

Factsheet 29: Bi-cropping Maize

Overview

Four farmers in Cornwall trialled growing pole beans as a bicrop with maize to test whether there would be an uplift in silage quality, but with a particular interest in protein. A rise in silage protein reduces the need for bought in protein, reducing cost and the farm carbon footprint. On aside, on one of the farms a maize crop followed lucerne. The lucerne had been killed off prior to maize establishment using reduced tillage but the lucerne unexpectedly re-established after the maize had reached a 5-leaf stage.

Establishment

The pole beans were sown at 5kg acre with maize sown at 100% of normal rate. Recommendations were for the beans to be sown in a separate coulters to the beans, but this was not achievable for this trial. No herbicide treatments were used throughout the growing season.

Cutting and Ensiling

The cutting of the beans caused no issues with the forager. The farmers used their standard ensiling process and placed the beans and maize in the clamp as a layer. Samples for analysis were taken at cutting.



Maize with a lucerne (left) and pole bean (right) bicrop. Photos from A Brenton and JJ Willcocks



Pole beans in the maize silage. Photo from A Bebbington

Results

Table: Results showing combined average quality parameters across farms. Values in brackets indicate maximum and minimum. If values followed by a different letter significantly differ.

	Crude protein (%)	NDF (%)	Starch (%)
Beans & maize	8.07 (6.27-10.98)	46.48 (42.26-52.94)b	26.02 (17.86 - 32.61)a
Lucerne & maize	7.45 (7.24-7.67)	41.36 (38.61-44.19)a	34.69 (33.59-36.39)b
Maize	7.91 (7.28-8.55)	42.33 (36.75-47.20)a	32.98 (27.62-37.97) C
P	0.32	<0.001	<0.001

Across farms there was no significant increase in protein with bean inclusion. However, on one farm the bean uplift averaged 2.10% and another by 1.54%. The remaining two had an average increase of 0.25% and a loss of 1.35%. NDF values fall well within the acceptable range, but NDF was significantly higher with maize and beans. Starch was lowest with maize and beans, and highest with lucerne and maize.

Summary

The findings merit further investigation. With management – including the right root rhizobia for beans– the protein benefits of beans and maize could be considerable. This is with the proviso, higher NDF does not limit forage intake, and starch shortfall can be viably satisfied with an affordable and low emission alternative.

This trial would not have been possible without the support of Mike Simms of Bright Maize.