

REGIONAL AND SEASONAL FORAGE PRODUCTION LIMITS

Lynn E. Sollenberger and Carrol G. Chambliss

Agronomy Department
University of Florida, Gainesville

INTRODUCTION

There are few locations in the world where forage-livestock systems can depend upon a consistent, year-round supply of forage for grazing. Exceptions are in areas where favorable temperature and rainfall conditions occur throughout the year. In Florida, temperature extremes and/or drought limit forage production during some seasons. Additionally, environmental factors affect forage quality of Florida forages, resulting in large variation in quality among or even within seasons.

Not only do productivity and quality of forages vary widely during the course of a year, but nutritional needs of beef cattle herds do also. This suggests that matching times of peak cattle nutritional demand with peak forage production or quality may be advantageous. Simply stated, there is a need to link cattle and forage production cycles to maximize efficiency of forage utilization, and minimize the need to harvest forage or purchase feeds in order to fill the gaps.

Although matching cattle and forage production cycles sounds like a simple exercise, it is rarely easy. Market trends may dictate choice of cattle production cycles more than available forage resources do. Also, unexpected or unusually severe drought or cold may disrupt growth or establishment of forages, resulting in less forage or lower-quality forage than expected. Despite these limitations, it is important for each livestock manager to consider carefully the degree to which available forage resources and animal needs correspond.

The objective of this paper is to highlight the major seasonal forage limitations in Florida by region and to overlay these limitations on beef cattle production cycles in use in these regions.

This exercise should demonstrate where the greatest problem areas are likely to occur, and later papers will use research results or on-farm experience to suggest potential solutions to these problems.

SEASONAL FORAGE LIMITATIONS BY REGION

Quantity of Forage in North Florida

Because our perennial pasture grasses are of tropical or sub-tropical origin, they are dormant or their productivity is severely limited during periods of cool weather. Thus, November through April are times when cool temperatures reduce quantity of forage for grazing in North Florida. Additionally, spring drought often limits forage production in this region from May through early- to mid-June. Growing winter annuals is the most useful option for increasing the quantity of forage available for grazing during January through April, but May, November, and December are typically times of quantity limitations even when winter annuals are used to complement the perennial pasture base.

Quality of Forage in North Florida

Quality of our perennial grasses is highest in Spring and decreases in mid-Summer through Fall. Thus, forage quality is likely to be a limiting factor during at least part of the period from August through December in North Florida. If winter annuals are used, high quality forages are available for grazing from January through March or April, but in the absence of winter annuals, quality is also limiting during January through March.

Quantity of Forage in South Florida

Because onset of cooler temperatures is later in South than in North Florida, quantity of forage is

less likely to be limiting during November and December in the South. Fall drought can result in quantity limitations during this time of the year, but utilization of forage stockpiled during late summer and early fall is still an option if frost has not occurred. Primary periods of shortfall on improved pasture are during January through early June. If native range is available to complement improved pasture, then quantity is not likely to be limiting during January through March. Amount of winter and spring rainfall will determine if forage is in short supply from April through early June.

Quality of Forage in South Florida

Forage quality limitations from August through December are similar and occur for the same reasons in South Florida as described earlier for North Florida. Quality constraints are common on range or improved pasture in the South in January and February, but quality improves in spring when perennial pasture grasses begin growth.

MATCHING THE ANIMAL CYCLE WITH FORAGE RESOURCES

Having described forage quantity and quality limitations throughout the state in a general way, the next step is to relate these constraints to specific animal cycles in the North and South Florida regions. Based on various combinations of length of breeding season and time of calving there are many animal cycles that could be used as examples. For simplicity, all examples that are considered in this paper fix length of breeding season at 90 days. It is important to note, however, that cycles of the type shown in this paper can be developed for each operation regardless of their specific conditions.

