Annual Forage-Type Legumes for Forage Production and Inclusion in Cocktail Mixtures or for Intercropping Systems

Trial Site: Fairview Research Farm
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Data from 2019

Nitrogen is usually the most limiting nutrient for annual crop production. It is supplied to crops by mineralization of soil organic matter, commercial fertilizers, and atmospheric nitrogen fixed by legumes and rhizobia. Because biologically fixed nitrogen may cost less than commercial fertilizers, maximizing the proportion of fixed nitrogen in cropping systems reduces costs. Including forage legumes in annual crop mixtures (cocktails), cereal/legume intercropping or rotation with annual crops can be a useful management strategy to increase the availability of fixed nitrogen (N). To recommend the right types of annual forage legumes for use in cocktails or intercropping systems, PCBFA continues to evaluate several annual forage legumes as they become available.

Legume Crop Species	Seeding Rate
Hairy Vetch	20lb/acre
Chickling Vetch	60lb/acre
Ebena Common Vetch	20lb/acre
H.O. Crimson Clover	15lb/acre
Subterranean Clover	20lb/acre
Winner Brand Berseem Clover	15lb/acre
Frosty Berseem Clover	15lb/acre
Frontier Balansa Clover	6lb/acre
Fixation Balansa Clover	6lb/acre
Laser Brand Persian Clover	15lb/acre
Serradella	4lb/acre
Crimson Clover	15lb/acre

Dry Matter

The highest yielding forage legumes were Frosty Berseem clover (8,738 lbs/acre) followed by Common Crimson clover (8271lb/acre) and H.O. Crimson clover (8134 lb/acre). The lowest forage D.M. yield from the legumes came from subterranean clover (645lb/acre), due to the clover's very low growth habit. The 3 types of vetches (hairy, bena and chickling) produced similar forage D.M. yield (5,066-5,744 lbs/acre).

The two balansa clovers (fixation and frontier) had a low D.M. yield this year due to scanty plant stands. Both varieties had poor establishment counts.

1 Standability of Frosty Berseem Clover as compared to Crimson Clover

Of the 12 legumes tested, only 4 (the 2 vetches, subterranean clover and frosty berseem clover) did not flower. Other legumes flowered and some even had pods when they were harvested on September 9th. The plant standability of frosty berseem clover was higher than those of the 2 crimson clovers tested within this trial

Forage Quality

The forage C.P. varied from 10.9% for common crimson clover to 23.6% for Ebena common vetch. In most cases, the clovers had a lower forage C.P. than the vetches. Overall, the forage legumes had adequate C.P. for different categories of mature beef cattle, which require 7, 9 and 11% C.P. at mid-pregnancy, late pregnancy and during lactation, respectively. Because of the generally higher forage C.P. values in the vetches, the vetches could be used to supplement lower protein feeds such as those from cereal greenfeed, silage, or grass hay. The vetches could also help increase the protein content of annual crop mixtures (cocktails).

Except for H.O. crimson clover, which had 59.0% TDN, the forage energy content (%TDN) of the legumes was above 60% TDN. Winner brand berseem clover, fixation balansa clover and laser brand Persian clover all had >70% TDN. All legumes had enough %TDN for mature beef cattle. Both H.O. crimson clover and hairy vetch seemed to only have sufficient %TDN for a dry gestating beef cow.

The forage Ca content was generally high for all forage legumes, varying from 0.97 to 2.47% Ca, thus, all forage legumes, have been able to meet the Ca requirements of mature beef cattle (0.18% Ca both in mid and late pregnancy, and 0.58% Ca during lactation). Similarly, the requirements of both K, Mg, Fe, have been met by all forage legumes tested within this study. The forage P, Mg and Na were highest for Ebena common vetch, Serradella and laser brand Persian clover.

Despite meeting many of the requirements, none of the forage legumes tested were able to completely meet the mineral (both macro and trace) needs of mature beef cattle. Thus, when feeding any of these forage legumes, some mineral supplementation would be needed.

It is important to note that the requirements of Cu (10 ppm) by both young and mature beef cattle can hardly be met by most forage feed types that are available in the Peace River region. Of the legumes tested, only 4 legumes (subterranean clover, hairy vetch, chickling vetch and Ebena Common vetch) have been able to produce up to 10 ppm Cu or more. This shows that all the vetches can provide higher forage Cu content than most forage legumes.

For more information on PCBFA's Forage Legume trials, contact us at info@pcbfa.ca or visit our website to view our project reports at peacecountrybeef.ca