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# SMALL MAMMALS OF MONGOLIA: REPORTS FROM THE SCIENTIFIC EXPEDITION

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## Background

Extreme environments host often a peculiar fauna characterized by low species richness belonging to a high number of taxonomic families. The main limiting factors at high latitudes such as water scarcity, extremely cold temperatures for over 7 months a year, lack of trophic resources could drivers the species' evolution, and morphological variation in space and time (1; 2).

Our research aimed to collect the first baseline information in South-Western Mongolian-Manchurian Grassland Ecoregion (Tov Province) and Eastern Gobi Desert Steppe Ecoregion (Omnigovi Province).

## Methods

### Study area

We ran a random stratified sampling design in 6 different habitats of South-Western Mongolian-Manchurian Grassland Ecoregion (from 46°57'N, 106°12'E to 60°57'N, 120°12'E) and Gobi Desert Steppe Ecoregion (43°11'N, 105°45'E) (Fig.1; Tab. 1).

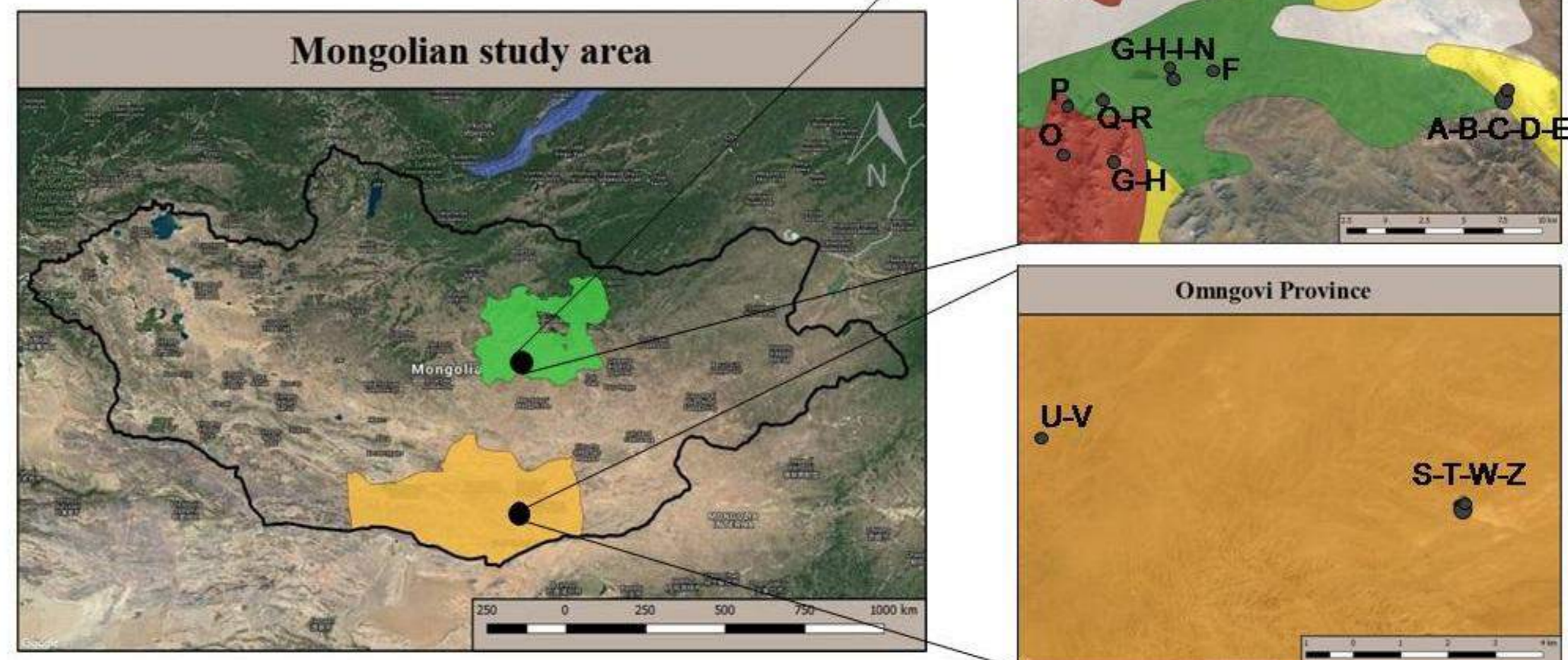