North Florida Adult Cow Cycles In the first five figures, periods of limitation in forage resources have been superimposed on adult cow cycles. The first example is for North Florida and assumes that the forage base is perennial grasses

with no cool-season annuals, and that the calving season is from January 1 through March 31. Using this system, forage quantity may be limiting to the cow during mid-November through June, with spring conditions highly dependent on rainfall and temperature (Figure 1). Although forage quality is low in fall it is not limiting to the mature, pregnant cow. Quality does become limiting after calving and continues to be a problem until the warm-season grasses begin growth in April. Higher quality forage is then available for most of the breeding season. To illustrate the kinds of problems that may occur with a different cycle, the calving season for the same system was changed to November 1 through January 31 (Figure 2). Note that with this system quantity is limiting through nearly all of the lactation period, including the breeding season. Quality, though adequate in November and December for a dry, pregnant cow (shown in Figure 1), is not adequate during these months for a lactating cow. Quality constraints continue through most of the breeding season, suggesting that this approach would not effectively utilize the available forage resource. Using the same cow cycle as in Figure 2 but incorporating cool-season annual forages into the program results in a more favorable balance of cow requirements and forage resources (Figure 3). Note that the limitations of quantity and quality occur during November and December, but limitations are less likely in spring and early summer using the annuals.

South Florida Adult Cow Cycles

Moving to South Florida, examples will be considered of cow cycles with fall calving and using only perennial grass pasture (Figure 4) or fall calving with grass pasture plus native range (Figure 5). Both quality and quantity of forage are limiting for large parts of early lactation and the breeding season when perennial pasture is the only forage source (Figure 4). Using this system, quantity limitations in March through May occur during dry years, but they may not be experienced if good spring rains occur. Adding

native range alleviates, at least partially, the quantity shortfall during December through February and allows some forage to accumulate on improved pastures for March grazing (Figure 5). In years when significant spring rains occur there may not be a quantity limitation with this system, but that would be the exception rather than the rule. Although native range reduces the extent of quantity limitations, quality limitations still persist during winter and early spring (Figure 5).

Replacement Heifer Cycles Selecting the calving season for the cow herd determines the heifer cycle. The major choice remaining to be made is whether to calve heifers for the first time at two or three years of age. This choice must be based on forage resources available because nutrition will have a major impact on the potential for calving heifers at two and getting them rebred to calve again at three. Two systems have been selected to illustrate the replacement heifer cycle. These are a North Florida situation with fall calving where both perennial grasses and cool-season annuals are used (Figure 6), and a South Florida situation with fall calving where improved perennial grasses and native range are used (Figure 7). A major problem for the North Florida situation is the lack of high quality forages for late summer through the time in

winter when the annuals are available for grazing (Figure 6). Quantity of forage in November and December is also a major limiting factor. The South Florida situation appears even more difficult because quality limitations extend over into the winter period and quantity limitations occur from January through the onset of summer rains (Figure 7). These constraints must be addressed if successful replacement heifer programs, particularly those attempting to calve heifers at two, are to be developed.

SUMMARY

Though it is not news to people who have been working in the cattle industry in Florida for a long time, this paper has shown that there are definite and somewhat predictable periods of forage quantity and quality limitations in both North and South Florida. It is important to know the forage production limitations at your location and the varying nutritional needs of your beef cattle herd through the year. By integrating forage resource, cattle nutrient requirement, and market information, the most appropriate production cycle for a specific cow herd can be determined and more efficient and economical production systems can be developed.

