BIOLOGY GRADUATE STUDENT SYMPOSIUM 2025

DEPARTMENT OF BIOLOGY

UNIVERSITY OF SASKATCHEWAN

PROGRAM AND BOOK OF ABSTRACTS

UNIVERSITY OF SASKATCHEWAN

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Welcome to the Biology 990 Symposium, our showcase of graduate student research

This year we have moved the symposium back before final exams. Unfortunately, given the exam schedule it means that it occurs while classes are still in session and some of you will miss part of the event. Thank you for your understanding.

The symposium will kick off with printed posters on the second and third floors of CSRB on Thursday afternoon (April 3) starting at 2:00. While you are here, grab a snack and catch up with friends and colleagues you may not have seen for a while. On Friday, we will be in Murray 299, for a day of oral presentations. If you have not been to this space, it is in the same location as the Gordon Snelgrove Gallery in the Murray Building. Head up the granite stairs, past the gallery, and up the stairwell to the lecture theatre.

There will be awards for the top poster and talks, which will be announced later in the spring at the Biology Celebration of Excellence held in Louis' Loft.

I want to wrap up by saying again that Biology 990 is one of my personal favourite times of the year. I love hearing about the diversity of research taking place in the department and I appreciate the thought, effort, and creativity, put into the student presentations.
The ongoing success of events like this lies with the people behind it and I want to thank all the students, supervisors, evaluators, and staff that help put it on. It is the people that make the Biology department such an amazing place to work and learn.

Have a wonderful symposium and best of luck to all of our presenters.

Chris

SYMPOSIUM SCHEDULE

Day 1 – Thursday, April 3rd, 2025

Refreshments from 2:00 to 4:00

Students with **odd-numbered** posters should be at their posters from **2:00 to 2:45**

Students with **even-numbered** posters should be at their posters from **2:45 to 3:30**

Free mingling from 3:30 onward

	POSTER PRESENTATIONS – CSRB		
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1.	Ifrah Abdirizak	CSRB Second Floor	5
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7.	Alexandra Grant	CSRB Second Floor	7
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Day 2 – Friday April 4th, 2025

	ORAL PRESENTATIONS (Murray 299)		
			Page # of Abstract
	8:55 am	Welcome	
15.	**9:00-10:30**	Cresilda Alinapon	10
16.		Julia Flett	11
17.		Levi Bettencourt	11
18.		Anastasiia Nykonenko	12
19.		Samira Baldin	12
20.		Sonia Barrios	12
	10:30 – 10:50	**Coffee break – (Murray 95)**	
21.	**10:50 – 12:20**	Kelsie Huss	13
22.		Rhamona McCalla	13
23.		Sydney-Marie Jones	14
24.		Katherine Marthens	14
25.		Neda Fattahi	15
26.		Lily Buckles-Whittle	15
	12:20 – 1:00	**Lunch**	
27.	**1:00 – 2:30**	Mikayla Rychel	15
28.		Zheng Wang	16
29.		Katie Fish	16
30.		Andres Rosales	17
31.		Kevin Kardynal	17
	2:30 – 2:50	**Refreshments – (Murray 95)**	
32.	**2:50 – 4:20**	Md Helal Uddin	18
33.		Victoria Crozier	18
34.		Nicholas Shephard	18
35.		A K M Munzurul Hasan	19
36.		Jinnath Ritu	19
37.		Portia Mohrbutter	20
		Closing Comments	

ABSTRACTS FOR APRIL 3 POSTER PRESENTATIONS

1. CHRISTY MORRISSEY & IFRAH ABDIRIZAK. Assessing Avian Diversity Inside and Outside First Nations Lands Using Bioacoustics Monitoring.

First Nations lands, managed with Indigenous stewardship practices have globally demonstrated higher biodiversity compared to non-Indigenous landscapes. However, there is limited research comparing avian biodiversity between First Nations and non-First Nations land types in Saskatchewan. This study uses passive bioacoustics monitoring and habitat mapping to investigate the relationship between avian diversity, abundance and species at risk in natural habitats inside and outside First Nations lands. Bioacoustics data were collected from 69 selected sites (33 First Nations and 36 non-First Nations lands) with Redberry Lake Biosphere region as the focal point. Species richness and vocal activity (abundance) were analyzed using "HawkEars" automated Canadian bird song AI classifier. Natural habitat characteristics were selected using remote sensing and GIS analysis. Generalized linear model will be applied to evaluate the association between different habitat characteristic and species richness and abundance. Preliminary findings suggest that over 130 avian species were detected in our study area, with 8 avian species at risk detected in First nations lands and 7 in non-First nations land. The findings will contribute to a more-detailed conservation management approach that incorporates both indigenous practices and scientific methods in protecting avian biodiversity in prairie ecosystems.

2. WILSON ACOSTA DIAZ & HONG WANG & YANGDOU WEI. The mysterious callose isoform: Unraveling the source of plasmodesmata callose during hypersensitive response. Department of Biology, University of Saskatchewan, Saskatoon, SK.

Plasmodesmata (PD) are critical for cell-to-cell communication in plants, allowing the exchange of molecules essential for growth and defense. During pathogen attack, PD permeability is regulated through callose deposition, which serves as a barrier to restrict pathogen spread. Blumeria graminis f. sp. hordei (Bgh), the causal agent of barley powdery mildew, invades host epidermal cells by direct penetration. In non-host Arabidopsis, Bgh forms a haustorium upon successful entry, but a hypersensitive response (HR) is quickly triggered, leading to localized cell death to limit pathogen progression. A hallmark of HR is callose deposition in cell walls. PMR4 (Powdery Mildew Resistant 4) has been identified as a key enzyme involved in callose synthesis during this process. In this study, we investigated spatiotemporal patterns of callose deposition during Bgh-triggered HR in Arabidopsis mutants lacking PMR4 and other callose synthase isoforms. Our results revealed that callose deposition at the PD occurred early in HR, independent of PMR4 activity. This suggests that multiple callose synthase isoforms contribute to the plant's immune response. The study emphasizes that PD callose deposition at the early stages of HR plays a critical role in plant immune signaling and defense responses.

3. Rahil Abedi, James D. Benson & Michael Wu. Caenorhabditis elegans chronic resistance to cryoprotectant-induced stress. Department of Biology, University of Saskatchewan, Saskatoon, SK.

Study of how organisms can resist osmotic and chemical stress is critical to enhance cryopreservation methods. This research seeks to use (Caenorhabditis elegans) C. elegans as a model to understand organismal tolerance to high levels of the cryoprotectant dimethyl sulfoxide (DMSO), with the aim of determining mechanisms responsible for resistance against osmotic and chemical toxicity damages. Our initial aim is to measure the transport of water and DMSO in C. elegans to determine how exposure time and concentration influence

volume change. We present initial data on this aim. Secondly, we aim to determine the level of osmotic and mechanical damage and examine DMSO toxicity in controlled stepwise exposures to discriminate between acute osmotic stress effects and direct chemical toxicity and then measure the contribution of exposure time to cumulative damage assessed by motility. Using mutagenesis, we will identify genetic determinants conferring resistance to osmotic and chemical stress. Combined, they will provide fundamental insights into the physiological constraints and adaptation mechanisms of C. elegans to cryoprotectant stress, with broad relevance to the development of cryopreservation technology in other biological systems.

