

Impact of the giant mole rat (*Tachyoryctes macrocephalus*) on the Afroalpine ecosystem

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The giant mole rat (*Tachyoryctes macrocephalus*) is a fossorial rodent endemic to the Afroalpine zone of the Bale Mountains, Ethiopia, where it is an important prey of the endangered Ethiopian wolf (*Canis simensis*). Its subterranean lifestyle is not as strict as in other species of the genus, among which it is the largest one, reaching body mass of around 1 kg. It forages aboveground, usually in the immediate vicinity of burrow openings. Locally it can reach extremely high population densities, which makes it a key factor altering the ecosystem. It is thought to be threatened by overgrazing of its habitat by domestic livestock.

Aim of our study was to reveal impact of the giant mole rat on vegetation and soil properties and incidence of other rodents in a heavily grazed Afroalpine meadow. In a selected locality we placed 60 random points, where we twice per year (end of wet season and advanced dry season) analyzed plant biomass and soil hardness and monitored marks of recent and past activity of giant mole rats and other rodents.

Mole rat activity resulting in incidence of burrow openings and dumped soil had a strong effect on the plant composition (Fig 1a.). For example *Salvia marjame* often grew on abandoned burrows while *Cardus sp.* and *Urtica simensis* were abundant on loose dumped soil (Fig 1). Mole rat activity also significantly reduced plant cover, mainly in the dry season (Fig 2a), and significantly reduced soil hardness in the dry season (Fig 2b). Of the old mole rat burrow openings detected, 23 % were used by other rodents, mainly *Lophuromys*, *Arvicanthis* and *Stenocephalemys*. Density of such rodent holes was 1730 ha⁻¹.

