



# Forage Management

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## The Production of Rotationally Grazed Pasture in Jefferson County

**This fact sheet describes the results of a study funded by a grant awarded to William W. Grantham, T. Neill Banks, Michael Boyd and Dr. O. C. Stine from SARE - Northeast Region. This Grant was submitted to SARE in the Northeast Region for funding by William (Bill) W. Grantham. Without his leadership and financial commitment, this study would not have been completed. Thanks also go out to Dr. O. C. Stine, T. Neill Banks and Michael Boyd who participated in this study with Bill to provide diversity in the types, locations and utilization of pastures in Jefferson County.**

This fact sheet is based on three years of work by four livestock producers in Jefferson County West Virginia. The county, which lies in the northern end of the Shenandoah Valley, is in the rain shadows from the Appalachian and the Blueridge mountain ranges. In the past, this has led to a reliance on row crop production and continuous grazing for feed rather than the use of rotational grazing. These long time traditions have discounted the use of pasture as a source of high quality forage. This fact sheet will discuss the potential dry matter yield for three types of pasture/meadow grown in this area of West Virginia. A total of 68 grazing events (cattle moved in and then out of a field) were recorded. Using a

pasture plate, 30 samples were taken before and after the livestock were in the field. Dry matter yield was evaluated by measuring the forage canopy height when depressed with an acrylic plate meter (TRIM Fact Sheet 5022, "An Acrylic Plastic Weight Plate for Estimating Forage Yield"). The samples were divided into three classes of pasture: Tall Grass-Alfalfa, Tall Grass-Clover and Bluegrass-Clover.

### Pasture Growth /Carrying Capacity

Over the three-year period of this study, the region experienced below-average rainfall and above- average temperatures. Table 1 summarizes the precipitation data. Table 2 summarizes the temperature data collected.

**Table 1: Precipitation 1997 - 1999**

<b>Farm</b>	<b>Mike Boyd</b>	<b>Bill Grantham</b>	<b>Dr. Oscar Stine</b>	<b>Neill Banks</b>	<b>Charles Town Average</b>	<b>Four Farm Average</b>	<b>Difference</b>
<b>April</b>	<b>1.62</b>	<b>2.89</b>	<b>2.82</b>	<b>3.04</b>	<b>3.23</b>	<b>2.59</b>	<b>- .64</b>
<b>May</b>	<b>1.58</b>	<b>2.2</b>	<b>2.14</b>	<b>2.48</b>	<b>3.81</b>	<b>2.10</b>	<b>- 1.71</b>
<b>June</b>	<b>1.25</b>	<b>2.75</b>	<b>3.10</b>	<b>2.92</b>	<b>3.53</b>	<b>2.51</b>	<b>- 1.02</b>
<b>July</b>	<b>2.12</b>	<b>3.22</b>	<b>2.96</b>	<b>3.59</b>	<b>3.77</b>	<b>2.97</b>	<b>- .8</b>
<b>August</b>	<b>.97</b>	<b>2.03</b>	<b>2.31</b>	<b>2.24</b>	<b>3.76</b>	<b>1.89</b>	<b>- 1.87</b>
<b>September</b>	<b>3.3</b>	<b>3.75</b>	<b>4.56</b>	<b>5</b>	<b>3.35</b>	<b>4.15</b>	<b>+ .8</b>
<b>October</b>	<b>1.76</b>	<b>1.38</b>	<b>1.59</b>	<b>1.05</b>	<b>3.38</b>	<b>1.44</b>	<b>- 1.94</b>
<b>Average</b>	<b>1.80</b>	<b>2.6</b>	<b>2.78</b>	<b>2.90</b>	<b>3.55</b>	<b>2.52</b>	<b>*****</b>

