For our example we choose:

applied N = 100 lb/acre

harvest interval (dt) = 6 weeks

1. This document is Circular 938, one of a series of the Department of Agricultural and Biological Engineering, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. First published May 1991; revised February 1997; reviewed April 2000. Please visit the EDIS Web site at **http://edis.ifas.ufl.edu**.

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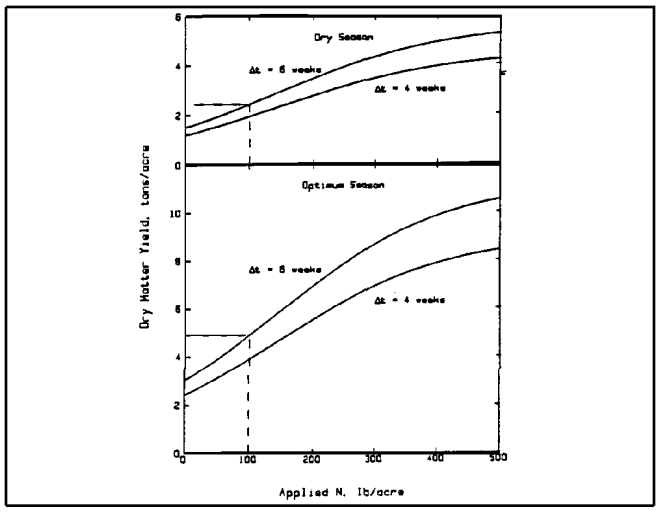

Figure 1 .

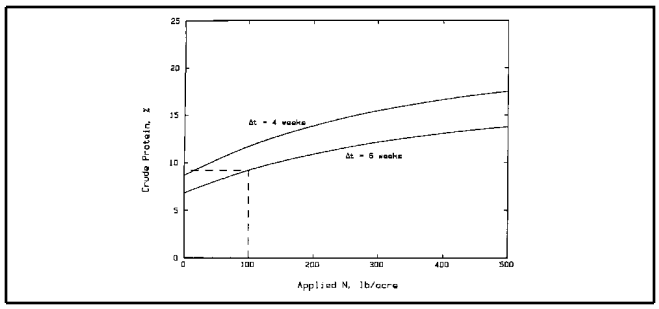

Figure 2 .

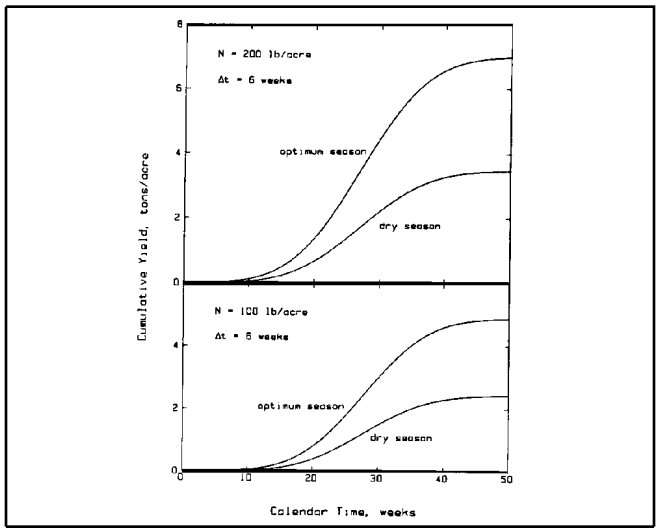

Figure 3 .

Estimated yields are (Figure 1):

optimum season: Yield = 5.0 tons/acre

dry season : Yield = 2.5 tons/acre

Estimated crude protein (CP) is (Figure 2):

CP = 9.0%

It should be pointed out that at applied N of 135 lb/acre, dry matter yield is half the maximum potential for that harvest interval and those moisture conditions.

Estimated dry matter accumulation over the season is shown in Figure 3. Yields for the dry season are half that for optimum season. Time to accumulate 50% of total dry matter is approximately 27 weeks (July 10).

The alternative procedure is to use Table 1. For the harvest interval of 6 weeks and applied N of 100 lb/acre, we read crude protein of 9.2%. Dry matter yield is 5.0 tons/acre (optimum season) and 2.5 tons/acre (dry season). Corresponding N removal is 150 lb/acre and 75 lb/acre, respectively. For average weather conditions, we might average values above to obtain the yield of 3.8 tons/acre and N removal of 110 lb/acre. This latter value suggests removal (110 lb/acre) exceeding application (100 lb./acre). To sustain production, applied N of 150 lb/acre gives 10% crude protein, 4.5 tons/acre and 150 lb/acre N removal for average conditions.

Summary

This publication has described a graphical procedure for estimating yield and crude protein of bermudagrass in Florida for optimum and dry seasons. While actual yields may vary from year-to-year due to weather conditions, these results show the affect of applied N (lb/acre) and harvest interval (weeks) on production under average conditions.

For sustained yields, soil chemistry must be kept in balance by addition of lime, phosphorus, potassium, and micronutrient. Periodic soil tests are recommended for this purpose.

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Table 1.

Table 1. Estimates of crude protein and dry matter for bermudagrass harvested every 6 weeks.

		Optimum season		Dry season	
Applied N, lb/acre	Crude Protein, %	Dry Matter, tons/acre	N removal, lb/acre	Dry Matter, tons/acre	N Removal, lb/acre
100	9.2	5.0	150	2.5	75
200	11.0	7.0	250	3.5	125
300	12.2	8.8	340	4.4	170
400	13.1	9.8	410	4.9	205
500	13.8	10.4	460	5.2	230