Forage Facts

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In This Issue:

DID YOU KNOW?

In 2020, 68% of Canada's beef was produced in Alberta

PCBFA Annual General Meeting Friday, February 25th

Our Annual General Meeting will be held on Friday, February 25th from 6-9pm. In light of current COVID restrictions, this meeting will be held online via Zoom.

The evening will kick off with our very own Dr. Akim Omokanye sharing some results of PCBFA research projects. The business meeting will follow, and the meeting will be wrapped up with our keynote speaker, Sean McGrath from Round Rock Ranching.

There are 2 openings on our board of directors, one position in the North and one position in the South East. We are accepting nominations ahead of the meeting as well as during the meeting.

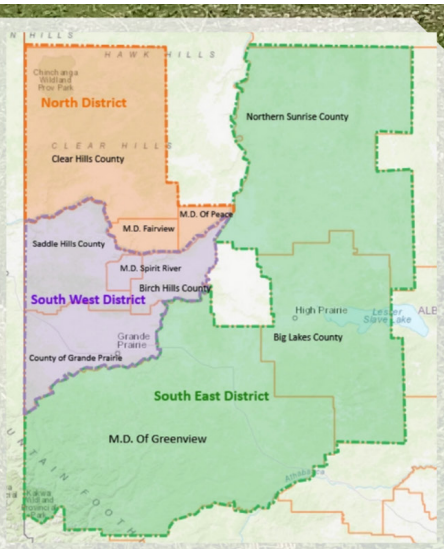
Your PCBFA Membership needs to be renewed for 2022-23 in order to participate at the meeting. You can register and renew your membership by visiting peacecountrybeef.ca/2022agm. We ask that you please register by 5pm on February 24th. If you are a multi-year membership holder, or would like to arrange alternate payment, please contact Katie at 780-772-0277.

Election of Board Members:

Please submit board nominations to:
executivedirector@pcbfa.ca

Director Positions open:
1 in the North Peace
1 in South East

Postions for Re-Election
2 in the North
1 in the South East
1 in the South West
1 @ Large



Questions about becoming a board member?
Contact Allan McLachlan at 1 780 834 7399

Benefits of Intercropping In Years to Come

By: Alan Lee

Extreme weather conditions are becoming more common as the global average temperature rises. We can expect extreme dry conditions as well as extreme wet conditions, both of which are detrimental to crop growth. While we can hope to engineer better crop varieties to combat these scenarios, there is an alternative that we can turn our attention to as a potential permanent solution. Intercropping, once known as the "Three Sisters" cropping method, shows results that can solve some of the issues that we are currently facing.

Intercropping consists of three major concepts: (1) the choice of plants, (2) the choice of planting arrangement, and (3) the choice of harvesting method. Choosing different plants, leads to plant interactions that result in different benefits. For example, the effects of growing cereals with legumes often leads to better access to nutrients, while different legume varieties may lead to better overall yield. Planting arrangement can play a big role in how different plant varieties interact with each other. Varieties planted close to each other yield differently than if they were planted further apart. Finally, the method of harvest could affect how the plants grow. By harvesting one plant ahead of another, we leave room for the remaining plant to grow, thus leading to better productivity.

Alan presenting his plot site at PCBFA's Annual Field Day at the Research Farm, August 2019. Photo: PCBFA

While plant to plant interaction is a major part of what makes intercropping valuable in a production system, recent studies have shown that there are more interactions than just those between the plants. We have learned that soil fungi, specifically mycorrhizal fungi, play an important role in plant interactions as they are capable of bridging between the plants. Mycorrhizal fungi can relocate moisture, as well

and Things to Consider When Intercropping

One of Alan's Oat & Pea Intercropping plots at the Fairview Research Farm Photo: Alan Lee

as some macro- and micro-minerals, which could translate to better access to nutrients for plants. Of these fungi, one type called the arbuscular mycorrhizal (AM) fungi infect the roots, like how rhizobia fungi infect peas and produce nodules. These AM fungi are capable of transporting nutrients to and from plants and could be beneficial to plant productivity.

In this article, I will be discussing the results found within the project completed in Fairview, Alberta, where we discovered the importance of intercropping, and how plant choice impacts plant forage yield, water use, and mycorrhizal diversity. I hope it will prompt you to learn more about how intercropping could help production in the future.