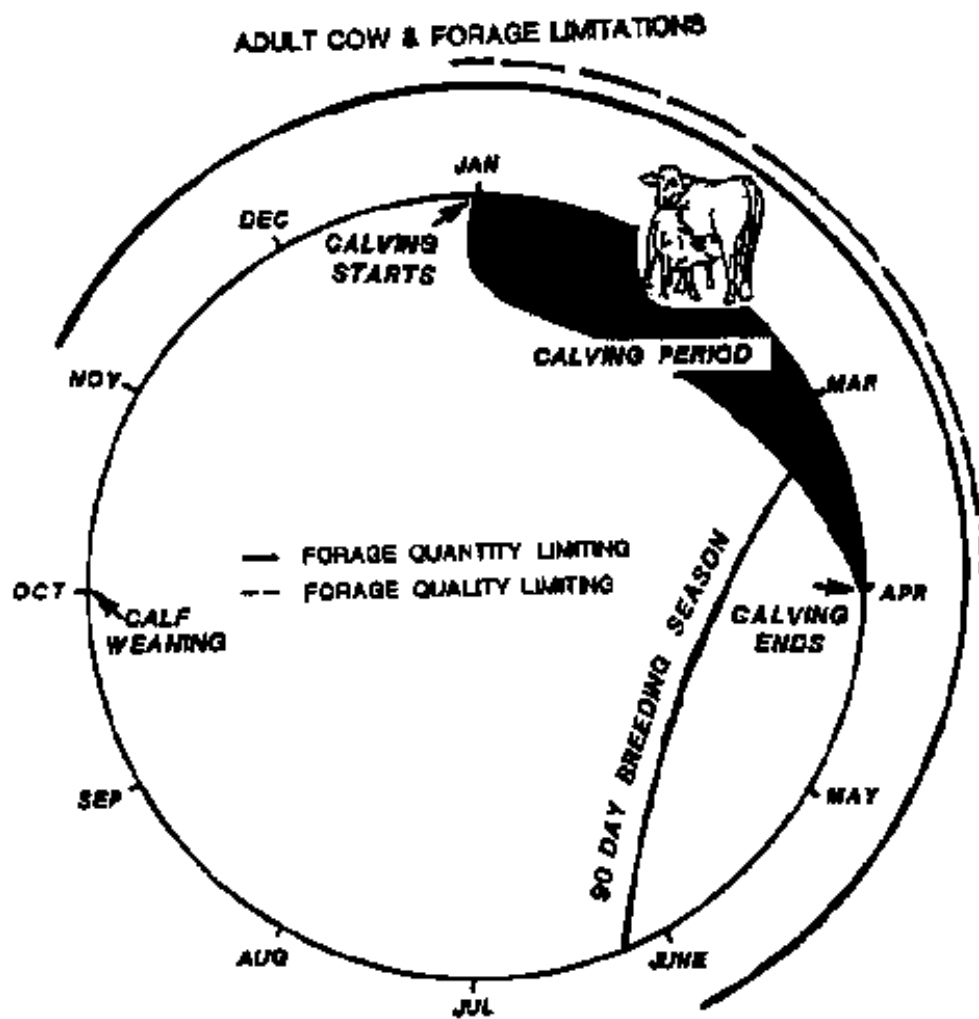


Figure 1. Adult cow production cycle and periods of forage quantity and quality limitations for North Florida when using a January through March calving period and perennial warm-season grasses as the forage source.