Fig.1 Study area with sampling sites locations

Desert steppe  
Mountain forest steppe  
Sand dune  
Nonpasture  
Desert

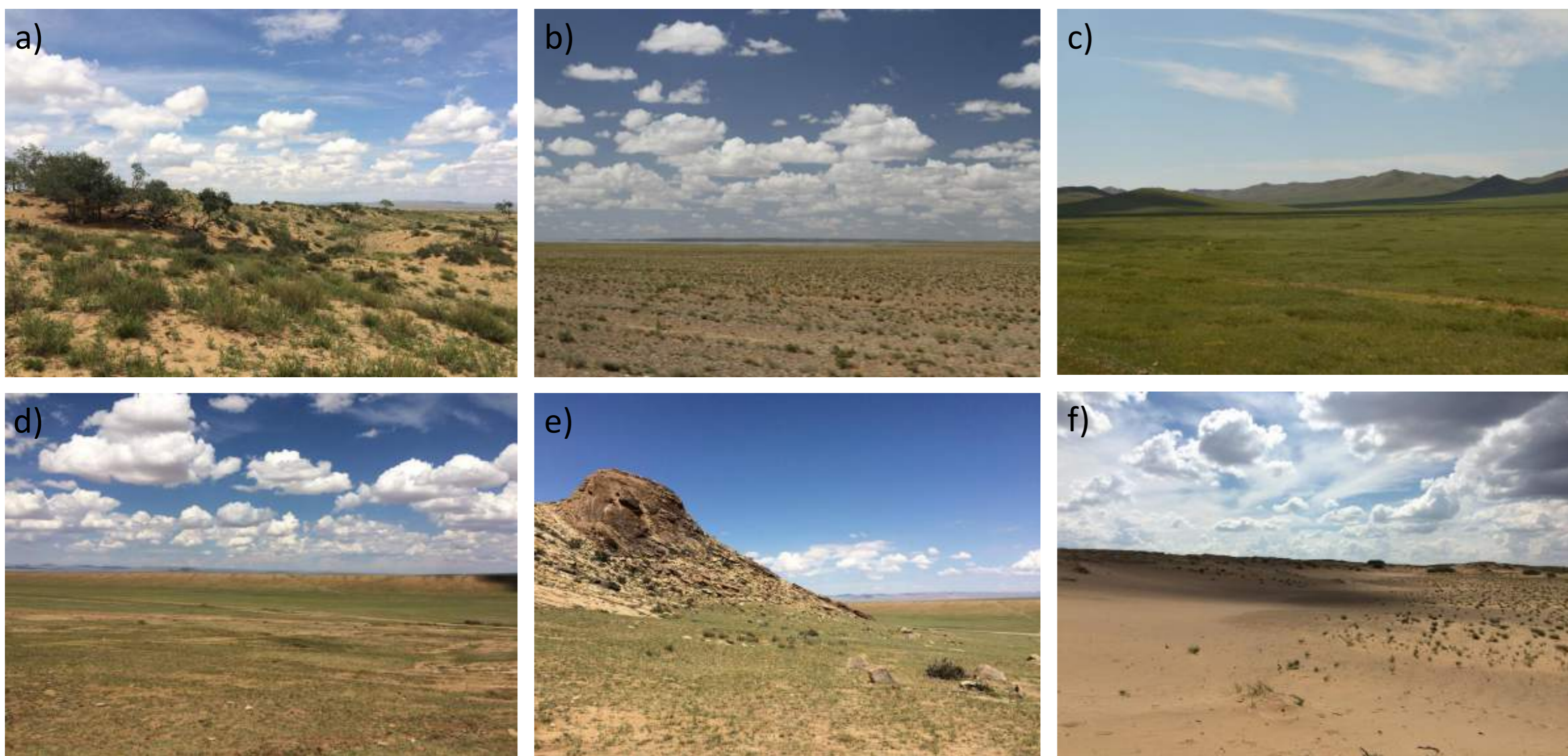


Fig.2 Habitat types: - a) Sand dune Grassland - b) Desert - c) Nonpasture - d) Desert Steppe - e) Mountain Forest Steppe - f) Sand dune Semidesert

- Habitat types were assessed according to the Vegetation Maps of Mongolia (3) and are characterized by:
- **Desert steppe** and **Nonpasture**: Forb-bunchgrass and rhizome grass steppes (gen. *Stipa*, *Leymus*, *Festuca*, *Carex*) with shrubs (*Caragana* spp.) on dark chestnut soils, locally with inclusions of chernozems;
- **Sand dune- semidesert** and **Mountain forest steppe**: Petrophytic forb-grass (*Festuca* spp.) shrub (*Caragana* spp.) steppes on mountain dark chestnut soils;
- **Sand dune-grassland**: Petrophytic rich forb-grass, *Filifolium sibiricum* and shrub (*Artemisia sibirica*) steppes on mountain chernozems;
- **Desert**: Bunchgrass (*Stipa gobica*, *Stipaglareosa*) with *Anabasis*, *Allium*, *Ajania*, *Artemisia* Nanophyton on brown desert-steppe, locally calcareous soils.

