



IX Field School on Soil Zoology and Ecology for Young Scientists

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Invasion of earthworms in the forests of Central Kazakhstan. The first results and research plans.

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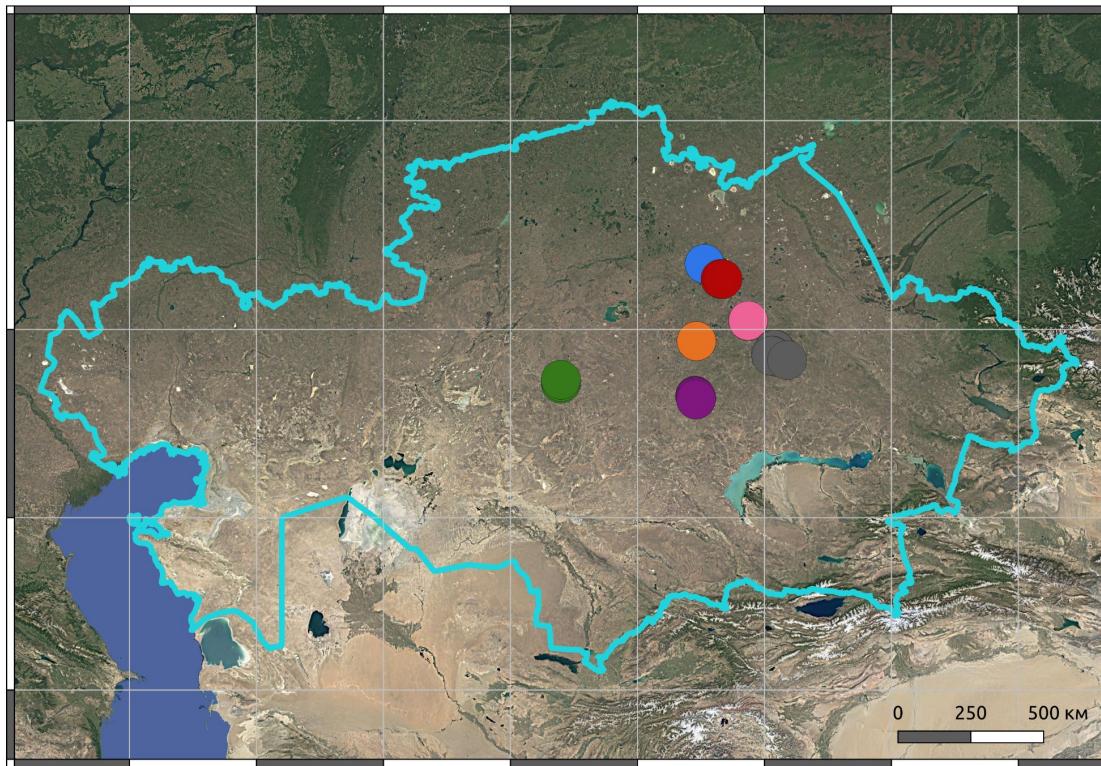


There are boreal forests in Central Kazakhstan!

Forests in Central Kazakhstan cover less than 2% of the area. Forest habitats are represented by relatively small steppe kolkis and larger mountain-forest areas confined to the lowlands of the Kazakh Shallow Forest (Sary-Arka). The mountain-forest areas located within the Ob-Irtysh interfluve are relicts of a formerly continuous forest territory connected with the forests of Western Siberia and Altai during the cold and wet Pleistocene epochs.



Study areas



- Karkaraly National Park (mountain forests) (17 plots)
- Ortau mountain forests (7)
- island pine barrens near Kerney village (4)
- Buiratau National Park: steppe kolki near Ereimentau town (3)
- Buiratau National Park: steppe kolki near Belodymovka village (4)
- steppe kolki Ulytau National Park (4)
- steppe kolki near Koyandy hill (2)

Methods for field data collection



Earthworms collection

Hand sorting, samples 25×25 cm.
1-4 samples per plot (usually 4).