Background and Results

This project operated during the 2019 and 2020 growing seasons, where the crops were grown at the Peace Country Beef and Forage Association's research farm, West of Fairview Alberta. We chose to use oats, peas, and canola as they are common commodities in the region. We chose to use mixed row intercropping and harvested the plants together since it would be the most conventional method of harvest, and the most efficient. We also sampled soil moisture using moisture sensors and mycorrhizal diversity using microscopy and DNA samples.

By studying the AM diversity, we learned a bit more about how intercropping affects this fungal group. Firstly, adding nitrogen fertilizer in the drier year increased the number of species present around the roots of oats, decreased the number in peas, and didn't affect the number when the two were intercropped. In the wetter year, where the species richness was relatively similar, we were able to see that peas have in general a

Upcoming Events

Event	Date & Time	Location & Cost
Virtual Grazing Conference: Year-Round Grazing with Jim Gerrish	Friday, February 4th 7pm	Online via Zoom Free
Intercropping Webinar Series: Intercropping Impacts on Nutrients & Disease	Tuesday, February 8th 1pm	Online via Zoom Free
Intercropping Webinar Series: Challenges & Successes - Producer Experiences	Thursday, February 10th 7pm	Online via Zoom Free
Virtual Grazing Conference: Economic Leverage of Grazing Management with Dallas Mount	Friday, February 11th 7pm	Online via Zoom Free
Peace Beef Cattle Day	Tuesday, February 15th 9:30am - 3:30pm	Dunvegan Inn & Suites, Fairview $25/Member
Intercropping Webinar Series: The Latest Research in Intercropping	Thursday, February 17th 1pm	Online via Zoom Free
PCBFA Annual General Meeting	Friday, February 25th 6 - 9pm	Online via Zoom PCBFA Membership must be renewed

For More Inforamtion or to Register for Any of Our Upcoming Events, Please Visit:

peacecountrybeef.ca | info@pcbfa.ca | 780-523-4033

All In-Person Events will be Following Current Health Guidelines

Peace Beef Cattle Day

Join us **Tuesday February 15** at Dunvegan Moter Inn
Coffee will be on at 9:30

$25 - PCBFA and NPARA Members
$35 - Non-Members
Cost includes Lunch

LOCATION CHANGE:
Dunvegan Motor Inn, Fairview AB

This year's topics include:

Profitability through Management
- Lance Stockbrugger CPA, CA

Pasture Recovery
- Dr Kris Nichols

Livestock Disease Surveillance
- Dr Barbara Wilhelm

Herd Health on Pasture
Dr Christa Harder

Due to AHS requirements this event will follow REP.
Please bring proof of vaccination or a negative test.

Limited space available, register at:
780-523-4033 peacecountrybeef.ca

Thank You to Our Municipal Partners!

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higher species diversity than oats, and that by intercropping them together, we also see that there is an overlap in fungal species between oats and peas.

In terms of forage yield, we were expecting to observe the effects of overyielding, as many studies have alluded to. However, from our results, we find that overall, overyielding requires very specific conditions to manifest. Instead, what we found within the two growing seasons is how stable intercropping is in terms of forage yield. 2019 was a drier than normal year while 2020 was a wetter than normal year in Fairview, yet the yield variation in intercropped plots were much smaller than what we saw in monocultures.

Forage quality also produced interesting results when intercropped. While we found that intercropping canola can slightly reduce the digestibility and total digestible nutrients, it greatly boosts phosphorus and potassium contents in the forage. The relative feed values were similar in both intercropping and monocropping, which indicates that it could be used as an alternative, despite the lower yield performance.