ADULT COW & FORAGE LIMITATIONS

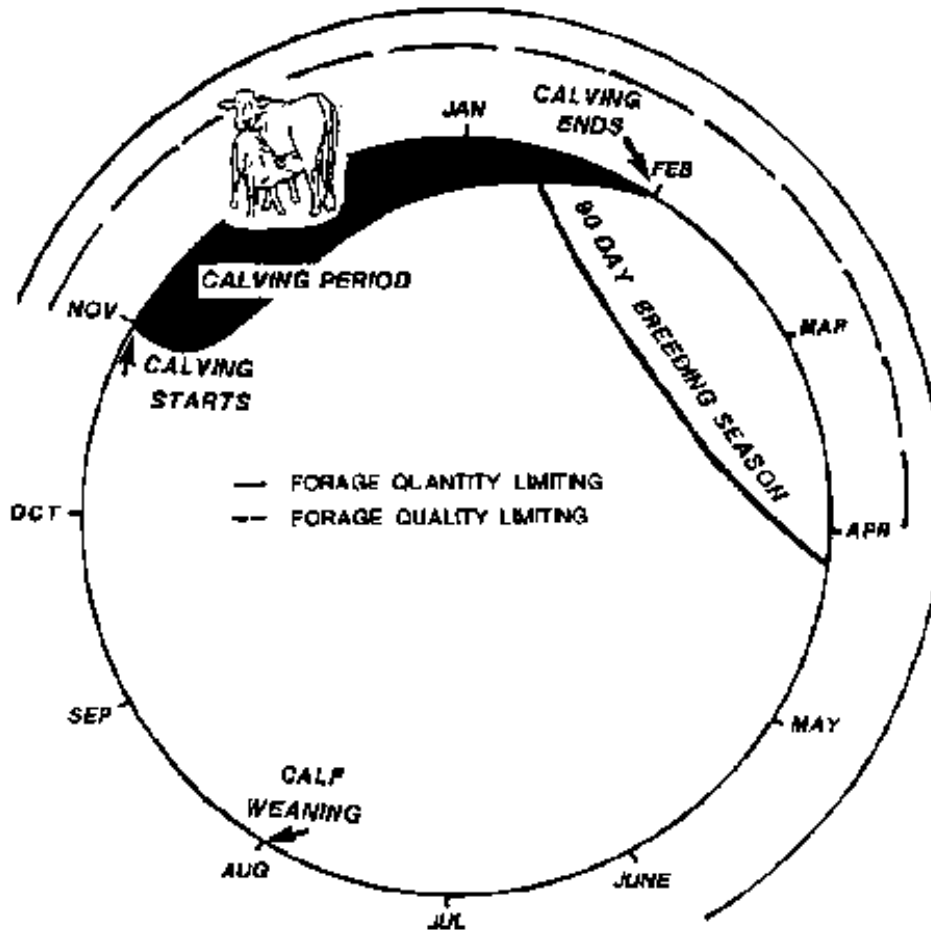


Figure 2. Adult cow production cycle and periods of forage quantity and quality limitations for North Florida when using a November through January calving period and perennial warm-season grasses as the forage source.

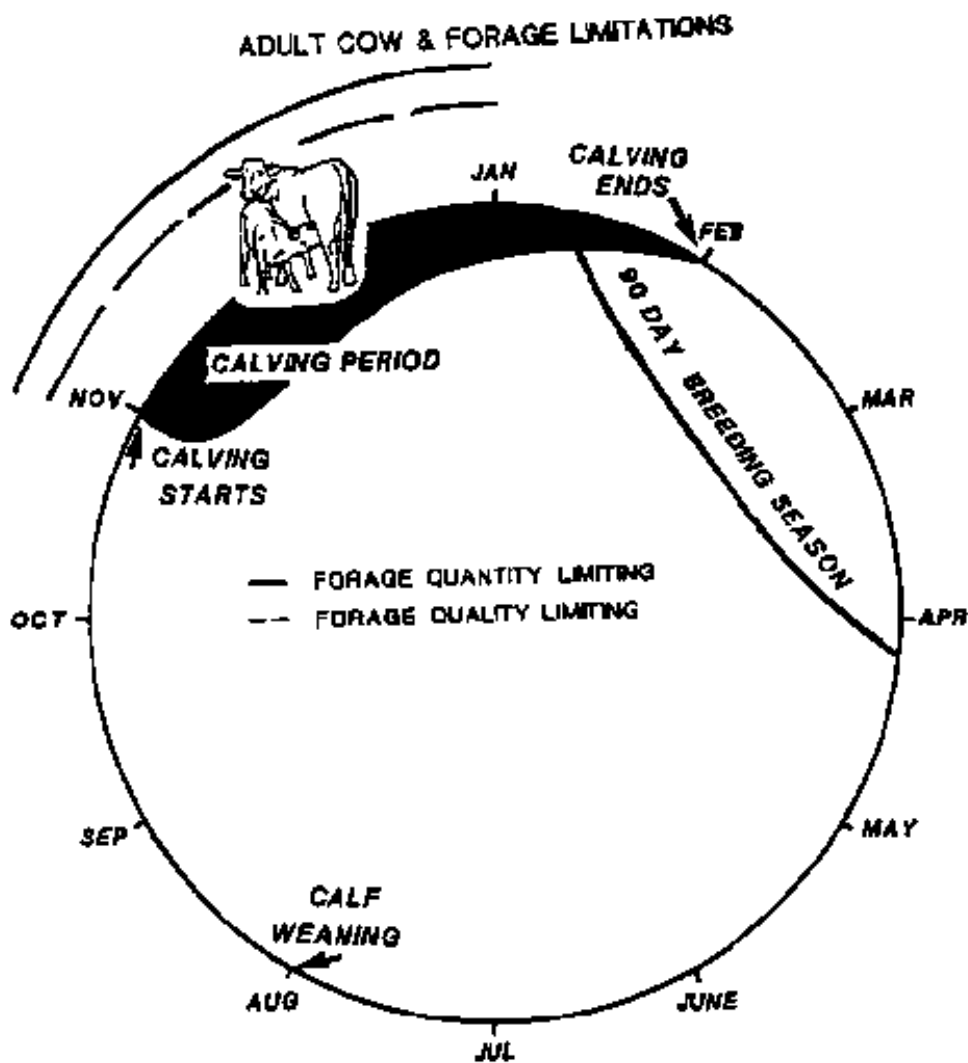


Figure 3. Adult cow production cycle and periods of forage quantity and quality limitations for North Florida when using a November through January calving period and cool-season annuals to complement perennial warm-season grasses as the forage sources.