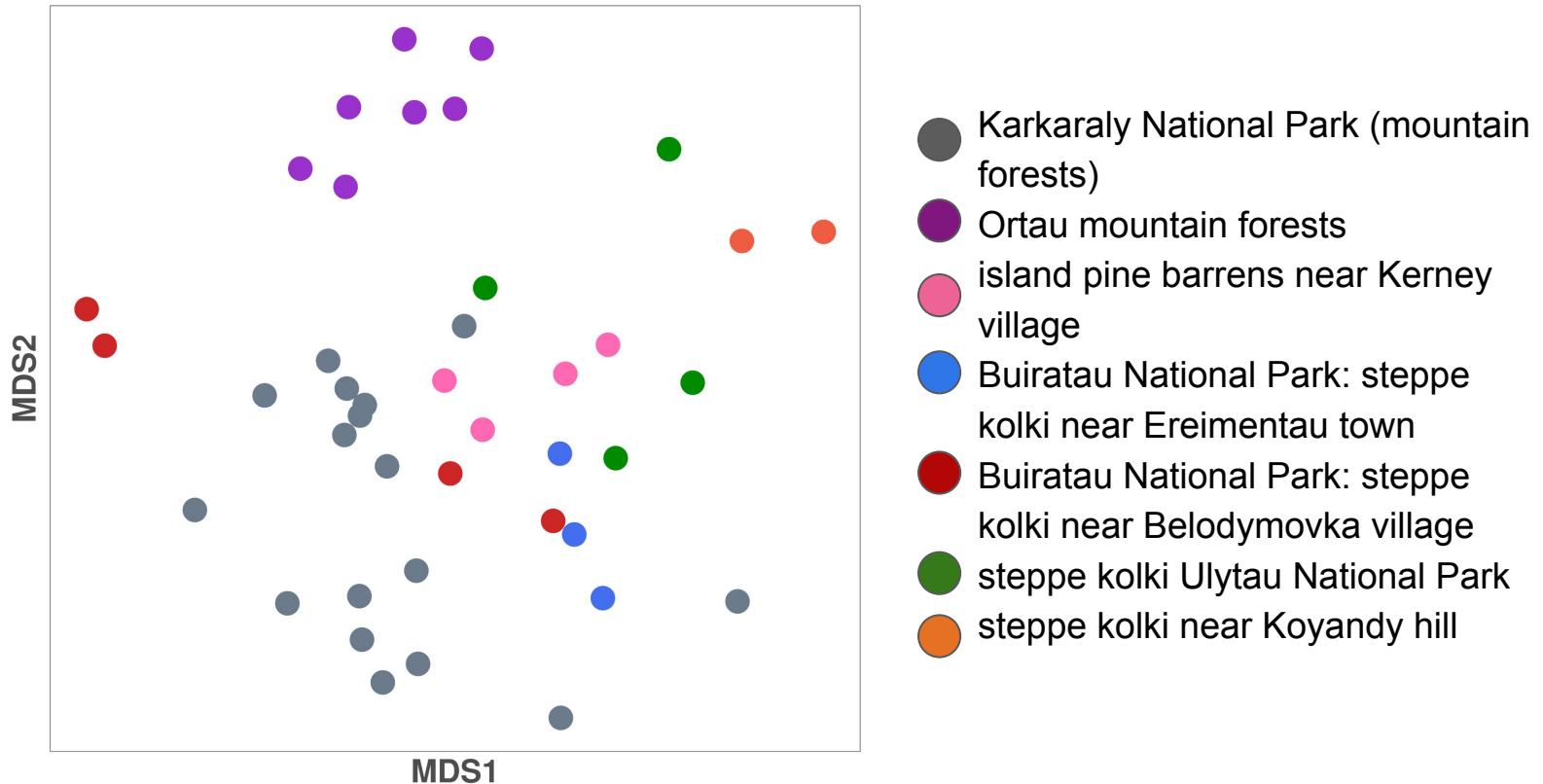
Vegetation relevés

Vegetation plots of 100 m²