Region	Transect	Habitat	ID_Habitat	Elevation (m a.s.l.)	Region	Transect	Habitat	ID_Habitat	Elevation (m a.s.l.)
Tov Province	A	Sand dune, Semidesert	SS	1411 - 1416	Tov Province	N	Mountain forest steppe	MFS	1287 - 1314
Tov Province	B	Sand dune, Semidesert	SS	1411 - 1414	Tov Province	O	Mountain forest steppe	MFS	1325 - 1338
Tov Province	C	Sand dune, Semidesert	SS	1411 - 1419	Tov Province	P	Mountain forest steppe	MFS	1300 - 1300
Tov Province	D	Sand dune, Grassland	SD	1425 - 1429	Tov Province	Q	Nonpasture	NP	1255 - 1267
Tov Province	E	Sand dune, Grassland	SD	1428 - 1431	Tov Province	R	Nonpasture	NP	1255 - 1263
Tov Province	F	Nonpasture	NP	1351 - 1356	Gobi Province	S	Desert	D	1501 - 1505
Tov Province	G	Nonpasture	NP	1292 - 1315	Gobi Province	T	Desert	D	1502 - 1512
Tov Province	H	Nonpasture	NP	1299 - 1301	Gobi Province	U	Desert	D	1553 - 1559
Tov Province	I	Nonpasture	NP	1295 - 1306	Gobi Province	V	Desert	D	1553 - 1559
Tov Province	L	Desert Steppe	DS	1116 - 1175	Gobi Province	W	Desert	D	1520 - 1533
Tov Province	M	Desert Steppe	DS	1116 - 1175	Gobi Province	Z	Desert	D	1500 - 1500

Tab.1. List of sampling plot.



Fig. 3 Captures: - a) *Cricetulus longicaudatus* in a Pitfall trap - b) *Phodopus roborovskii* in a Sherman trap - c) *Meriones* sp. - d) Tail measurement

## Small mammal sampling

- Two days of sampling were performed from July to August 2017 in each one of 22 linear transects (n. 10 traps) (Fig. 1; Tab. 1);
- Sites were checked once a day;
- Animals were live-trapped using Sherman (PLFA, 7.62 x 8.89 x 22.86 cm) and pitfall traps (20 cm diameter) (Fig.3c; Fig.3d);
- Traps were baited with peanut butter, honey and oats;
- Animals were sexed and weighed using a Pesola spring balance (precision: 0.05g) and identified according to the morphological identification keys (4);
- Morphological and biometrics measurements (total length, tail length, head length, fibula-metatars, radio-ulna, 3rd rear and front phalanges) were obtained through a digital caliper (0.01mm of accuracy) (Fig. 3a);
- Ear tissue samples were collected and stored in 95% ethanol.

## Results and Discussion

Tissue samples and morphological measurements were collected from 38 to 76 total captured individuals belonging to 9 species:

*Merionesunguiculatus/meridianus* (75%), *Phodopusroborovskii* (5.26%), *Cricetulusmigratorius* (5.26%), *Hemiechinusauritus* (2.66%), *Allocrietulus curtatus* (2.66%), *Dipus sagitta* (1.3%), *Cricetulus longicaudatus* (1.3%), *Ochotona daurica* (1.3%) and birds (*Passeriformes*) (5.26%).

Species	Habitat_types	Qty	Habitat	Male	Female	ND
<i>Meriones</i> sp.	Desert	19	D	9	8	2
<i>Meriones</i> sp.	Sand_Grassland	9	SG	1	8	0
<i>Meriones</i> sp.	Sand_Semidesert	10	SS	1	2	7
<i>Meriones</i> sp.	Nonpasture	19	NP	6	5	8
<i>Cricetulus migratorius</i>	Desert	4	D	1	1	2
<i>Phodopus roborovskii</i>	Desert	3	D	0	3	0
<i>Phodopus roborovskii</i>	Desert_Steppe	1	DS	0	0	1
<i>Dipus sagitta</i>	Sand_Semidesert	1	SS	0	1	0
<i>Allocrietulus curtatus</i>	Sand_Semidesert	2	SS	0	0	2
<i>Cricetulus longicaudatus</i>	Mountain_forest_steppe	1	MFS	0	1	0
<i>Ochotona daurica</i>	Sand_Semidesert	1	SS	0	0	1
<i>Hemiechinus auritus</i>	Desert	3	D	1	0	2
		73		29	25	19

Tab.2. Summary of small mammals captures for Habitat types.

The highest number of captures and species diversity were obtained in the **Desert** habitat (Gobi area), followed by **Nonpasture** and **Sand dune semidesert** habitats. In **Mountain forest steppe** and **Desert steppe** we captured a low number of individuals for only one species (Fig. 4).