ADULT COW & FORAGE LIMITATIONS

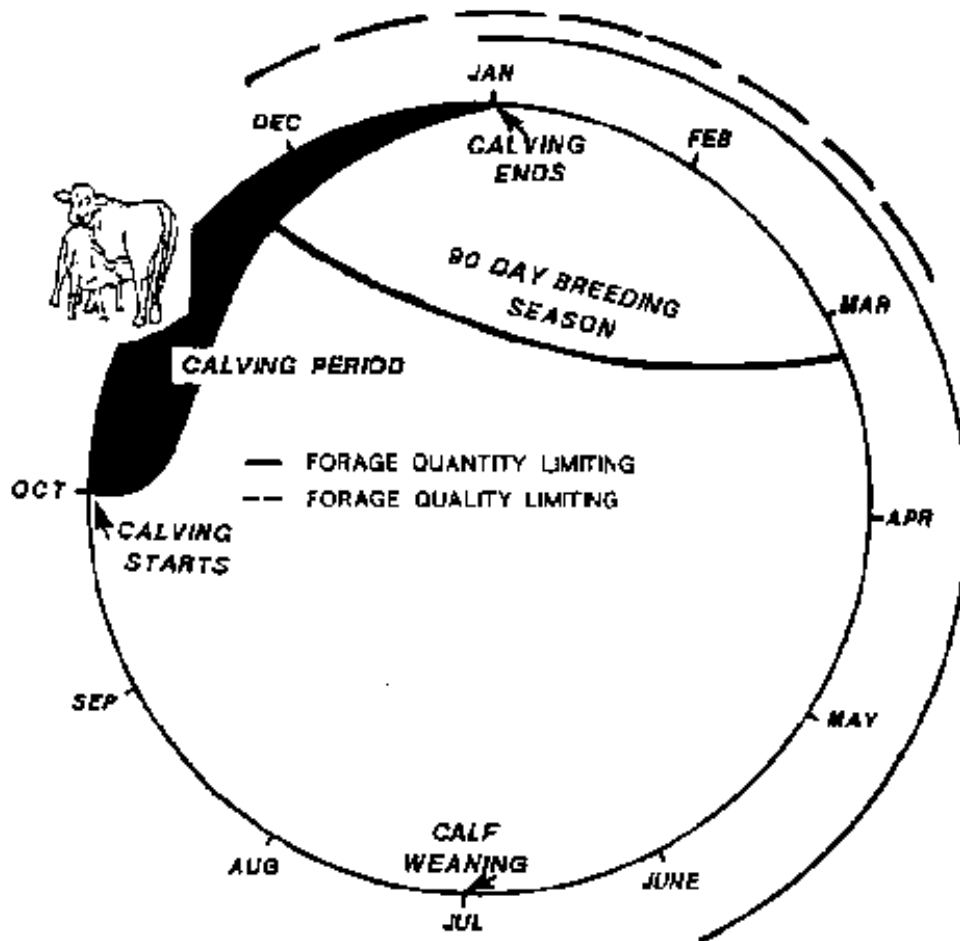


Figure 4. Adult cow production cycle and periods of forage quantity and quality limitations for South Florida when using an October through December calving period and perennial warm-season pasture grasses as the forage source.