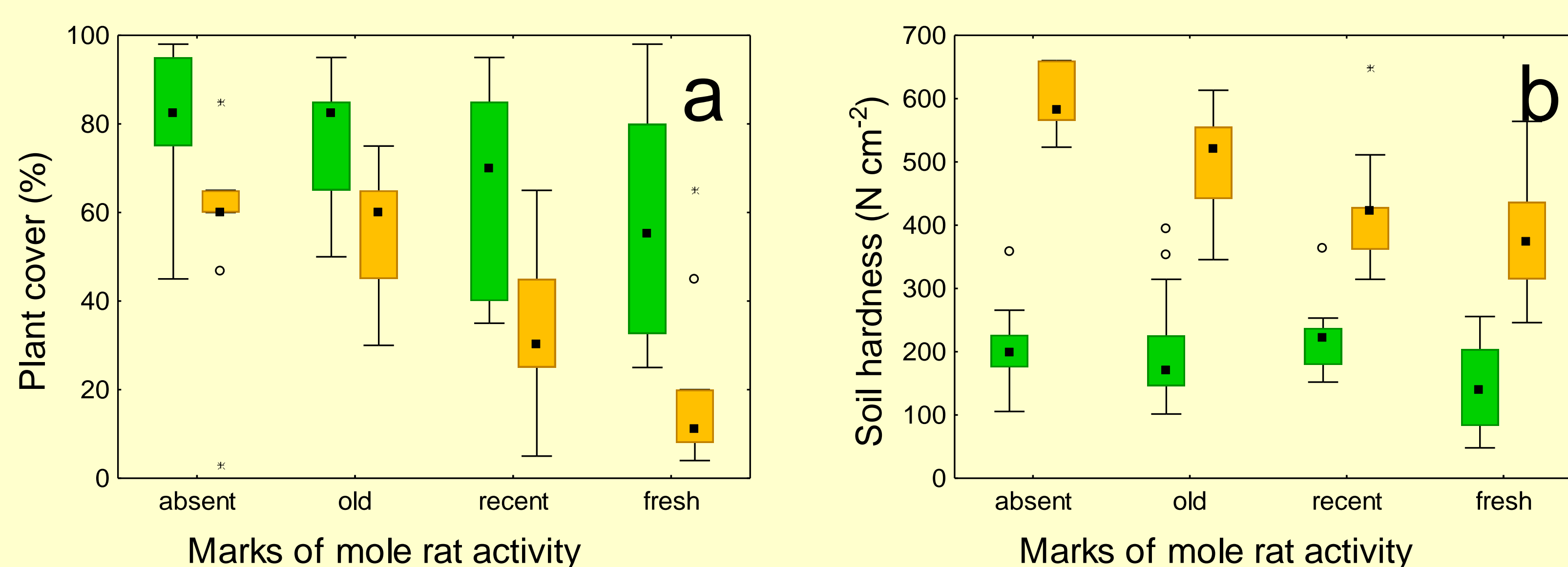


Fig 2. Plant cover (a) and soil hardness (b) on sites with marks of mole rat activity of different age. Green bars represent the end of wet season, yellow bars represent the advanced dry season