4. MOHSIN ALI, DELANIE MCEVOY & CHRIS AMBROSE. Cellular Mechanisms of Leaf Growth and Adaptation to High Light Stress. Department of Biology, University of Saskatchewan, Saskatoon, SK.

Photosynthesis occurs inside leaves in specialized cells called mesophyll cells. The structure and spacing of mesophyll cells define the leaf's capacity for light absorption and CO2 capture, and regulates sugar transport to the leaf veins, and ultimately, the rest of the plant. The size, shape, and organization of mesophyll cells are highly adaptable to environmental factors, particularly light intensity and spectral composition. However, the cellular mechanisms driving these anatomical changes remain poorly understood, especially regarding how light intensity affects growth patterns at the cellular level.

My project will build upon this foundational question to understand how light stress influences these cellular growth patterns, and how these patterns are then translated to effect changes at the tissue and organ levels. I hypothesize that, under light stress, changes in the organization and anatomy of leaf mesophyll cells result from altered patterns of cell division and expansion. These changes would allow plants to respond to light stress by fine-tuning the balance between cell division and expansion, which then leads to changes in the degree of cell-cell interconnectivity and air space volume.

5. LILIANA M. R. AUSTIN1, 2, ISOBEL A. P. PARKIN1, CHRISTOPHER D. TODD2. CRISPR/Cas9-mediated knockout of meiotic genes to increase Camelina diversity. 1Agriculture and Agri-Food Canada, Saskatoon, SK; 2Department of Biology, University of Saskatchewan, Saskatoon, SK.

Camelina (Camelina sativa) is an oilseed crop with emerging applications in the food, feed, and biofuel industries. However, its commercial expansion is hindered by its susceptibility to clubroot disease, which inhibits root growth and significantly reduces yield and quality. Clubroot resistance has been identified in a wild relative, Camelina microcarpa, though hybridization efforts between C. sativa (n = 20) and C. microcarpa (n = 19) are complicated by differences in chromosome number between the species. This difference in chromosome number results in hybrid progeny with abnormal meiosis and low pollen viability. CRISPR/Cas9-mediated knockout of genes involved in meiotic chromosome pairing will be conducted to reduce strict homologue pairing requirements, bypass meiotic arrest mechanisms, and allow gametes with mismatched chromosomes to form, potentially enabling the formation of viable hybrids. Immunofluorescent microscopy will be performed to visualize chromosome pairing and assess pairing fidelity in gene-edited plants, after which gene-edited C. sativa will be manually crossed with C. microcarpa. Resultant progeny will be evaluated for fertility through assessments of pollen viability and seed set, and for clubroot resistance through molecular marker analyses and disease resistance assays. This investigation aims to contribute to broader efforts in crop improvement and resilience in C. sativa.

6. LAURA H. DYSON & PHILIP D. MCLOUGHLIN. Risk assessment for chronic wasting disease in Saskatchewan's boreal caribou (Rangifer tarandus caribou). Department of Biology, University of Saskatchewan, Saskatoon, SK.

Chronic wasting disease (CWD) is a fatal prion disease of cervids in North America and is widely regarded as a major challenge to wildlife management. Due to the ability of prions to persist in the environment for several years, the ability to eradicate CWD in areas where it becomes established is limited. Recent detections of CWD-positive deer in boreal caribou habitat in Saskatchewan, combined with a 2016 outbreak of CWD in Norway's wild reindeer have highlighted the need for comprehensive CWD surveillance on the boreal plains. This work establishes surveillance with the deployment of a camera-trap array in the boreal plains to non-invasively monitor interactions of caribou with moose and white-tailed deer as apparent competitors and vectors of CWD. A paired trail/off-trail camera design will account for differential detection probabilities of cervid species on trails to obtain ground-truthed multi-species density estimates and update historical cervid distributions on the boreal plains. Partnerships with Indigenous hunters and trappers to collect CWD samples from cervids as well as soil testing in the study area will be used to determine CWD presence as part of a niche-based transmission-risk model to assess the spatiotemporal overlap of caribou with infected moose and deer.

7. ALEXANDRA A. GRANT, PHILIP D. MCLOUGHLIN, & RUTH GRUEL. Feral Forces: the Ecological Influence of Sable Island Horses. Department of Biology, University of Saskatchewan, Saskatoon, SK.

Grazing by large herbivores shapes plant communities and indirectly affects other organisms. Sable Island (SI) National Park Reserve, a remote 36 × 1.25 km crescent-shaped sandbar 160 km off Nova Scotia, hosts approximately 190 plant species and a single terrestrial mammal, the SI horse. While these horses may act as ecosystem engineers, their ecological role remains poorly understood. To investigate this, Fences in the Sand (FitS) was launched by Parks Canada, the Sable Island Institute, and academic partners. From 2021 to 2025, eight fenced sites paired with unfenced controls were established to assess the effects of horse exclusion. I hypothesize that horses alter vegetation communities as a function of density because disturbance intensity selects for different adaptive strategies in plant species. Additionally, I propose that horses reduce habitat quality for Ipswich sparrows (Passerculus sandwichensis princeps), an endemic subspecies, by diminishing nesting cover. At exclosures and controls, vegetation surveys will capture changes in structure, diversity, and composition while autonomous recording units (ARUs) will assess sparrow abundance. Range cages at controls will provide within-year estimates of grazing pressure. My research will inform conservation strategies for SI National Park and improve understanding of how a large herbivore influences a dynamic ecosystem.

8. SHANAE K. HEUER1 & MAUD C. O. FERRARI2. How habitat complexity impacts the ecosystem engineering of northern crayfish (Faxonius virilis). 1Department of Biology, University of Saskatchewan, Saskatoon, SK; 2Department of Veterinary Biomedical Sciences, University of Saskatchewan, Saskatoon, SK.

Ecosystem engineers alter the environment and influence the availability of resources for many other species. Therefore, changes to the environment that affect the behaviour of ecosystem engineers may impact other species indirectly. My research focuses on how the habitat complexity of one ecosystem engineer, the northern crayfish (Faxonius virilis), affects their environmental modification behaviours. I will run three experiments to analyze the impact of different habitats on the way they move their substrate. Initially, I will look at how long-term exposure to either a black or white background colour, along with high or low predation risk, affects the way crayfish alter the ratio of black and white gravel. Following this, I will see if nitrate exposure causes an effect on the magnitude of gravel alteration by crayfish. My third experiment will look at how crayfish move

their substrate when differing levels of macrophyte coverage are present. This research will further develop current understandings of a keystone species' habitat alteration behaviours within numerous environments, thus highlighting the potential impacts of crayfish on both native and non-native ecosystems.