**Table 2: Temperature 1997 - 1999**

<b>Farm</b>	<b>Mike Boyd</b>	<b>Bill Grantham</b>	<b>Dr. Oscar Stine</b>	<b>Neill Banks</b>	<b>Charles Town Average</b>	<b>Four Farm Average</b>	<b>Difference</b>
<b>April</b>	<b>56.6</b>	<b>55.6</b>	<b>56.6</b>	<b>55.6</b>	<b>53.8</b>	<b>56.1</b>	<b>+2.3</b>
<b>May</b>	<b>65.7</b>	<b>64.9</b>	<b>65.7</b>	<b>65.1</b>	<b>62.0</b>	<b>65.3</b>	<b>+3.3</b>
<b>June</b>	<b>71.6</b>	<b>71.0</b>	<b>70.9</b>	<b>71.0</b>	<b>69.0</b>	<b>71.1</b>	<b>+2.1</b>
<b>July</b>	<b>78.0</b>	<b>77.5</b>	<b>77.3</b>	<b>77.1</b>	<b>75.0</b>	<b>77.5</b>	<b>+2.5</b>
<b>August</b>	<b>74.7</b>	<b>74.1</b>	<b>74.3</b>	<b>74.0</b>	<b>74.0</b>	<b>71.9</b>	<b>- 2.1</b>
<b>September</b>	<b>67.5</b>	<b>68.9</b>	<b>68.9</b>	<b>67.7</b>	<b>67.0</b>	<b>68.7</b>	<b>+1.7</b>
<b>October</b>	<b>56.1</b>	<b>54.6</b>	<b>55.3</b>	<b>56.0</b>	<b>56.0</b>	<b>55.0</b>	<b>- 1.0</b>
<b>Average</b>	<b>65.4</b>	<b>66.3</b>	<b>67.0</b>	<b>65.3</b>	<b>65.3</b>	<b>66.5</b>	<b>*****</b>

The Charles Town averages are taken from a National Weather Service observer, Lawrence Lloyd, with over 60 years of data. The data were used to evaluate the three years of this

study.

The grass-legume mixtures on these four farms performed at the levels expressed in Table 3.

**Table 3: Monthly Growth Rate and Carrying Capacity**

	<b>Growth Rate</b>			<b>Carrying Capacity</b>		
	<b>Pounds per Acre per Day</b>			<b>Acres per Cow</b>		
	<b>Tall Grass -Alfalfa</b>	<b>Tall Grass -Clover</b>	<b>Bluegrass -Clover</b>	<b>Tall Grass -Alfalfa</b>	<b>Tall Grass -Clover</b>	<b>Bluegrass-Clover</b>
<b>May</b>	<b>21.2</b>	<b>60.0</b>	<b>55.2</b>	<b>1.4</b>	<b>.5</b>	<b>.5</b>
<b>June</b>	<b>52.1</b>	<b>31.8</b>	<b>30.7</b>	<b>.6</b>	<b>.9</b>	<b>1.0</b>
<b>July</b>	<b>34.3</b>	<b>30.5</b>	<b>45.6</b>	<b>.9</b>	<b>1.0</b>	<b>.7</b>
<b>August</b>	<b>33.9</b>	<b>34.6</b>	<b>20.7</b>	<b>.9</b>	<b>.9</b>	<b>1.5</b>
<b>September</b>	<b>32.2</b>	<b>48.4</b>	<b>55.0</b>	<b>.9</b>	<b>.6</b>	<b>.5</b>
<b>October</b>	<b>31.7</b>	<b>56.4</b>	<b>14.9</b>	<b>.9</b>	<b>.5</b>	<b>2.0</b>
<b>Average</b>	<b>34.2</b>	<b>43.6</b>	<b>37.0</b>	<b>.9</b>	<b>.7</b>	<b>1.0</b>

The table demonstrates that a conservative estimate over the last three years (1997-1999) would have been to plan for one cow or animal unit per acre during the growing season for grazing purposes. The tall grass-clover mixture had a faster average growth rate than the two other mixtures.