ADULT COW & FORAGE LIMITATIONS

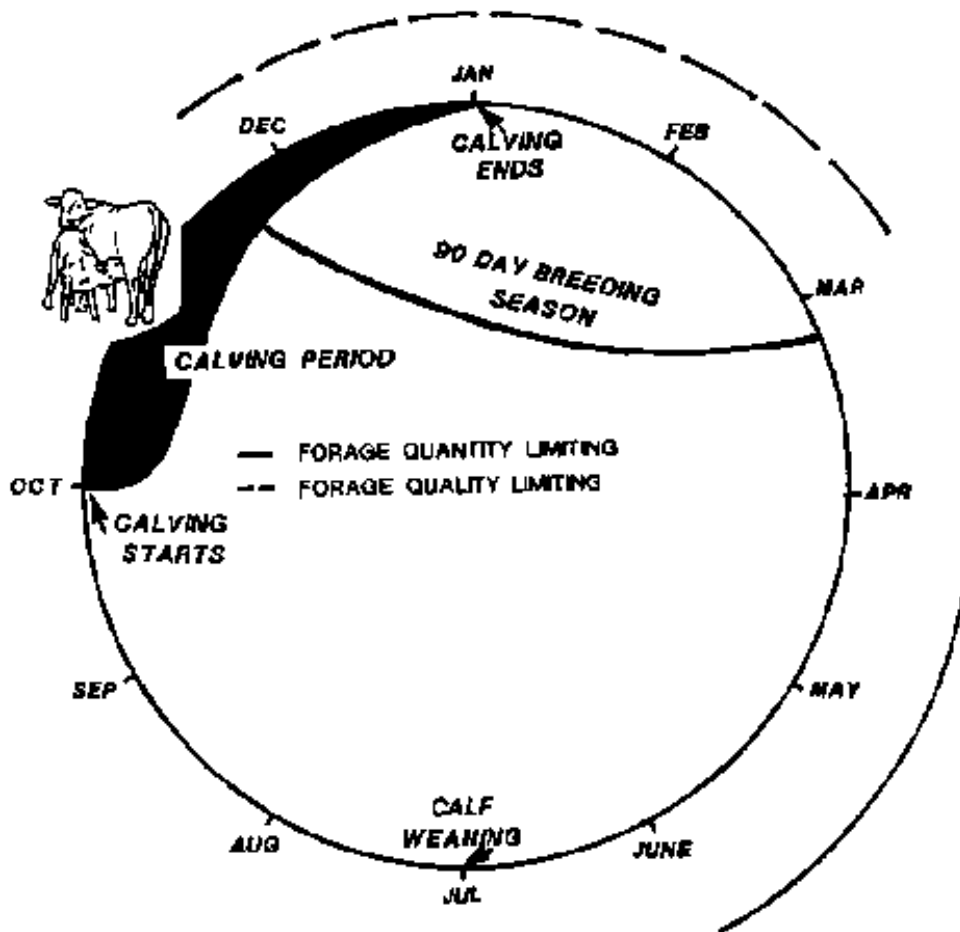


Figure 5. Adult cow production cycle and periods of forage quantity and quality limitations for South Florida when using an October through December calving period and native range to complement perennial warm-season pasture grasses as the forage sources.