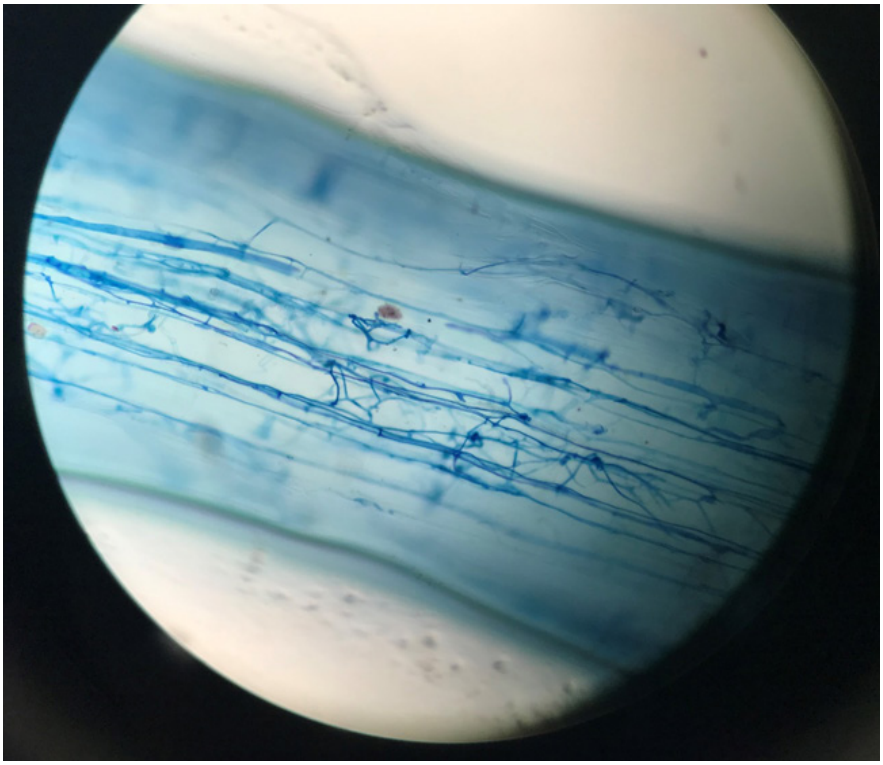
Intercropping is very resource efficient. Intercropping can convert the same amount of nitrogen into more dry matter yield compared to monocropping. Similarly, intercropping also has better water use efficiency, where for the same amount of water uptake, intercrops produced higher yield than monocrops. However, intercropping couldn't make use of the water present in the system, as it had a lower water uptake compared to monocropping.

What insight does this study provide?

From this study, we can see that intercropping at this stage isn't a replacement to conventional systems as it doesn't provide yields that can match conventional systems. While there are some benefits in terms of forage quality, the benefits of intercropping are similar to that of adding sainfoin to alfalfa mixes to avoid bloat. However, the key takeaway from this study is the stability of intercropping systems and how they can withstand extreme weather as compared to conventional systems. This resilience makes it a tool for avoiding crop failure.

Isolating mycorrhizal fungi in the lab. Photo: Alan Lee

The most obvious reason for the yield stability of intercrops is their high resource use efficiency. However, resource efficiency only scratches the surface of understanding why intercropping produces such stable yields. By analyzing the behavior of AM fungi in an intercropping system, we have begun learning about how plants could be using this fungal system to access better nutrient resources. By increasing the diversity of the mycorrhizal species through intercropping,



Arbuscular mycorrhizal fungi under the microscope. Photo: Alan Lee

the plants could have more access to resources than they would in a monoculture. In addition, there is an ever-growing emphasis on protecting the soil that we grow crops on so that the fungal and microbial ecosystem can help plants grow better.

It is truly incredible how by having more than one crop species in a system, we were able to stabilize the yield, to the point where all the intercropped plots were producing relatively similar yield, regardless of plant species. One of the benefits of having a stable yield is the assurance that no matter the forecasted growing season, the producer is always able to know how much yield they can expect. With the increased chance for extreme weather, conventional systems could experience higher chance of crop failure compared to intercropping since it is prone to higher yield fluctuation.

While I may not be advocating for a transition from conventional cropping to intercropping, I highly encourage producers to engage in the talk about this system. Intercropping is a relatively new field of study and there are many interactions left to be explored. Not only is it an opportunity to see how different plant species compete and work with each other, but we are also given the opportunity to see if we can create a method to consistently reproduce the overyielding phenomena that sometimes occurs in intercrops. With the discovery of the interaction between oats and peas with AM fungi, we can make further progress by learning what the individual genera and species do for each of the plants, thus being able to better cater to the plant and the soil needs to produce higher yields.

Member Information

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peacecountrybeef.ca

Member Feed Testing Service

PCBFA Members recieve 2 free feed tests with their membership.

All feed tests are sent to Central Testing Labs in Winnipeg. Nutrients and minerals are tested by wet chemistry.

Nitrate, Mould, and Mycotoxin tests can be completed and will be invoiced at lab cost.

Feed Test Pricing:

Feed Tests for Members (after 2 free) - $45/sample

Feed Tests for Non-Members - Billed at Lab Cost

Nitrate Testing - $15/sample

Rush Shipping - $50

Hay Probe Deposit for Non-Members - $100

Feed Test Drop Off Sites:

Fairview Research Farm, County of Grande Prairie's Clairmont Office, MD of Greenview's Valleyview Office, Saddle Hills County Office, and the Lesser Slave Watershed Council Office in High Prairie

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