There are differences between forage combinations. These differences can be seen in comparing figures 1, 2, and 3. Figure 4 graphically demonstrates the relationship between precipitation and forage production. Figure 5 demonstrates the influence of temperature on these cool- season grasses.

Figure 1

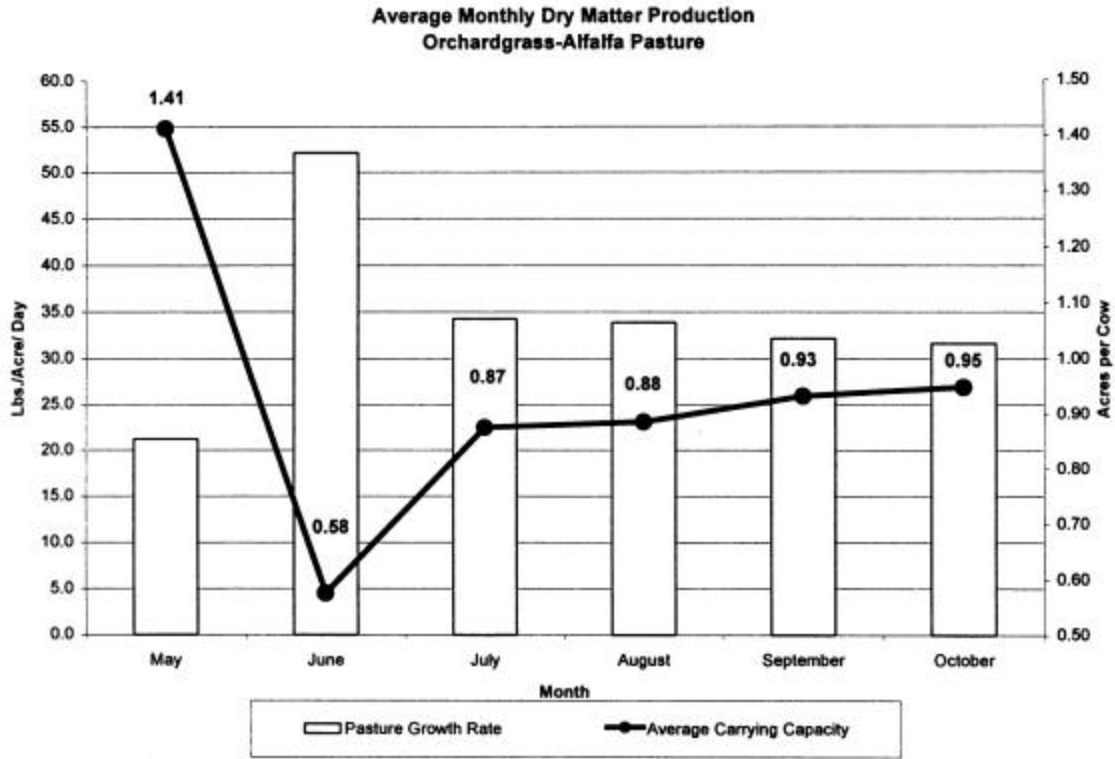


Figure 2

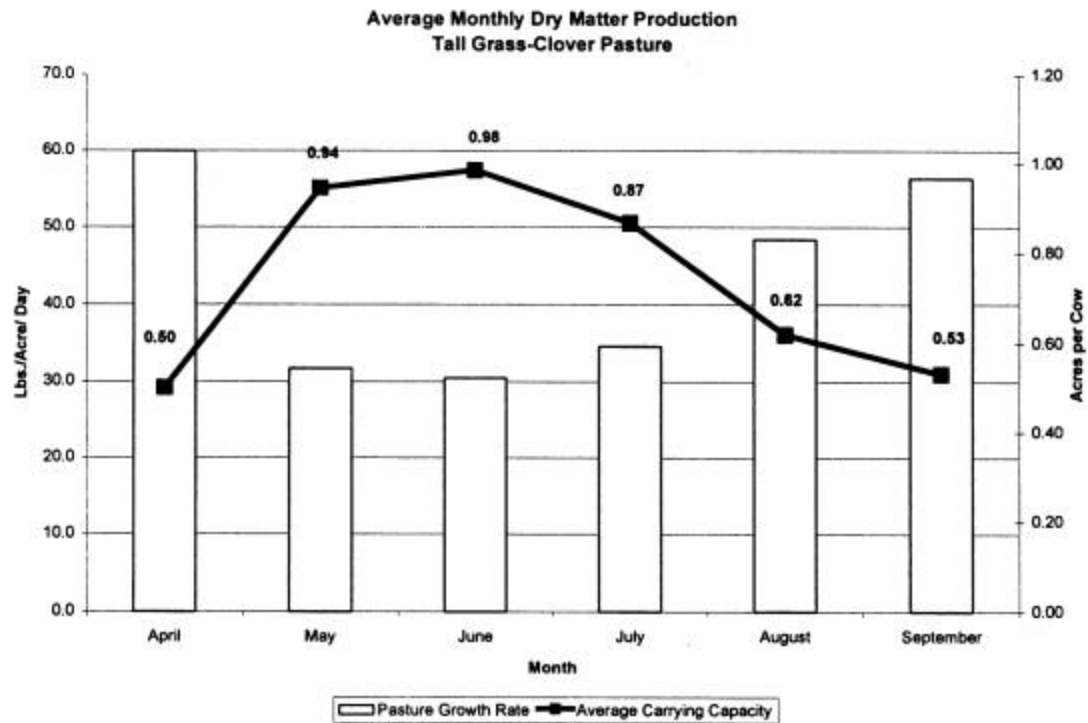
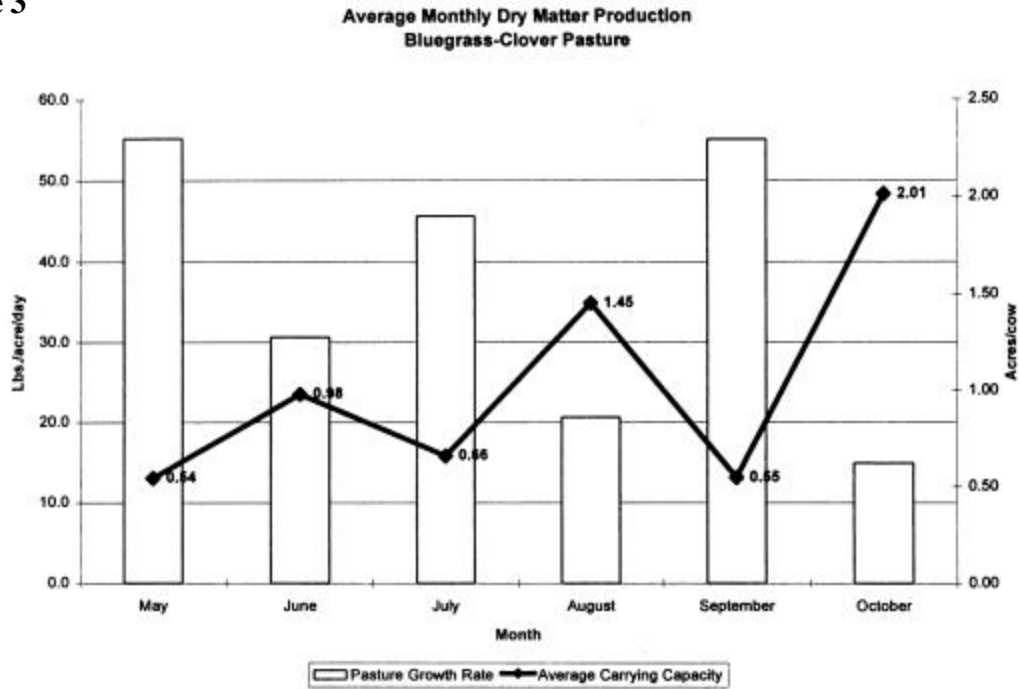