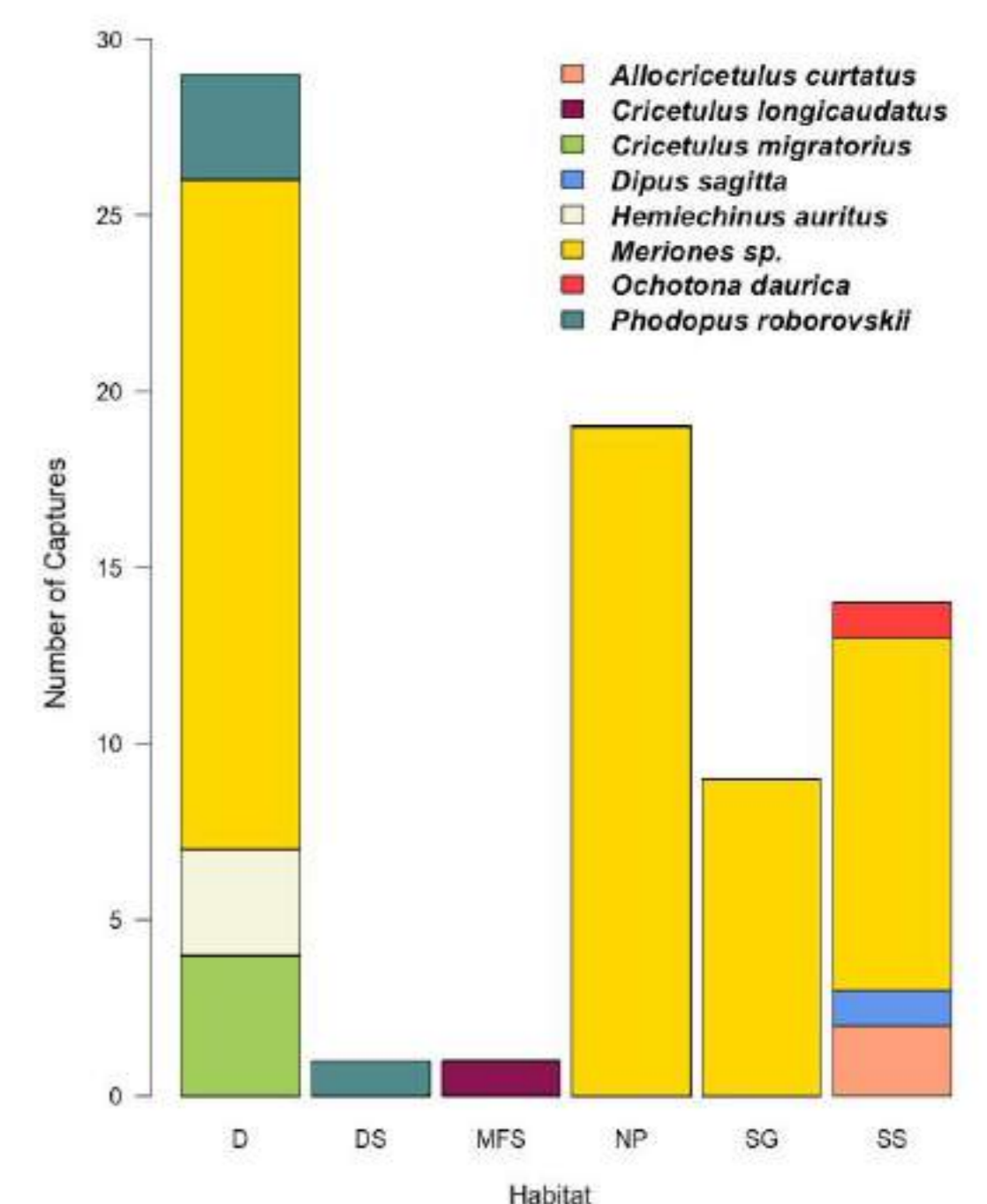


Fig. (4) Proportion of small mammal species captured in different Habitat types.

## Future perspectives

Our work is preliminary research project, morphometric and genetic analysis will be processed and analyzed in the early future. Our study will play important roles on evolutionary biology and conservation, specifically to developed alternative methods to recognize subspecies in *Meriones* spp.

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## Acknowledgment

The expedition was self-funded by all the members: It's part of a main project intitled "Checklist of Mammals in the South-Western Mongolian-Manchurian Grassland Ecoregion", which is funded by the Global Biodiversity Information Facility.

We thank Linnea Worsøe Havmøller and Rasmus Worsøe Havmøller for field assistance.

We are grateful to ONG Green Initiative, Mongolian's institutions and the Museum of Natural History of the Mediterranean, Livorno for the authorization and logistic support.