Braun-Blanquet scale

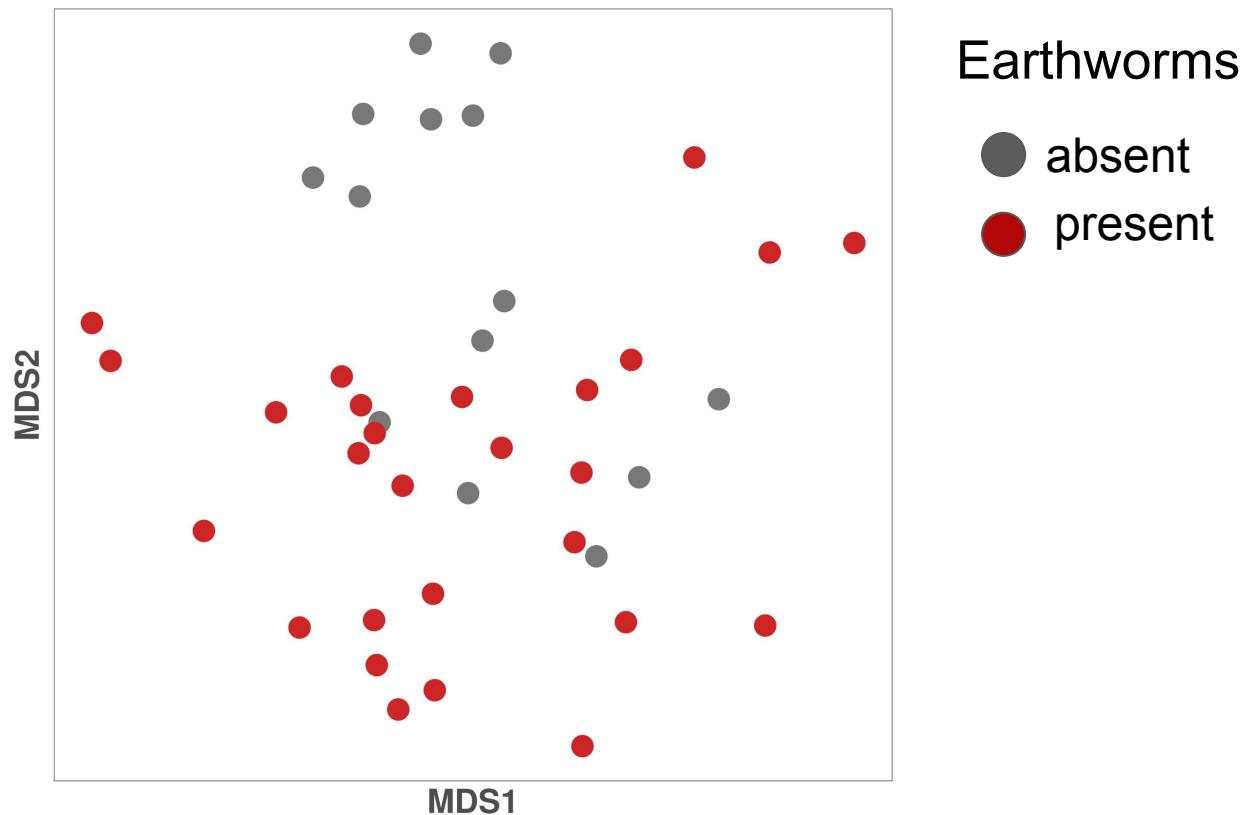


A total of **41 plots** were studied.