Figure 3

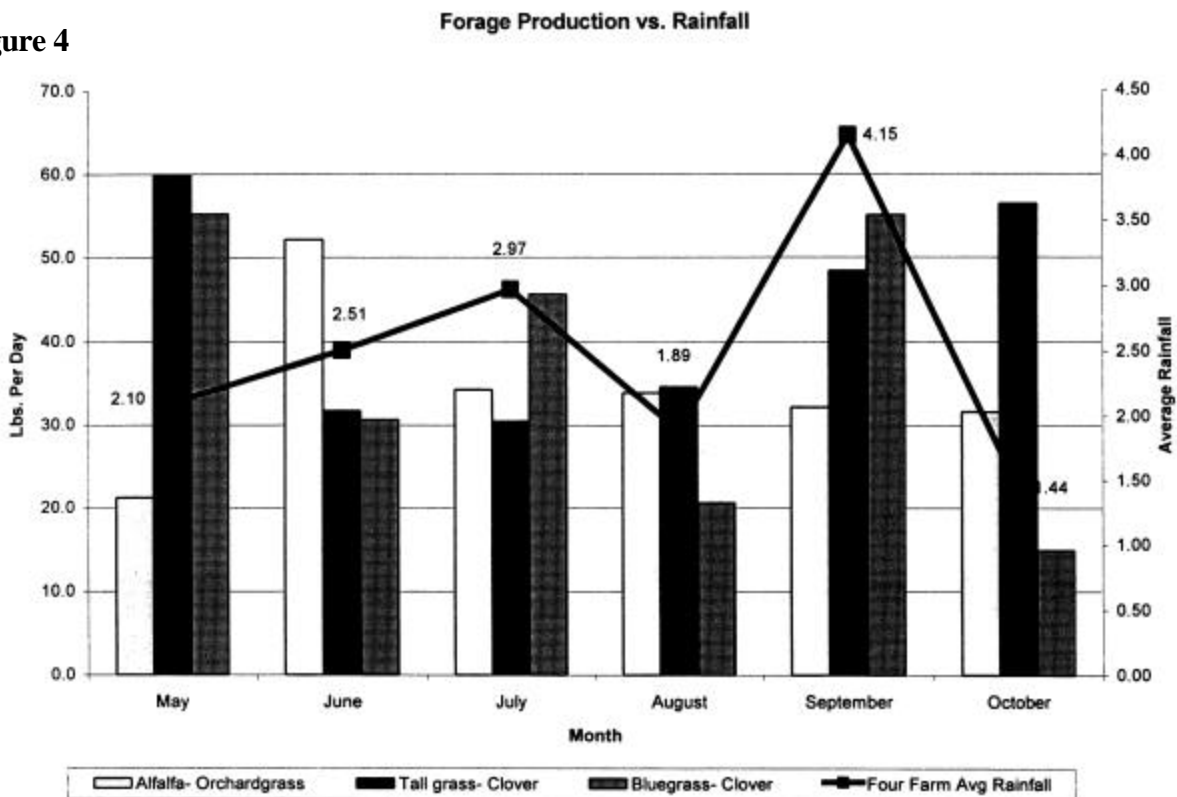


These three

Bluegrass is a cool-season grass. The unusually high production in July is attributed to a warm-season grass that was actively growing in the bluegrass stand during July.

graphs demonstrate the variability among species in production. They also demonstrate how different species respond during the growing season.