9. REBECCA M. NIXON & NEIL B. CHILTON. Characterization of the Complete Mitochondrial Genomes of Four Species of Oropsylla, Neopsylla inopina, and Rhadinopsylla fraenata (Siphonaptera). Department of Biology, University of Saskatchewan, Saskatoon, SK.

Fleas (order Siphonaptera) are important arthropod vectors that transmit disease-causing agents to humans, domestic animals, and wildlife. It is important to accurately distinguish between species and to determine their evolutionary relationships. Species identification can be achieved using a limited set of structural characteristics. However, morphological examination requires the use of chemicals to visualize internal structures which compromises the ability to subsequently conduct molecular-based studies on fleas. The aim of my project is to sequence the complete mitochondrial genomes of six common fleas of Richardson's ground squirrels (Urocitellus richardsonii), Oropsylla tuberculata, O. labis, O. rupestris, O. bruneri, Neopsylla inopina, and Rhadinopsylla fraterna, all of which (except R. fraterna) are vectors of Yersinia pestis, the causative agent of plague. This will be achieved by using long PCRs combined with a primer walking strategy. Sequence data will be analyzed to determine the best genes for species identification. Evolutionary trees will be inferred from analyses of the complete nucleotide sequences and the amino acid sequences of the protein-coding genes. The findings of this research will provide a foundation for future studies examining the population genetics of fleas and expand upon our limited understanding of the evolution of the order Siphonaptera.

10. VICTORIA A. REDMAN1 ; KEVIN J. KARDYNAL 1,2 ; & KIRSTY E. B. GURNEY1,2. Evaluating passerine communities and diet in relation to forestry-related landscape change in the Saskatchewan boreal forest. 1 Department of Biology, University of Saskatchewan, Saskatoon, SK. 2Environment & Climate Change Canada, Saskatoon, SK

The North American boreal forest is subject to increasing pressures from industrial development, climate change-driven disturbances, and timber harvest. While substantial research has explored how forest harvest impacts avifaunal community composition and structure through changes in habitat, there is limited understanding of how bird communities in undisturbed forest stands near harvested forests are affected by these changes. Additionally, the impact of forestry on bird diets and trophic niche in the boreal forest remains unexplored. To address these gaps, our study will assess the effects of forestry on boreal bird communities in Cold Lake First Nation's traditional territory, focusing on spatial effects and the diets of four focal species. We will quantify differences in bird communities across different forest types, including clear cuts, residual patches, and old-growth forests to understand how forestry influences regional bird communities in undisturbed forests. We will use DNA metabarcoding and stable isotope analyses to quantify diet variation across forest types for four focal passerine species with different foraging strategies. Together, our findings will provide baseline data on how forestry practices influence community composition and diet, filling a knowledge gap on the ecological effects of forestry on boreal songbirds.

11. CARTER W. STOELZEL & CHRISTY A. MORRISSEY. Impact of Agricultural Practices on Horned Lark (Eremophila alpestris) Reproduction in Southern Saskatchewan. Department of Biology, University of Saskatchewan, Saskatoon, SK.

Horned Larks (Eremophila alpestris) are a common bird species experiencing steep population declines. While they frequently breed in agricultural landscapes, the effects of agricultural practices on their reproduction remain unclear. This study will investigate Horned Lark density, occupancy, and reproductive success in and around a community pasture. Territory and roadside surveys will be conducted three times during the breeding season to assess whether larks abandon territories as vegetation height increases. Nest searching will be paired with assessments of insecticide exposure using fecal samples and insect boluses collected via the ligature method. Samples will be collected before and after seeding in crop fields to evaluate changes in exposure. Vegetation structure will be quantified through obstruction readings at nest sites and visual composition assessments. Fecal samples will be analyzed using high-performance liquid chromatography, while insect boluses will undergo gas chromatography analysis to identify insecticide presence and concentration. This research aims to identify crop types preferred by Horned Larks and assess their exposure to insecticides in relation to land use and vegetation structure. Findings will provide insight into how agricultural practices influence Horned Lark reproduction, informing conservation strategies for this declining species.

12. LUV SEHGAL & MAUD C. O. FERRARI. Eutrophication on the foraging and antipredator responses of freshwater virile crayfish (Faxonius virilis). Department of Biology, University of Saskatchewan, Saskatoon, SK.

Past research on pollution has primarily focused on lethal concentrations, yet sublethal disruptions in behaviour — rather than immediate toxicity — are often the proximate cause of mortality in disturbed ecosystems. Foraging and antipredator behaviour (eat and not be eaten) are perhaps two of the most crucial determinants of survival in animals. Failure to secure food or detect threats almost always results in mortality. Many aquatic species, including crayfish, rely on chemical cues to locate food and assess predation risk. However, anthropogenic disturbances such as eutrophication — driven by nitrate pollution — may impair chemosensory function, disrupting these essential behaviours. In this experiment, crayfish were assessed on several key metrics encompassing both antipredator response and foraging behaviour within eutrophic conditions. Because foraging inherently involves a trade-off with antipredator behaviour, we predicted that elevated nitrate levels would impair crayfish sensitivity to risk, resulting in increased foraging activity and overall bolder behaviour. Understanding how nitrate influences behavioural responses is crucial for assessing its broader ecological impact in freshwater environments.

13. CAMRYN J. VESTBY & MITCH D. WEEGMAN. Assessing the influence of environmental drivers and light goose population dynamics on components of king eider recruitment in the central Canadian Arctic. Department of Biology, University of Saskatchewan, Saskatoon, SK.

In many relatively long-lived species, variation in population growth is driven by variation in reproductive success and recruitment. This project will assess the environmental drivers of the components of recruitment of a relatively understudied sea duck. Aided by a long-term demographic dataset of king eider (Somateria spectabilis) clutch size and nesting success collected at Karrak Lake from 1995-2019; we will determine the extent to which climatic indices and interspecific competition explain variation in king eider reproductive metrics over our study period. Karrak Lake comprises one of the largest lesser snow goose and Ross's goose (i.e., light goose) breeding colonies in North America, and their demography has been well studied. Although

the breeding ranges of light geese and king eiders mostly overlap in the central Canadian arctic, the consequences of a large nesting colony of light geese on king eider reproductive success have not been studied in the context of rapid colony growth and subsequent collapse, such as the pattern at Karrak Lake. Investigating how these arctic species coexist with each other can form the basis for future sea duck management decisions and bolster our understanding of sea duck population dynamics and environmental pressures.