REPLACEMENT HEIFER CYCLE & FORAGE LIMITATIONS

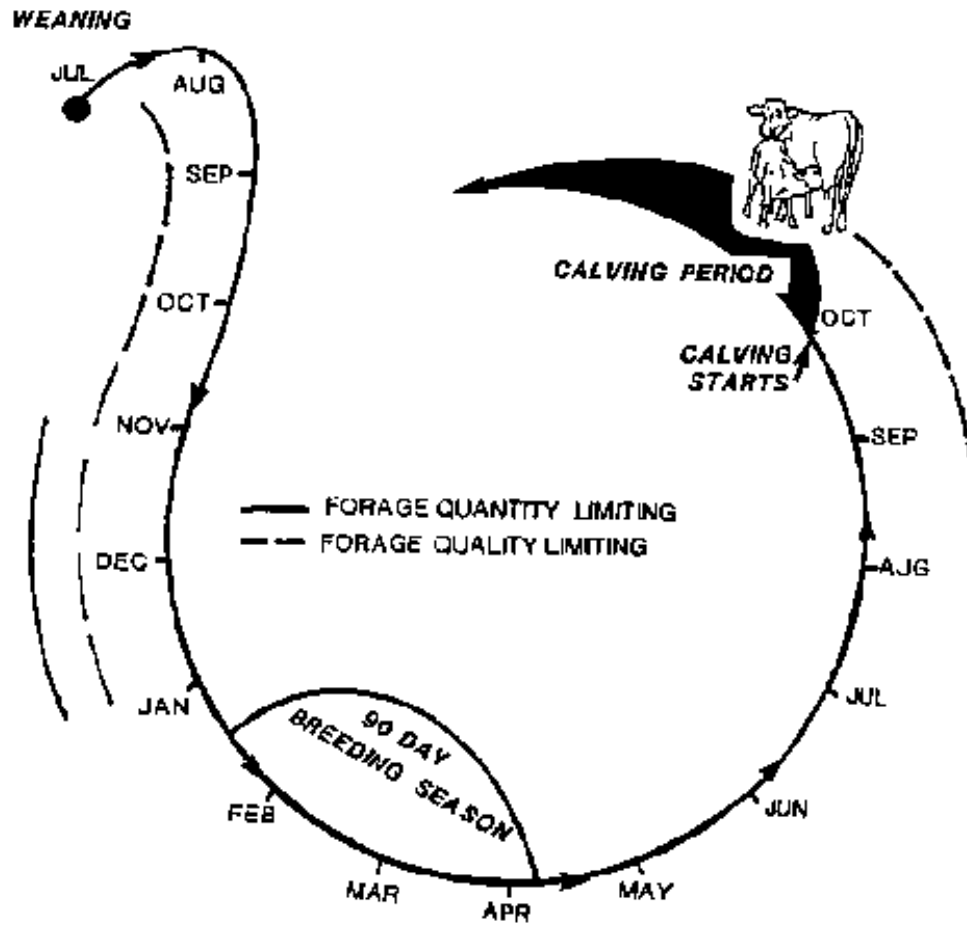


Figure 6. Replacement heifer production cycle and periods of forage quantity and quality limitations for North Florida when using a November through January calving period and cool-season annuals to complement perennial warm-season grasses as the forage sources.

REPLACEMENT HEIFER CYCLE & FORAGE LIMITATIONS

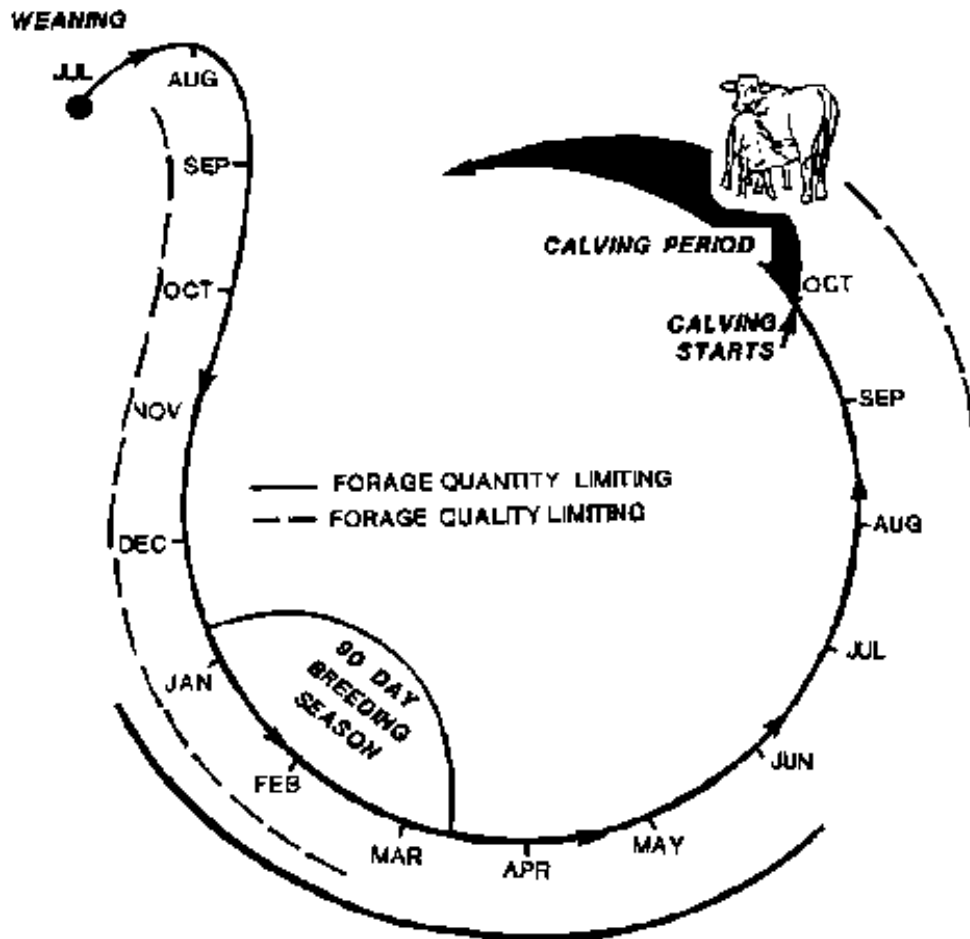


Figure 7. Replacement heifer production cycle and periods of forage quantity and quality limitations for South Florida when using an October through December calving period and native range to complement perennial warm-season pasture grasses as the forage sources.