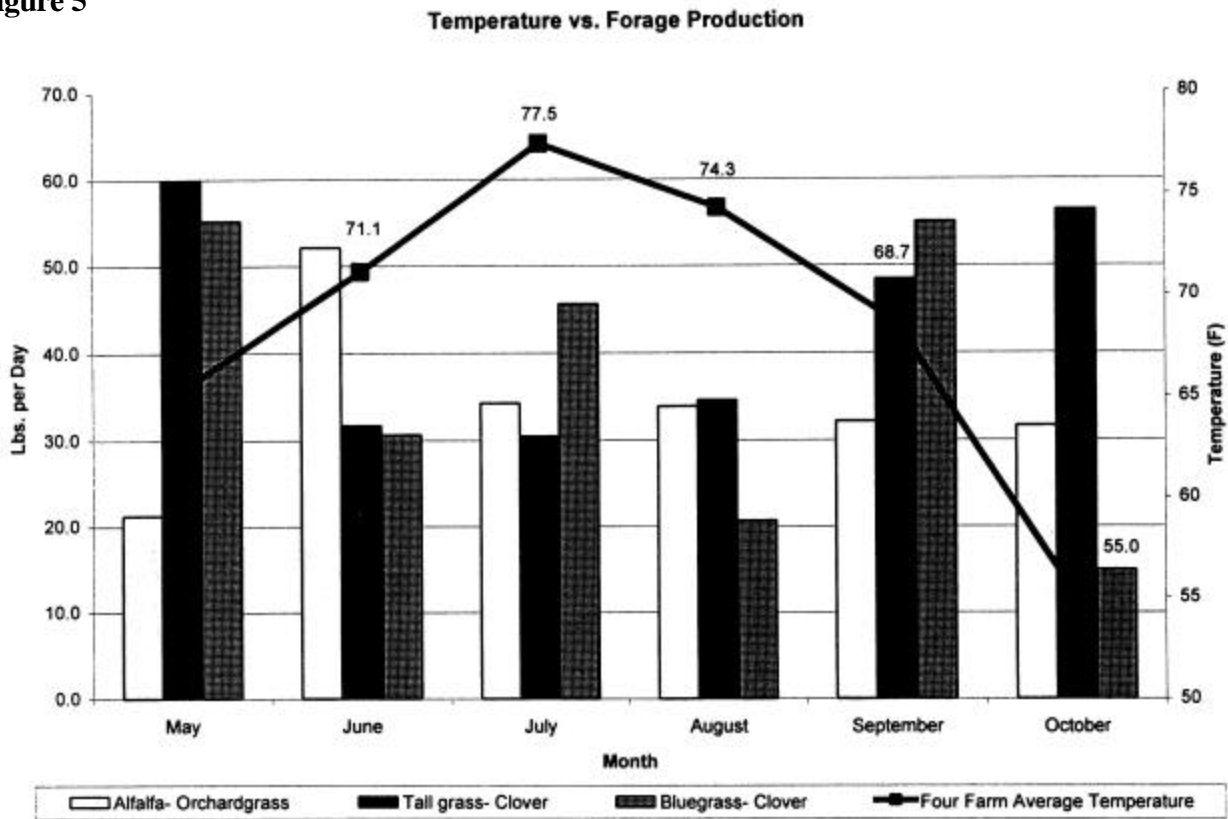
Figure 4



Precipitation had some effect on the production of the tall grass-clover. It most notably affected the growth of the bluegrass-clover mixture. The

tall grass-alfalfa mixture was less affected. This may be due to the fact that alfalfa is deep-rooted.

**Figure 5**



The same forage mixtures were affected by temperature, with the bluegrass-clover mixture being the most affected by higher temperatures.

**Summary**

Pastures and meadows in the Northern Shenandoah Valley produce, on average, 38 pounds of dry matter per day during the

growing season. This would provide forage for a little over one animal unit per acre for grazing purposes. Tall grass-clover mixtures have the greatest overall growth rate per day. The production per day has the potential to be greater if normal rainfall is received. Dry matter production is influenced by precipitation for the grass-clover mixes more than the grass-alfalfa mixes.

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