NMDS ordination of vegetation relevés at earthworm surveys

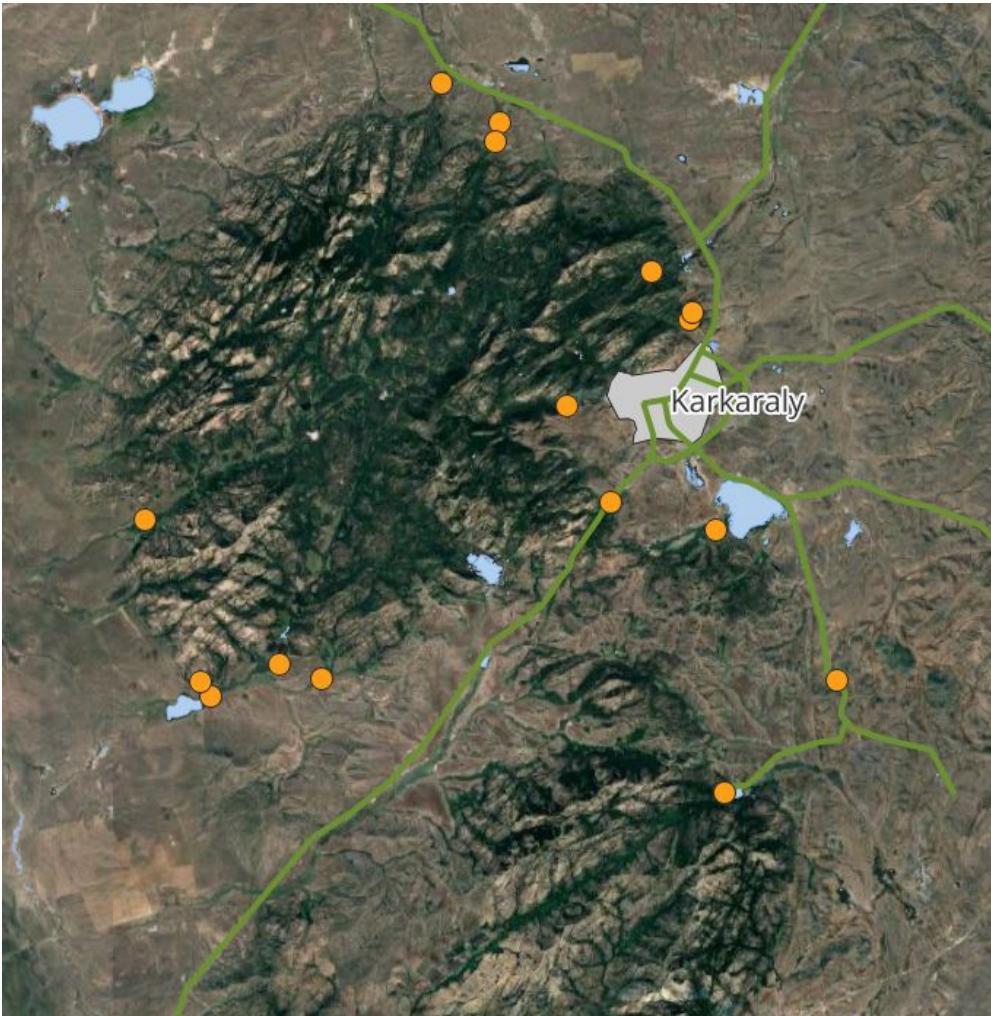


NMDS ordination of vegetation relevés at earthworm surveys



What affects the presence of earthworms?

	coefficient	p-value
Intercept	-30.692	0.0514
Longitude	0.425	0.0482
Distance to road	-0.0207	0.1095
Availability of the territory		
Strictly protected areas	-16.290	0.996
Tourism and/or cattle grazing	2.407	0.0208



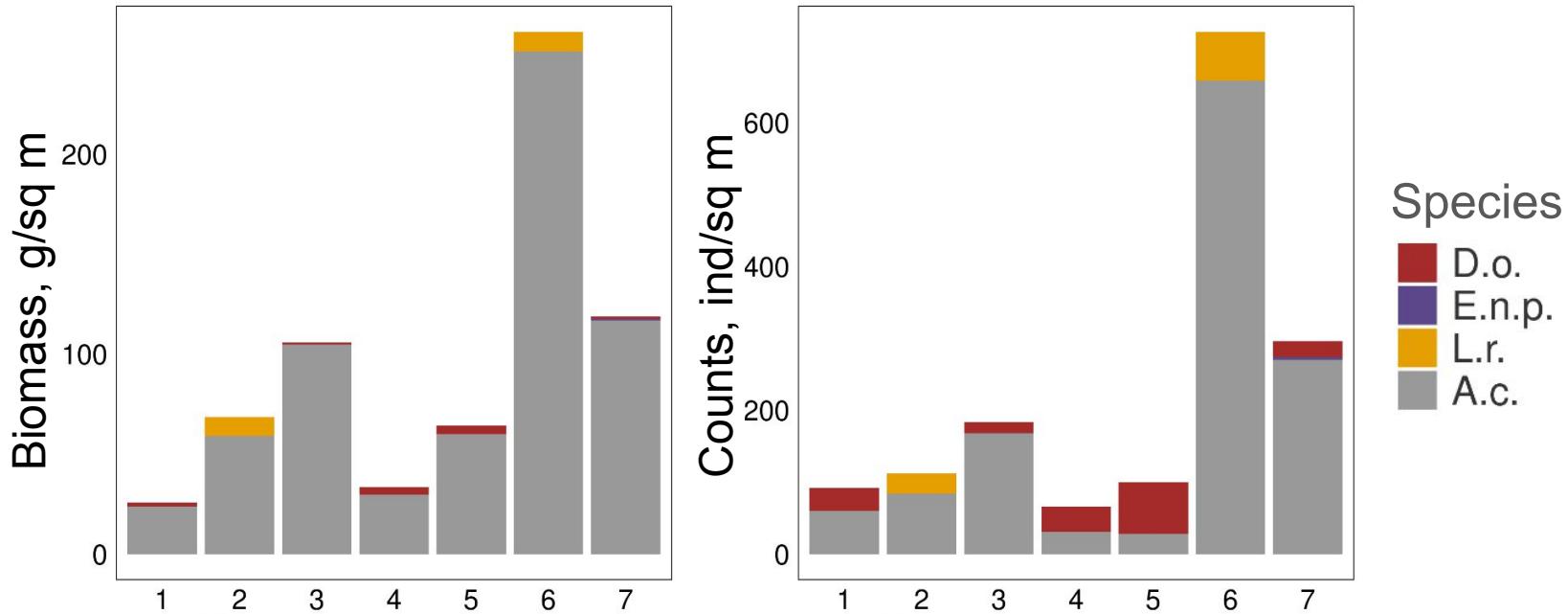
**Karkaraly National Park is
the most surveyed area in
our study**