14. ZANE WIEBE1 & MAUD C. O. FERRARI2. Effects of Cyanotoxin BMAA on Northern Crayfish (Faxonis virilis) Behavior. 1Department of Biology, University of Saskatchewan, Saskatoon, SK. 2Department of Veterinary Medicine, University of Saskatchewan, Saskatoon, SK

β-Methylamino-L-alanine (BMAA) is a neurotoxic cyanotoxin produced by the globally distributed cyanobacteria (blue-green algae). First discovered in the 1950s on the island of Guam, BMAA has become widely researched due to its links to neurodegenerative properties in mammals. Comparatively, our knowledge is lacking on how BMAA impacts other organisms, especially aquatic macroinvertebrates with the entire field being largely understudied. Macroinvertebrates, such as the northern crayfish, play critical roles as keystones species and ecosystem engineers in their environments. With an increase in harmful algal blooms (HABs) in freshwater environments due to increased temperatures and agricultural eutrophication it is important to examine the interaction between BMAA and the behavioural outcomes following exposure. In the first experiment we will attempt to determine what concentration of BMAA elicits any effects on crayfish locomotion and activity through a series of increasing concentration exposures to determine its effects their roaming behaviour, essential for maintaining the benthic environment. The second experiment will determine what effects BMAA has on boldness in crayfish using well developed probe tests, as this can give us insight into how BMAA influences the defensive and escape behaviour of crayfish, which are essential to keep themselves safe from predators and competitors.

ABSTRACTS FOR APRIL 4 ORAL PRESENTATIONS

15. CRESILDA V. ALINAPON, PETA C. BONHAM-SMITH, & CHRIS D. TODD. Characterization of effector PbPE29: Its potential role in successful Plasmodiophora brassicae colonization in Brassica napus L. (Canola). Department of Biology, University of Saskatchewan, Saskatoon, SK.

Clubroot is a devastating disease caused by Plasmodiophora brassicae, a soil-borne obligate biotrophic plant pathogen negatively affecting canola yield. Clubroot management programs have been developed to try to mitigate this problem but have been unsuccessful in limiting the spread of the disease. Plant pathogens suppress or evade different layers of plant immunity by releasing a wide range of effectors. These effectors are secreted molecules interacting with host targets, manipulating host physiology or deregulating host immune responses. My study aims to characterize the molecular function of the P. brassicae effector protein PbPE29 and how it influences disease progression. PbPE29 is expressed throughout the secondary stage of infection and during the development of galls on the roots of infected plants. PbPE29 contains a functional signal peptide, indicating that it is being secreted by the pathogen into the infected host cell and shows a nuclear/nucleolar localization in the plant cell when the signal peptide is removed. Transient expression of this protein causes small necrotic lesions in leaf tissue and transgenic Arabidopsis lines overexpressing ΔSPPbPE29-GFP show stunted growth and precocious leaf senescence phenotype when compared to controls. However, research will continue characterizing the molecular function and mechanism of how PbPE29 is involved in P. brassicae infection and disease progression.

16. JULIA FLETT1, TIM JARDINE2 & CHRISTY MORRISSEY1. Investigating sublethal pesticide effects in emerging insect communities as fatty acid and insecticide vectors. 1Department of Biology, University of Saskatchewan, Saskatoon, SK. 2Toxicology Centre, University of Saskatchewan, Saskatoon, SK.

Wetlands serve as important ecosystems for birds and riparian predators that rely on seasonal insect emergence for sustenance. Due to the increased demand for agriculture, wetlands have been subject to drainage and degradation, frequently resulting in higher quantities of pesticide residues entering waterbodies through runoff and spray drift events. Aquatic insects serve as important vectors between wetland and terrestrial ecosystems, exporting essential nutrients such as polyunsaturated fatty acids that are limited in the terrestrial environment. Exposed insect populations can be reduced but sub-lethal exposure affects the development of insects and can lead to insecticide accumulation and flux out of the wetland. To quantify fatty acid and insecticide export, I am manipulating insect communities through experimental exposures using 21 limnocorral structures deployed in a natural wetland. In 2024, two successive 28-day experiments were completed to assess the impacts of three current use insecticides on insect vectors. Experiment 1 assessed chlorantraniliprole exposure at increasing concentrations while experiment 2 compared the impacts of 3 systemic insecticides: chlorantraniliprole, clothianidin and deltamethrin at a single concentration relative to controls. In 2025, I will repeat both experiments, replacing deltamethrin with flupyridifurone. Preliminary results from 2024 indicated the exposure concentrations may not have reached targets; however, chlorantraniliprole caused a decrease in overall biomass and abundance from the highest exposure treatment. This research aims to inform aquatic safety policy to limit indirect agricultural impacts on natural insect communities.

17. LEVI M. BETTENCOURT1, KAREN MACHIN2, JENNIFER PROVENCHER3 & KIRSTY E. B. GURNEY1,5. Assessing the Levels and Biological Fate of UV-328 in Captive Mallards. 1Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan; 2Department of Veterinary Biomedical Sciences, Western College of Veterinary Medicine, Saskatoon, Saskatchewan; 3Environment and Climate Change Canada, Science and Technology Branch, Ottawa, Ontario; 4Environment and Climate Change Canada, Science and Technology Branch, Saskatoon, Saskatchewan

Plastics and their chemical additives are widespread contaminants in ecosystems. Among these, benzotriazole UV-stabilizers (BUVs), particularly UV-328, have raised concerns due to their persistence, bioaccumulative potential, and toxicity. While UV-328 has been observed to accumulate in multiple taxa, its broader ecological effects remain poorly understood. This study investigates the biological fate of UV-328 in birds through a controlled exposure experiment using captive mallards (Anas platyrhynchos). The mallards received an environmentally relevant dose of UV-328 orally, and maternal transfer was assessed by collecting eggs daily during and after the exposure period, while tissue accumulation was examined in lipid-rich organs like the liver. Preliminary results indicate maternal transfer of UV-328 to eggs, with egg concentrations unexpectedly decreasing near the end of the exposure period, suggesting potential metabolism or excretion over time. Ongoing analyses will help clarify expected patterns. Ultimately, this research advances our understanding of UV-328 exposure and its fate in birds, focusing on the role of maternal transfer as a potential detoxification mechanism and informing risk assessments for waterfowl, with broader implications for wildlife conservation and plastics additive regulatory policies.

18. ANASTASIIA NYKONENKO & DR. PHILIP MCLOUGHLIN. Effects of social bonds on survival in adult Sable Island feral horses following a severe winter die-off.

Department of Biology, University of Saskatchewan, Saskatoon, SK.

Sociality is a common feature in animals, yet the reasons behind individual preferences and the fitness consequences of social bonds under different ecological constraints remain unclear. Feral horses (Equus feral caballus) live in multi-sex, multi-age family groups year-round, making them a suitable model species for studying social affiliations. Using observations of spatial associations among Sable Island feral horses (n = 148) and known individual fates, I investigated the effect of social bonds on individual survival following a severe overwinter die-off that reduced the population by one-third. Individual social preferences within groups appeared to be non-random with each horse having preferred and avoided associates. However, assortment based on sex, age, boldness, or gregariousness was not a significant predictor of social affiliations. In adult females social bonds with similar-aged females increased survival probability, with the strongest effect on the east part of the island with poorer conditions. In adult males, however, greater associations with females, particularly of younger age, reduced survival probability. Conversely, males with stronger social bonds to same-age conspecifics of either sex had a higher likelihood of survival. These results highlight the need to differentiate affiliations within and between sex-age classes when studying the effects of sociality on individual fitness.