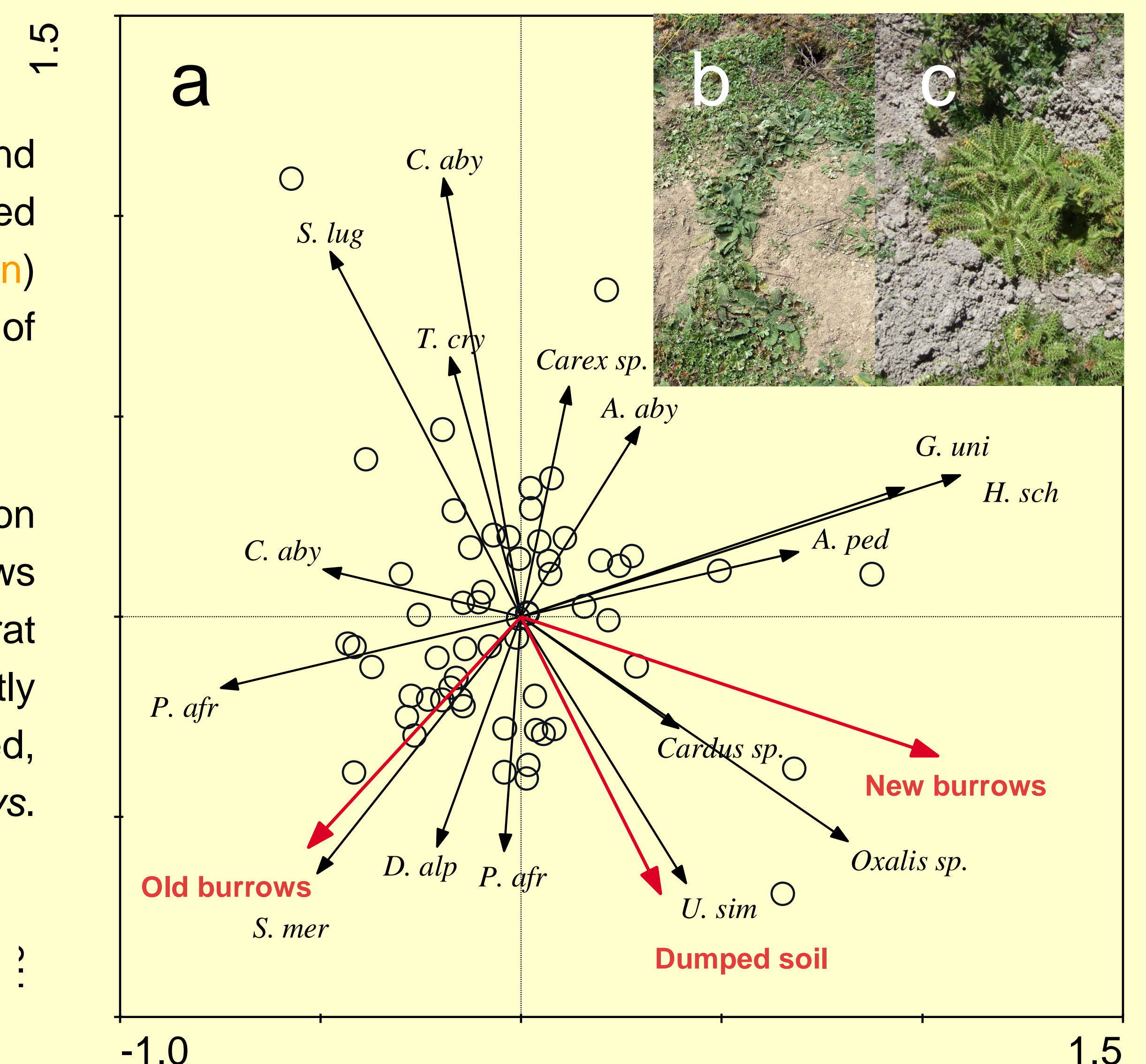


Fig 1. a) PCA plot of plant composition at 60 random points with various marks of mole-rat activity projected. b) *Salvia* growing on old burrow; c) *Cardus* and *Urtica* growing in loose soil

Both mole rats and other rodents living in its abandoned mole rat burrows are prey for the Ethiopian wolf. Another crucial ecosystem feature is a pasture of domestic livestock. Its impact on rodent populations is yet unclear. Likely relationships between the most important components of the ecosystem are depicted in Fig 3.

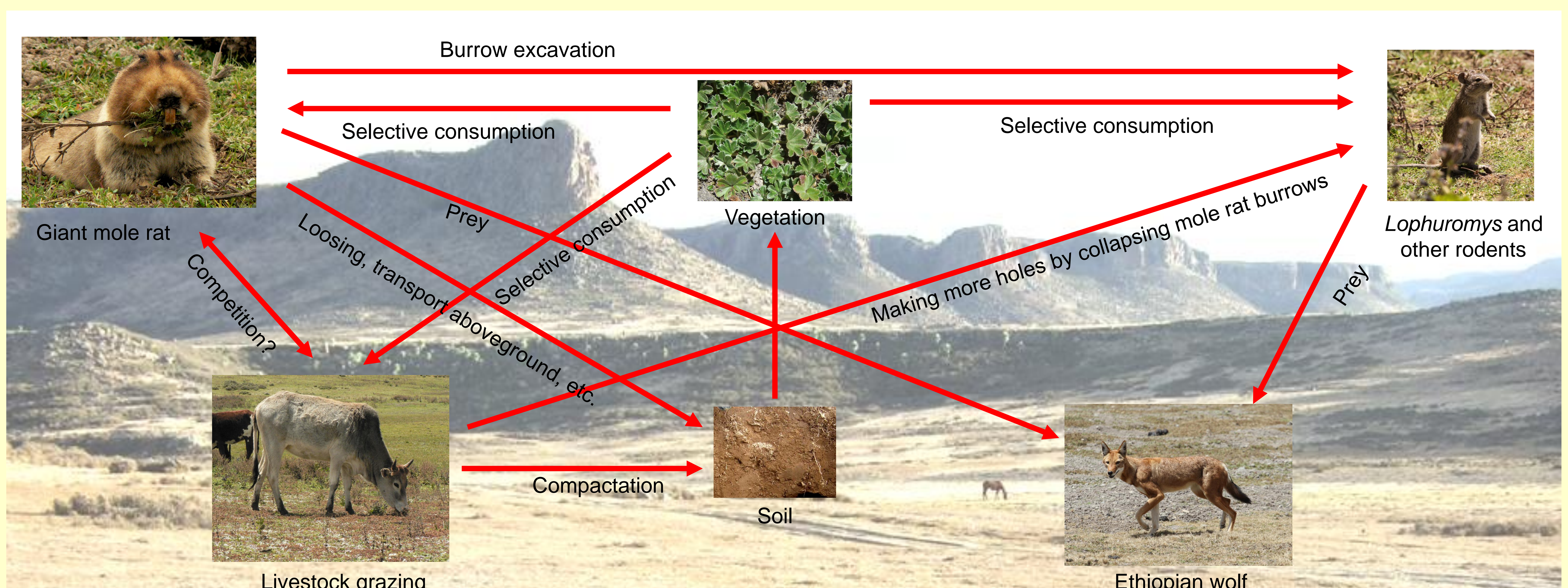


Fig 3. Likely relationships between the most important ecosystem features in the Afroalpine zone of the Bale Mountains

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