Earthworm species diversity in the 1980s

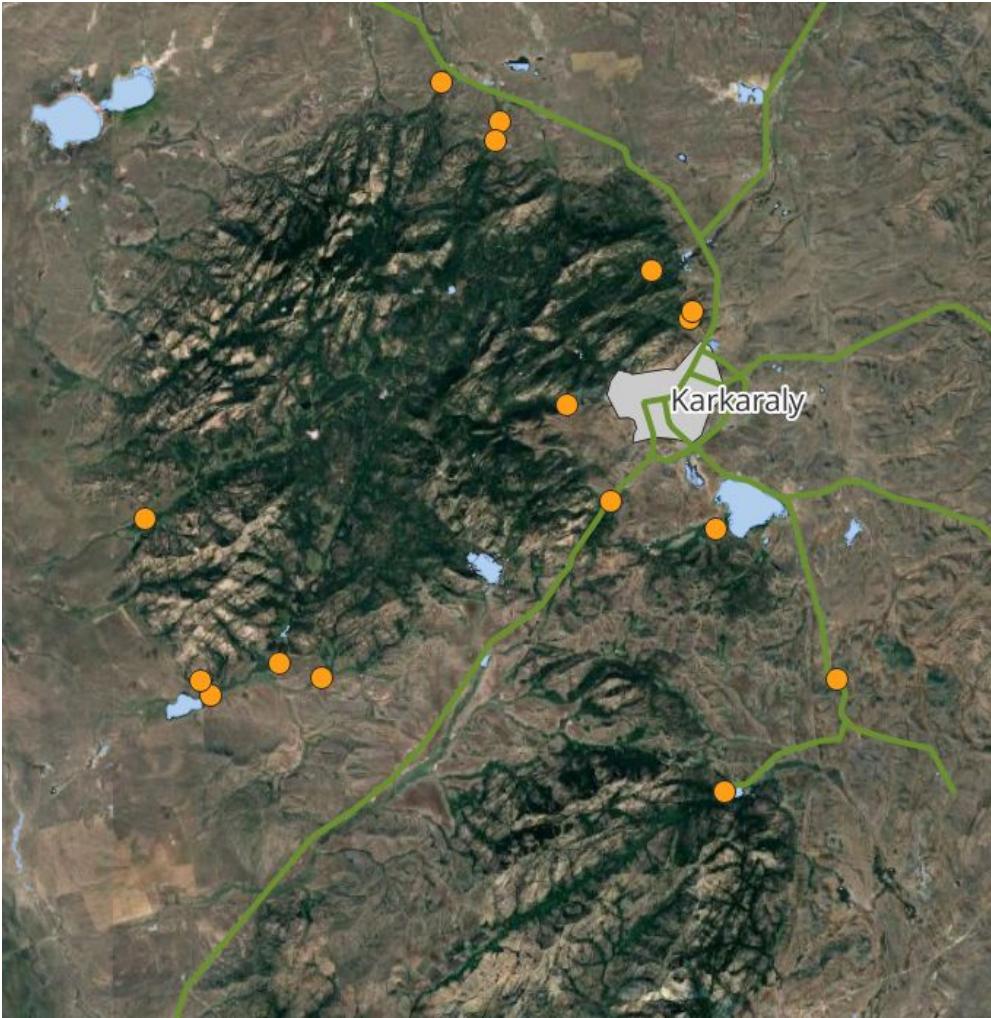
	Pine forests	Birch and aspen forests	Tree nursery	Floodplains	Gardens
<i>Dendrodrilus rubidus</i> subsp. <i>tenuis</i>	✗	✗	✗	✗	
<i>Allobophora parva</i>		✗		✗	
<i>Aporrectodea caliginosa</i> subsp. <i>caliginosa</i>			✗	✗	✗
<i>Aporrectodea caliginosa</i> subsp. <i>trapezoides</i>			✗	✗	✗
<i>Eisenia fetida</i>				✗	✗
<i>Eisenia nordenskioldi</i> subsp. <i>pallida</i>				✗	✗
<i>Eisenia tetraedra</i> f. <i>typica</i>				✗	
<i>Dendrobaena octaedra</i>		✗		✗	