19. SAMIRA L. BALDIN & SOM NIYOGI. Behavioural effects of environmentally relevant cadmium exposure in larval zebrafish (Danio rerio). Department of Biology, University of Saskatchewan, Saskatoon, SK.

Cadmium (Cd) is a ubiquitous contaminant that is highly toxic to fish. However, the effects of cadmium exposure in the early life stages of fish remain poorly understood. The present study examined the behavioural effects of embryonic exposure to Cd in zebrafish. Zebrafish embryos were exposed to increasing waterborne Cd concentrations [0 (control), 1, 5, 10, and 50 µg/L] from 1–120 hpf (hours post-fertilization). Subsequently, hatching success, larval survival and heart rate were evaluated. Behavioural effects of Cd were assessed by reflexive movement behaviour (photo-motor response) and thigmotaxis (anxiety-like behaviour) at 120 hpf. In addition, Cd-induced reactive oxygen species (ROS) production and apoptosis were also evaluated at 120 hpf by whole-mount DCFDA staining and acridine orange staining, respectively. Exposure to Cd did not affect hatching success, survival rate or abundance of apoptotic cells but significantly increased the heart rate and ROS production. Interestingly, Cd exposure elicited a biphasic dose response on behaviours, as reflexive movement and thigmotaxis responses were suppressed at low concentrations, followed by hyperactivity at high concentrations. Collectively, these observations suggest that Cd, even at very low exposure levels, can impair locomotion and sensorimotor responses in larval zebrafish, likely by inducing oxidative stress and altering metabolic rate.

20. SONIA BARRIOS & JEFFREY E. LANE. Myotis lucifugus roost and foraging resource selection in the Northern Great Plains. Department of Biology, University of Saskatchewan, Saskatoon, SK.

The little brown bat (Myotis lucifugus) is ubiquitous in Canada, but endangered due to the introduced disease white-nose syndrome (WNS). Recommendations for recovery strategies emphasize the need for characterization of high-quality habitat, like summer roosting and foraging areas. Little research has focused on the Northern Great Plains, despite breeding populations existing here. The aim of this study is to investigate the selection behaviour of summer colonies of little brown bats in Saskatchewan across landscapes. To develop roost selection models at the landscape and site-scales, we performed radio-tracking experiments and mathematically

estimated roost-level home ranges. Using generalized linear model selection, we modelled "used versus available" resources for both roost landscape features and biophysical data. To analyze foraging habitat selection within the home range, we collected insect community data from several potential foraging habitats. DNA metabarcoding was used to compare available insect community diversity to insect taxa found within roost guano. All models were run according to landscape type (grassland or forest) to determine if maternity colony resource selection differs according to landscape type. This study presents a novel comparative modelling analysis elucidating landscape dependent resource selection, which can directly guide conservation management strategies.

21. KELSIE N. HUSS1, MATTHEW E. DYSON2, PAUL T. LINK3, KAREN L. MACHIN4, CHRIS A. NICOLAI5, FRANK C. ROHWER5, & MITCH D. WEEGMAN1. Comparing the behaviour of dabbling ducks fitted with tracking devices using different attachment techniques. 1Department of Biology, University of Saskatchewan, Saskatoon, SK; 2Ducks Unlimited Canada, Winnipeg, MB; 3Louisiana Department of Wildlife and Fisheries, Baton Rouge, LA; 4Department of Veterinary Biomedical Sciences, University of Saskatchewan, Saskatoon, SK; 5Delta Waterfowl, Bismarck, ND.

The development of miniaturized tracking technologies has enabled practitioners to study animals in space and time as never before, but devices can have a significant negative effect on birds (e.g., increased energy expenditure). With various transmitter attachment techniques being known to influence individuals differently, it is vital to robustly quantify indirect and direct device effects across attachment techniques. In the last 10-15 years, thousands of waterfowl across North America have been fitted with devices using four different attachment techniques. While the most common techniques are (1) single-loop harnesses and (2) double-loop harnesses, researchers are also using (3) subdermal units and (4) implantable tracking devices. We compared the behaviour of mallards (Anas platyrhynchos) across four attachment techniques by deploying 75 Global Positioning System-acceleration (GPS-ACC) transmitters per technique. Using a previously developed library of video footage as training data, we developed a machine learning model to classify each ACC fix to a particular behaviour in the collected wild bird data. Furthermore, we examined the proportion of devices that are transmitting in relation to attachment technique, deployment location, and time. Results from this work will contextualize past research and help future practitioners select the attachment technique most appropriate for their work and goals.

22. RHAMONA C. MCCALLA AND MAUD C.O. FERRARI. Investigating the Effects of Anthropogenic Change (Eutrophication) on the Individual Variation in Cognitive Abilities of Virile Crayfish. Department of Biology, University of Saskatchewan, Saskatoon, SK; APEC Lab, VBMS/WCVM, University of Saskatchewan, Saskatoon, SK.

Variations in personality and cognitive traits influence an animal's interactions with its environment; furthermore, both factors may play a role in how animals adapt to anthropogenic changes. My thesis examines animal personality and cognitive ability in virile crayfish (Faxonius virilis), a model species for studying the neuronal mechanisms underlying navigation. I assess crayfish performance in a series of personality tests (boldness, exploration), alongside a spatial learning task, in one of two environmental contexts: under either a control or a polluted (high-nitrate) environment—to explore the effects of agricultural pollution on the expression of both personality traits and spatial learning performance. I predict that individual crayfish will consistently differ in average time of emergence across both environmental conditions, in other words crayfish will demonstrate animal personality. Moreover, I expect to see evidence of environmentally induced behavioural plasticity and for consistent differences in behavioural plasticity to exist between individuals. The findings of my study will contribute to a deeper understanding of the complex relationships between cognition,

personality, and ecology, while also highlighting the potential of invertebrates as a model for studying the evolution of cognitive variation.

23. SYDNEY-MARIE JONES1, KIRSTY E. B. GURNEY1,2 & ANN E. MCKELLAR1,2. Assessing migratory connectivity and genetic population structure in the Upland Sandpiper. 1Department of Biology, University of Saskatchewan, Saskatoon, SK, 2Environment and Climate Change Canada, Prairie and Northern Wildlife Research Centre, Saskatoon, SK.

Effective conservation of long-distance migratory shorebirds requires a comprehensive understanding of population structure throughout the annual cycle. The grassland-dependent Upland Sandpiper (Bartramia longicauda) is declining across its expansive North American breeding range, threatened by habitat loss, agrochemical exposure, and the cumulative effects of disturbance throughout migration. However, limited knowledge of migratory connectivity and genetic structure limits targeted conservation efforts. My thesis integrates spatial and genetic analyses to assess population structure in the Upland Sandpiper at a range-wide scale. To test the hypothesis of weak connectivity, we evaluated data from satellite transmitters deployed at six breeding sites across North America. Results indicate scale-dependent spatial separation on nonbreeding grounds, with western- and central-breeding populations exhibiting overlapping migratory routes through the Central Flyway to shared nonbreeding areas in Argentina and Uruguay. In contrast, the eastern-breeding population followed significantly shorter nonstop flights across the Atlantic to nonbreeding regions in northern South America and Brazil, almost entirely distinct from those used by other populations. Ongoing genetic analysis will assess whether these spatial patterns of connectivity correspond with genetic structure. Understanding both spatial and genetic structure in the Upland Sandpiper will provide critical insight for conservation planning, including the potential designation of conservation units under COSEWIC.

