Team Members

EDWARD BORK  Matheis Chair in Rangeland Ecology & Management
CAMERON CARLYLE  Rangeland Ecology
LINDA HALL  Environmental Biosafety and Integrated Weed Management
BARRY IRVING  Manager, Research Stations
NAT KAV  Biochemistry & Biotechnology
JOCELYN OZGA  Plant Physiology & Horticultural Science
HABIBUR RAHMAN  Canola Breeding & Research
DEAN SPANER  Plant Breeding & Organic Agriculture
STEPHEN STRELKOV  Plant Pathology
RANDALL WESELAKE  Canada Research Chair, Agricultural Lipid Biotechnology
RONG-CAI YANG  Statistical Genomics & Quantitative Genetics
Grassland researchers help settle global debate on biodiversity

Findings refute a four-year-old paper, which concluded that empirical patterns between biodiversity and productivity are weak and inconsistent.
Working with a large network of scientists worldwide who studied grasslands of every type in all climate zones, rangeland ecology researchers Edward Bork and Cameron Carlyle helped reaffirm a theory of diversity that had been under attack.

They’ve confirmed that the humped-back model of diversity, which states that plant diversity peaks in grasslands of intermediate (medium) productivity, while high- and low-productivity grasslands tend to have fewer plant species, is accurate.

“We were also able to see that pattern,” said Carlyle who, along with Bork, took samples at the Department’s Mattheis Research Ranch in southern Alberta.

“We were also able to conclude that the pattern held across a wide range of spatial scales within these grasslands.”

The data set also included samples from the Department’s Roy Berg Kinsella Research Station in central Alberta (see story on p. 36). All told, the landmark study involved 62 scientists from 19 countries and six continents, who examined 30 sites. The findings refute a four-year-old paper, which concluded that empirical patterns between biodiversity and productivity are weak and inconsistent.

“It’s important to come to a consensus on the pattern because it changes how we might look at, interpret and manage, low-, moderate- and high-productivity sites, particularly if the conservation of plant diversity is an important objective,” said Bork, who is the Mattheis Chair in Rangeland Ecology and Management.

For instance, under the humped-back model, conservation of overall plant diversity may be more dependent on strategically retaining and enhancing grasslands of intermediate productivity. Meanwhile the conservation of biodiversity in high- and low-productivity sites may focus particular attention on a smaller group of plant species to ensure their functional role in the ecosystem is maintained.

Many other management decisions on grasslands are also dependent on knowing whether there’s a vital relationship between biomass and biodiversity, said Bork.

Rangeland ecology students study grasslands as part of a worldwide effort to settle an old debate.
Elzbieta Mietkiewska, a Research Associate with Phytola, isolated three genes from pomegranates and incorporated them into high-value oilseed crops adding punicic acid to its list of nutritional benefits.

Punicic acid is a polyunsaturated fatty acid that has been found to help slow the growth of skin, prostate and breast cancer cells. Until now, it was only found in pomegranates and Chinese cucumber seed oil.

Mietkiewska’s experimental plants, in which she inserted the three genes, accumulated up to 25 per cent punicic acid in the oilseeds that initially contained no punicic acid at all.

Punicic acid also assists with weight loss, has anti-inflammatory characteristics, and can even act as a chemical agent that can help paints dry quicker.

Because of punicic acid’s unique benefits and the progress made so far in Canadian oilseed crops, interest in Mietkiewska’s research is quickly growing.

Mietkiewska, who has a patent pending on the discovery, is confident that in the coming years, the oilseed crops that Phytola is developing in partnership with Alberta Innovates Technology Futures, will make products containing punicic acid easier to access and help more people capitalize on their benefits.

In addition to the nutritional value they already contain, common Canadian crops like canola and flax may soon have cancer fighting benefits too.

Discovery adds health benefits to common Canadian crops

In addition to the nutritional value they already contain, common Canadian crops like canola and flax may soon have cancer fighting benefits too.
“My education and the networks made through my PhD research opened many doors and provided me with opportunities which led to my current career.”

BARBARA ZIESMAN ’11 BSc (Ag) Crop Science and current PhD student commenting in the advantages of AFNS
AFNS plant pathologist Stephen Strelkov is working on DNA-based tools to fight clubroot, canola’s most significant threat. By analyzing DNA extracted from dust soil samples in 2011 and 2012, Strelkov and his team showed for the first time that clubroot spores can be quantified and measured in windborne dust. That’s significant because it demonstrated that clubroot spreads mostly through infested soil carried by farm machinery, and that the disease needs a host.

Strelkov monitors about 400 fields every year. He found a new strain of clubroot in a resistant variety of canola in 2013. Nine more strains were found in fields across a 600-kilometre stretch in central Alberta in 2014.

“We would like to develop molecular markers to distinguish the strains. It would make a time-consuming and labor-intensive process much quicker.”

Since 2015 was such a dry year, it’s possible the clubroot infestation won’t be as severe this season, says Strelkov. But the pathogen spores can stay dormant in the soil for up to 20 years, waiting for enough moisture and the presence of host roots to germinate and cause infection.

So a race is on between its spread and that of DNA-based tools to detect it and react.

“We would like to develop molecular markers to distinguish the strains,” said Strelkov. “It would make a time-consuming and labor-intensive process much quicker.”

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