Slavchenko & Slavchenko, 1989

Earthworm species diversity now



Sampling plots: 1–3 Pine forests, 4–6 Birch forests, 7 – Aspen forest
Species: D.o. – *Dendrobaena octaedra*, E.n.p. – *Eisenia nordenskioldi pallida*,
L.r. – *Lumbricus rubellus*, A.c. – *Aporrectodea caliginosa*

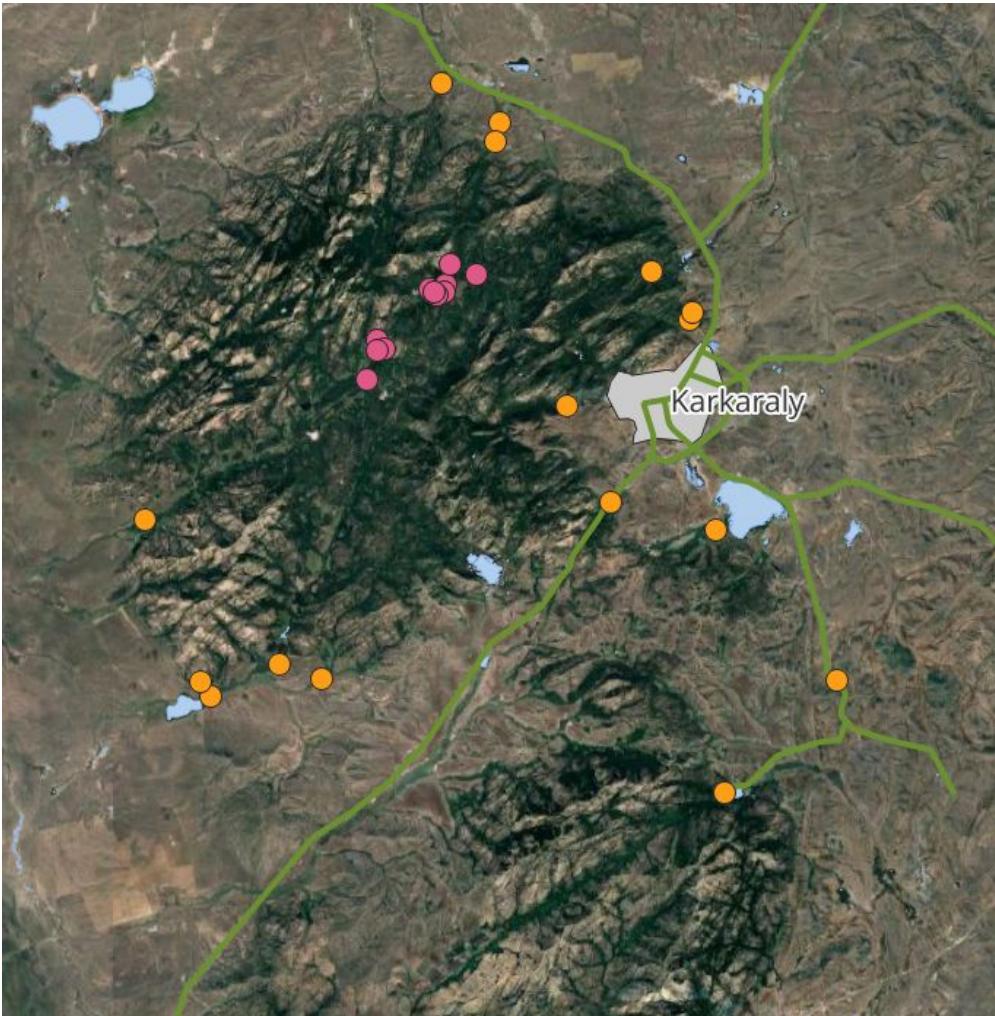


+3 new earthworm species in forest sites:

Aporrectodea caliginosa subsp.
caliginosa
Lumbricus rubellus

Aporrectodea rosea (DNA)

The structure of earthworm communities has changed



Field season 2025

The Kendara Valley – a new study area

Area with moderate cattle grazing
(only local animals)

We found that the structure of earthworm communities in the valley differs from communities outside the mountain range.

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Outcomes

- Earthworms were found in most of the study sites. The species diversity and population of earthworms varied widely.
- Over the past 30 years the abundance of *Aporrectodea caliginosa* has dramatically increased in Karkaraly National Park. *Lumbricus rubellus* and *Aporrectodea rosea* were first recorded.
- Grazing is an important driver of earthworm dispersal.