24. Katherine A. Marthens1, Eric T. Reed2, Amelia Coxe3, Michael L. Casazza4, Cory T. Overton4, Jay A. VonBank 5, Tracy Davison6, & Mitch D. Weegman1. Drivers of Transitions among Habitats During Breeding and Staging Periods in an Arctic-Nesting Goose. 1Department of Biology, University of Saskatchewan, Saskatoon, SK; 2 Canadian Wildlife Service, Gatineau, QC; 3Department of Environment and Climate Change, Government of Northwest Territories, Yellowknife, NT; 4U.S. Geological Survey, Western Ecological Research Center, Dixon Field Station, 69924 Tremont Rd., Dixon, CA; 5U.S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA; 6Department of Environment and Natural Resources, Government of Northwest Territories, Inuvik, NT

Understanding habitat use is important when considering population dynamics and life history outcomes, particularly on the arctic landscape, where resource availability windows are brief, and behavioural decision-making can have strong impacts on survival and reproductive success. Lesser Snow Geese (Anser c. caerulescens, hereafter SNGO) offer an interesting system in which to examine these decisions; populations are increasing significantly in the Western Canadian Arctic, and, in southern staging areas, birds have proven to be highly effective at adjusting habitat use strategies in response to increased agricultural land conversion. Advances in tracking technology have provided researchers with more insight than ever before into bird behavior at hard-to-reach periods of the annual cycle. I am using a Markov model in a Bayesian framework to assess how behavioural decisions (i.e. proportions of time spent on different behaviours) influence movement among different landcover types during summering periods as well as during northern staging periods in spring and fall, which are more poorly studied than southern stopover areas. Combining GPS and acceleration data allows for unprecedented insight into behavioural shifts at different annual cycle periods, and may provide valuable information, both for SNGO management in the Western Arctic and for comparison among different SNGO subpopulations.

25. Neda Fattahi & Chris Todd

Accumulation of allantoin in response to combined stress in Arabidopsis (Arabidopsis thaliana) Department of Biology, University of Saskatchewan, Saskatoon, SK

Plants in the field are exposed to a variety of biotic and abiotic stresses which influence their growth and development. These stresses include fluctuations in temperature, extremes in salinity, exposure to heavy metals, variations in water availability and encounters with pathogens and pests. The impact of these abiotic stresses on agriculture is profound resulting in substantial crop yield losses that incur significant economic costs on a global scale. Allantoin is a nitrogen-rich compound produced by the ureide catabolic pathway responsible for recycling nitrogen from purine bases in plants and other organisms. However, although recent studies illustrated that allantoin is involved in various abiotic stress responses, the specific mechanism by which it contributes to stress tolerance in plants has remained a question. My research focuses on exploring these mechanisms, particularly during salt stress. My research employs genetic approach using different types of Arabidopsis mutants to explore how the Abscisic acid (ABA) signaling pathway interacts with allantoin accumulation. Using mutants like aln-3 (deficient in allantoinase), ALNox (overexpressing allantoinase) and several ABA mutants (abi, nced3), we can ask how these responses are connected and begin to look at the physical and biochemical impacts of stress in these genotypes

26. LILY D. BUCKLES-WHITTLE & NICOLE B. WEBSTER. Neural role in biomineralization for the slipper snail Crepidula atrasolea (Calyptraeidae, Gastropoda). Department of Biology, University of Saskatchewan, Saskatoon, SK.

While we understand biomineralization as a chemical process, we know little about how organisms like molluscs (e.g., snails, Nautilus, clams, etc.) control mineral deposition. Several studies suggest that biomineralization in molluscs is under neuronal control, however, there is currently no direct evidence to support this hypothesis. Specifically, the neural control hypothesis (NCH) proposes that neurosecretory networks signal to the mantle, the organ that secretes the shell, to control biomineralization. Our goal was to test the NCH by determining if nerves are present throughout all stages of shell formation in the slipper snail Crepidula atrasolea. To date, the ontogeny of mantle neural anatomy was observed across shell developmental stages using the neural antibodies serotonin and FMRF-amide. Preliminary data suggests that neural tissue may be present early during shell formation. However, further markers and higher-resolution studies are required to confirm this. This research is the first step in understanding how molluscs control shell secretion, as well as developing an antibody staining protocol for future studies with C. atrasolea. Furthermore, it will aid future molluscan research on shell form variation and alternate shell control hypotheses.

27. MIKAYLA J.-A. RYCHEL1, EMILY L. BAMFORTH2,3 & TRACY A. MARCHANT1. Bone structure and development in Late Cretaceous polycotylid plesiosaurs: a histological approach. 1Department of Biology, University of Saskatchewan, Saskatoon, SK; 2Philip J. Currie Dinosaur Museum, Wembley, AB; 3Department of Geological Sciences, University of Saskatchewan, Saskatoon, SK.

Plesiosaurs are a group of extinct, fully aquatic marine reptiles that swam the open waters of the Mesozoic. Near Herschel, SK., a Late Cretaceous marine bonebed preserves an unusually high number of isolated polycotylid plesiosaur limb bones hypothesized to span a range of developmental stages. This fossil locality provides an excellent opportunity to investigate plesiosaur ontogeny within a single lineage. Histological thin sectioning of these elements reveal the preserved internal structure and microanatomy. Features such as the system of vascularization, fibrillar organisation, bone tissue type, and the degree of remodelling indicate the osteological maturity of each specimen. Small, juvenile specimens display radial vasculature in the periosteal tissue, indicative of rapid growth rates and immature bone. Larger specimens appear more osteologically

mature, still with radial vasculature but with the addition of remodelled and secondary bone. Our data will be compared to a previously proposed framework of histological ontogenetic stages for plesiosaurs to help construct a detailed growth sequence for this lineage. This will refine our understanding of plesiosaur bone growth and development, offering important insights into the plasticity of reptilian bone development in diverse environments and the evolution of this vertebrate tissue in general.

28. FENGQUN YU1, ZHENG WANG1, YANGDOU WEI2 . Fine Mapping of Clubroot Resistance Genes Rcr5 and Rcr10 in Canola (Brassica napus).

