



# Small but mite-y: Soil invertebrates in reclaimed coal mines

## Poster #10

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### BACKGROUND

#### Human activities and disturbances are decreasing global biodiversity and critical habitat types

- Land reclamation returns disturbed land to a usable state; in Alberta, industry is legally required to reclaim and monitor any disturbed lands. Regulations ensure disturbed lands are returned to a productive state; indicators include soil and vegetation properties, but fail to consider ecosystem complexity and function.

#### Are current reclamation indicators effective? Can we ensure long-term reclamation success?

- Soil invertebrate diversity and composition are directly linked to ecosystem health, biodiversity, function, and stability; presence or absence of specific soil invertebrate groups can influence reclamation outcomes
- Two forest reclamation sites and an undisturbed forest at Genesee Coal Mine southwest of Edmonton, Alberta were assessed using current reclamation criteria and overall soil invertebrate abundance and composition
- Key soil invertebrate groups were identified and differences between research sites explored

### RESULTS

- Most abundant invertebrate classes collected were Oribatid, Prostigmatid, and Collembolans, comprising 29.3%, 31.4%, and 31.3% of the total individuals, respectively.



Oribatid mites: slow, heavily armoured, low reproductive rates, contribute to soil organic matter



Prostigmatid mites: soft bodied, often prey, quick reproductive rates, diverse feeding habits



Collembola: Springtails, omnivores, often prey, very mobile due to jumping appendage (furcula)

- Overall soil invertebrate abundance was significantly different between the research sites; the undisturbed forest had significantly higher soil invertebrate abundance in soil and litter samples compared to reclamation sites
- Oribatid mites and Collembolans were strongly significantly positively correlated with soil organic matter and litter, while Prostigmatid mites exhibit a weak correlation



Spruce Reclamation Site: lowest oribatid abundance of all sites, predator mite abundance similar to forest site



Forest Site: oribatid mites 3x, prostigmatid mites 2x, and collembola 1.5x higher abundance than reclamation sites



Aspen Reclamation Site: lowest collembola abundance of all sites, lower prostigmatid mite abundance than other reclamation site

### CONCLUSIONS

- Oribatids mites are indicators of ecosystem recovery and these 10+ year old reclamation sites are lagging in oribatid mite abundance and diversity.
- Reports have shown that current reclamation practices, criteria and monitoring used in a majority of Alberta's certified reclaimed sites, **DO NOT** meet government standards. We need to do more to ensure reclaimed systems will be successful especially in the wake of climate change.

**We owe it to future generations to take care of our planet, there is no PLAN-et B.**

### PARTNERS