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Clubroot, caused by the obligate biotrophic pathogen Plasmodiophora brassicae Woronin, is one of the most important diseases of Brassica crops globally. Growing cultivars carrying clubroot resistance (CR) genes is the most efficient and practical approach to managing clubroot disease on Brassica napus. In our previous genetic studies, we have identified two CR genes, Rcr5 and Rcr10, which confer race-specific resistance against clubroot strains SK-28 and CP-5, both strains are prevalent in Canada. Earlier studies have provided a preliminary map indicating the gene locations and chromosome numbers for these two CR genes. The objective of this study is to fine map of the Rcr5 and Rcr10 genes using Single-Nucleotide Polymorphic (SNP) markers developed previously. We used Kompetitive Allele Specific PCR (KASP) for genotyping SNPs associated with clubroot resistance, enabling the identification of genetic associations between progeny and marker locations. These fine mapped genes have future implications for breeding programs such marker-assisted selection and development of resistance cultivars.

29. KAITLYN M. FISH1 & MAUD C.O. FERRARI2. Post-hatch antipredator behaviour of juvenile northern crayfish (Faxonius virilis) after embryonic exposure to predation risk. 1Department of Biology, University of Saskatchewan, Saskatoon, SK; 2Department of Veterinary Biomedical Sciences, University of Saskatchewan, Saskatoon, SK.

Neophobia, or the aversion to novel stimuli, is an adaptive response that enhances survival by promoting caution in uncertain environments. While neophobia has been extensively studied in vertebrates, its development and function in aquatic invertebrates remain less understood. This study examines whether embryonic northern crayfish (Faxonius virilis) develop neophobic responses following early exposure to a high-risk environment. Previous research suggests that prey animals exposed to high levels of predation cues exhibit heightened wariness toward unfamiliar stimuli, potentially as a generalized risk-avoidance strategy. By exposing crayfish embryos to alarm cues during early developmental stages, we assess whether this exposure influences their behavioural responses to novel stimuli. If neophobia manifests in response to high-risk environments, it may indicate that invertebrates possess a level of cognitive plasticity that enables them to generalize threat responses beyond specific predator cues. Understanding how early-life experiences shape neophobic behaviour in crayfish contributes to broader discussions on the evolution of risk assessment and adaptive behaviour in invertebrates. This research provides insight into the ecological significance of neophobia in predator-prey interactions and the potential role of environmental factors in shaping behavioural phenotypes in aquatic ecosystems.

30. ANDRES N. ROSALES1, ANN E. MCKELLER1,2, SCOTT WILSON3,4, CHRISTY A. MORRISSEY1, & KIRSTY B. GURNEY1,5. Evaluating effects of agriculture on Population Trends of a breeding grassland shorebird. 1Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan; 2Environment and Climate Change Canada, Wildlife Research Division, Saskatoon, Saskatchewan; 3Department of Forest & Conservation Sciences, University of British Columbia, Vancouver, British Columbia; 4Wildlife Research Division, Environment & Climate Change Canada, Delta, British Columbia; 5Environment and Climate Change Canada, Science and Technology Branch, Saskatoon, Saskatchewan

Widespread agricultural intensification across North America has raised concerns about potential impacts on breeding bird populations. Whereas negative effects of intensification on population trends, species abundance, and avian biodiversity are well-documented, effects on breeding grassland shorebirds have not been well studied. During the breeding season, Upland Sandpiper (Bartramia longicauda) are widely distributed across North America and inhabit a range of agricultural landscapes, making them an ideal model for evaluating effects of agriculture on breeding grassland shorebirds. To test the hypothesis that variation in landscape composition, configuration, and diversity of breeding landscapes influence local trends in abundance of breeding Upland Sandpiper populations, we combined two key sets of data: (i) the large-scale, spatially explicit eBird Status and Trends dataset (2011–2022) to index breeding population abundance; and (ii) 11 years of land cover data to characterize breeding landscapes across North America. Trends in relative abundance during the breeding season (May to June) were modeled as a function of changes in landscape composition and configuration, and results will contribute to a broader understanding of how large-scale landscape changes shape breeding trends in grassland-dependent birds.

31. Morph matters most? An assessment of factors influencing territory characteristics of white- and tan-striped White-throated Sparrows in shoreline and upland boreal habitats

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Shoreline boreal forests may provide higher quality habitat for some avian species due to more and higher-quality food and/or more complex habitat structure that potentially influence space use and density. White-throated Sparrows (Zonotrichia albicollis) are polymorphic occurring as white and tan colored morphs that exhibit different territorial defense behaviors with white morph males being more aggressive than tan morphs. To test what factors influence territory characteristics of White-throated Sparrows most, we fit miniaturized archival global positioning system (GPS) tags to tan and white morph individuals in 300 m × 300 m quadrats adjacent wetlands and > 600 m from wetlands in the boreal forest of Saskatchewan, in 2023 (n = 44) and 2024 (n = 27). We examined whether habitat structure and conspecific density, as proxies of habitat quality, drive relationships in territory characteristics (e.g. size, configuration) between these habitat types and morphs. Differences in overall territory sizes of White-throated Sparrows were non-significant between habitat types but white morphs had significantly smaller territories in shoreline forest, and non-significantly smaller territories in upland forests. Our results indicate that territory characteristics of White-throated Sparrows are influenced by an interaction of behavior and habitat type mediated by morph.

32. MD HELAL UDDIN, SOM NIYOGI & DOUGLAS P. CHIVERS. Waterborne Selenite Induced Oxidative Stress and Altered Neuronal Development and Behaviour in Larval Zebrafish, Danio rerio. Department of Biology, University of Saskatchewan, Saskatoon, SK.

Abstract

Selenium (Se) is an essential element that becomes highly toxic to fish at elevated exposure levels. Although the neuro-behavioural effects of organic Se are well documented in adult fish, the effects of inorganic Se on neurodevelopment and behaviour, particularly in early life stages, remain poorly understood. In this study, zebrafish embryos were exposed to different environmentally relevant concentrations of waterborne Se (0 (control), 10, 50, 100 µg/L; as selenite) from 4 hours post-fertilization to 30 days post-fertilization. We evaluated neurodevelopmental and behavioural outcomes, along with oxidative stress as a potential mechanism of Se neurotoxicity. Fish larvae exposed to higher Se concentrations (50 and 100 µg/L) exhibited significant behavioural impairments, including reduced reflexive movement, altered social preference, and impaired exploratory response to the novel object. These behavioural deficits were associated with elevated oxidative stress, as indicated by increased DCF-DA fluorescence intensity, and dysregulation of key antioxidant genes. Neurodevelopmental disruptions were evident through altered expression of dopaminergic and serotonergic pathway genes, critical regulators of behaviour in fishes. Overall, our findings suggest that Se-induced oxidative stress and neurodevelopmental gene dysregulation contribute to the observed behavioural impairments in developing zebrafish, highlighting the potential risks of Se exposure during early life stages.

33. Victoria Crozier1, Jocelyn Poissant2 & Philip McLoughlin1. Influence of density-dependent parasitism on female reproductive success in Sable Island horses. 1Department of Biology, University of Saskatchewan, Saskatoon, SK; 2Faculty of Veterinary Medicine, University of Calgary, Calgary, AB.

Sable Island (SI), Nova Scotia is home to approximately 500 feral horses, first introduced in the mid-1700s and completely unmanaged since 1960. Along the island, a habitat gradient (forage quality, water availability) underpins spatial heterogeneity in density along a west-east gradient, with highest density occurring at the western end of the island. These horses have never been exposed to anthelmintics and thus have a high intestinal parasite burden (quantified by fecal egg count [FEC]), which varies between individuals from both intrinsic and extrinsic factors. Horses in the western portion of SI have been shown to have a greater FEC than in other parts of the island. Parasite infection has been shown to reduce body condition and increase inter-birth interval in other species, and parasite-mediated selection has been shown to occur in other ungulates. At lower densities and densities and distance from local carrying capacity, females should be able to produce a foal annually without immediate costs to their own survival, while closer to carrying capacity and thus higher density, higher parasite loads will necessitate a trade-off between the costs of survival and reproduction, thus an increased inter-birth interval.

34. NICHOLAS G. SHEPHARD1, MATTHEW REUDINK2, & ANN E. MCKELLAR1,3. Do Black Tern (Chlidonias niger) populations on the periphery of the range act as population sinks? An assessment of breeding productivity across the species range. 1Department of Biology, University of Saskatchewan, Saskatoon, SK; 2Department of Biology, Thompson River University, Kamloops, BC; 3Environment and Climate Change Canada, Wildlife Research Division, Saskatoon, SK.

The Black Tern (BLTE) has experienced long-term population declines that are geographically variable across its North American breeding range, with greater declines on the periphery of the range compared to the core. Research on breeding success from the periphery has shown that productivity is low and appears to be a primary factor driving population declines. Despite this low success, peripheral populations are persisting, potentially due to immigration from source populations. Productivity in the core of the range has yet to be studied.

Understanding source-sink population dynamics is critical for a species in decline like the BLTE. In this study, we assessed and compared productivity of individuals at breeding colonies in Saskatchewan ('core' site), and Ontario and British Columbia ('peripheral' sites). The daily survival rates of BLTE nests were calculated using a logistic exposure model in a Bayesian framework with data collected from across a range of 1-4 years at the three sites, including an age effect on the daily survival rate of nests. There was a negative relationship between the daily survival rate of nests and nest age, and vegetation composition surrounding the nest influenced nest survival. Preliminary results suggest that nest survival in the core of the species range is higher than that in **the periphery.**

35. A K M MUNZURUL HASAN, SOM NIYOGI & DOUGLAS P. CHIVERS. Embryonic exposure to Bisphenol S causes long-term behavioural alterations in zebrafish (Danio rerio). Department of Biology, University of Saskatchewan, Saskatoon, SK, Canada

Bisphenol S (BPS), a widely used alternative to Bisphenol A, is frequently detected in aquatic environments, yet its long-term neurodevelopmental effects remain poorly understood. This study investigated the behavioural consequences of embryonic BPS exposure in zebrafish (Danio rerio). Embryos were exposed to DMSO (0.01%) or 30 µg/L BPS from 4-120 hours post-fertilization (hpf) and subsequently raised in clean water until adulthood (6-months). At the juvenile stage, BPS-exposed fish exhibited reduced social interaction at 21 days post-fertilization (dpf) and impaired cognitive function in a novel object recognition test at 25 dpf. These behavioural alterations were accompanied by reduced dopamine (DA) levels and significantly increased serotonin (5-HT) and acetylcholine (ACh) levels, indicating modulation of neurotransmitter systems during development. In adulthood, early-life BPS exposure resulted in persistent deficits in social behaviour, as evidenced by altered group preference, while no significant changes were observed in anxiety-like behaviour (novel tank test) or shoaling behaviour. Notably, DA levels remained significantly reduced in adults, although no alterations were found in 5-HT and ACh levels. Together, these findings indicate that embryonic exposure to environmentally relevant concentration of BPS leads to persistent social behavioural impairments and long-term alterations in neurotransmitters levels in zebrafish, highlighting potential neurodevelopmental risks of BPS pollution.

36. JINNATH REHANA RITU1, MAUD C. O. FERRARI2 & DOUGLAS P. CHIVERS1. BMAA neurotoxin impairs the development and behaviour in larval zebrafish (Danio rerio). 1Department of Biology, University of Saskatchewan, Saskatoon, SK; 2Department of Veterinary Biomedical Sciences, WCVM, University of Saskatchewan, Saskatoon, SK.

β-N-Methylamino-L-alanine (BMAA) is a neurotoxic non-proteinogenic amino acid that has emerged as a global environmental concern. Given its widespread production by ubiquitous cyanobacteria, BMAA poses a potential ecotoxicological threat, particularly in aquatic ecosystems. However, research on its neurotoxic effects in aquatic species remains limited, and the underlying mechanisms driving its adverse impacts are not yet fully understood. To investigate BMAA's developmental and neurotoxic effects, zebrafish embryos were exposed to environmentally relevant concentrations (0, 10, 20, and 40 µg L^{-1}) until 120 hours post fertilization. While no significant differences were observed in hatching and mortality rates, BMAA exposure significantly increased deformities compared to the control. At higher concentrations (20 and 40 µg L^{-1}), BMAA exposure induced oxidative stress, triggering apoptosis in larval zebrafish, indicative of potential cellular damage. Behavioural analyses revealed that exposure to 40 µg L^{-1} BMAA impaired thigmotaxis, as evidenced by reduced time spent in the outer zone, suggesting increased anxiety. Additionally, BMAA disrupted reflexive movement by decreasing maximum speed in dark conditions, indicating neurological dysfunction. Furthermore, dysregulation of antioxidant and apoptotic gene expression was observed, supporting a mechanistic link between oxidative stress, apoptosis, and neurotoxicity. The findings will contribute to environmental protection, guiding policies to mitigate the risks posed by neurotoxins to the aquatic ecosystem.

37. J. PORTIA MOHRBUTTER, DANIEL R. GARRETT, CHRISTY A. MORRISSEY and JEFFREY E. LANE. The influence of agricultural intensification on bats in the Northern Great Plains. Department of Biology, University of Saskatchewan, Saskatoon, SK.

The temperate grasslands of the Northern Great Plains remain one of the most endangered ecosystems worldwide, with over 70 % of native grasslands converted for agricultural use. Bats play a key role in regulating insect populations within these agroecosystems, yet little is known about their response to agricultural intensification in the Canadian Prairies. Intensification is often characterized by landscape simplification, increased pesticide use, and the removal of aquatic habitats, all of which can reduce prey availability, alter habitat use, and heighten pesticide exposure for bats. To assess how native bat populations respond to these pressures, I hypothesize that areas of high agricultural intensity will reduce foraging activity and habitat use while increasing pesticide exposure. To quantify habitat use and foraging activity across the entire bat community, I conducted acoustic monitoring from 2022 to 2024 along a gradient of agricultural intensity in southern Saskatchewan. Additionally, I captured Myotis lucifugus and Eptesicus fuscus to investigate changes in diet composition and pesticide exposure associated with intensive land use. Preliminary results suggest reduced bat activity in areas of high agricultural intensity, highlighting potential declines in ecosystem services due to intensive farming practices.

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