

# Salt supplements can be effectively used to manage cattle hardy breeds for the restoration of shrub-encroached grasslands

## Strategic Placement of Salt Supplements to Restore Shrub-Encroached Pastures. A Case Study from Italian Alps.

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### INTRODUCTION

Socio-economic transformations occurred in Europe over the last decades led to a broad **abandonment** of mountain areas. Consequently, the processes of natural succession favored **shrub and tree encroachment**, resulting in a dramatic degradation of **semi-natural grasslands**. **AGER iGRAL** is a project aiming at assessing the effectiveness of the use of **cattle hardy breeds** for the **restoration** of woody-encroached pastures in Alpine and Mediterranean environments. For instance, the features of the **Highland cattle breed** make it suitable for the exploitation of abandoned pastures of the Alps characterized by rough terrain and abundant shrub cover. In the present work, the strategic placement of **salt supplements** was tested with the aim of increasing the frequentation of shrub-encroached areas by livestock. The effects of cattle grazing and trampling on the **vegetation structure** around salt supplements was evaluated.

### METHODS

In July 2019, a 24-ha pasture (Vogna Valley, **North-Western Italian Alps**) was grazed by 72 Livestock Units of **Highland cattle**. Three **poles with salt blocks** and three paired **control poles** were placed in *Rhododendron ferrugineum* L. **encroached areas** for nine days. **Shrub and herbage heights** were measured within a 15-m radius around each pole before and after grazing using the **sward-stick method**. Measurements were performed along four axes of 15-m each, every 0.5 m from 0 to 5 m, and every 1 m from 5 to 15 m. Data were analyzed using GLMMs. The differences in shrub and herbage heights before and after grazing (**i.e. height reduction**) were used as response variables, the interaction between treatment (salt / control) and the distance from the poles as fixed factor, while the pair was added as a random factor.

### RESULTS

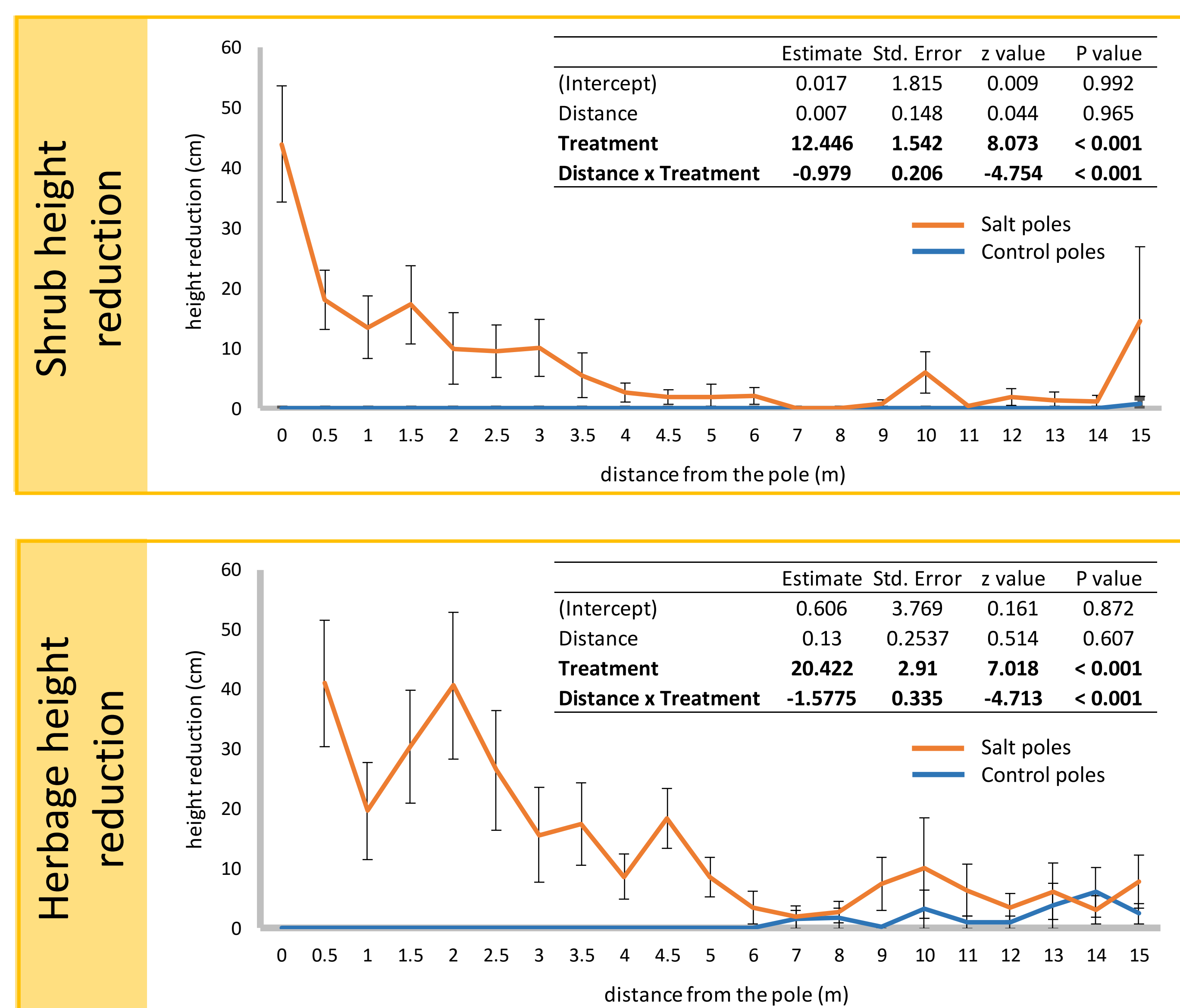


Figure 1 - Shrub and herbage height reductions along a 15-m radius around the salt and control poles

### DISCUSSION

The strategic placement of salt supplements for cattle resulted in the **reduction of shrub and herbage heights** around salt poles. The reduction was more pronounced ( $P < 0.001$ ) **near salt poles** than areas located farther away, i.e. within a 3.5-m radius for shrubs and a 5.0-m radius for herbage. Results highlight that salt supplements can be an **effective tool** to change the spatial behavior of cattle hardy breeds and use them to **restore shrub-encroached grasslands** in the Alps.

### EXTRA FIGURES

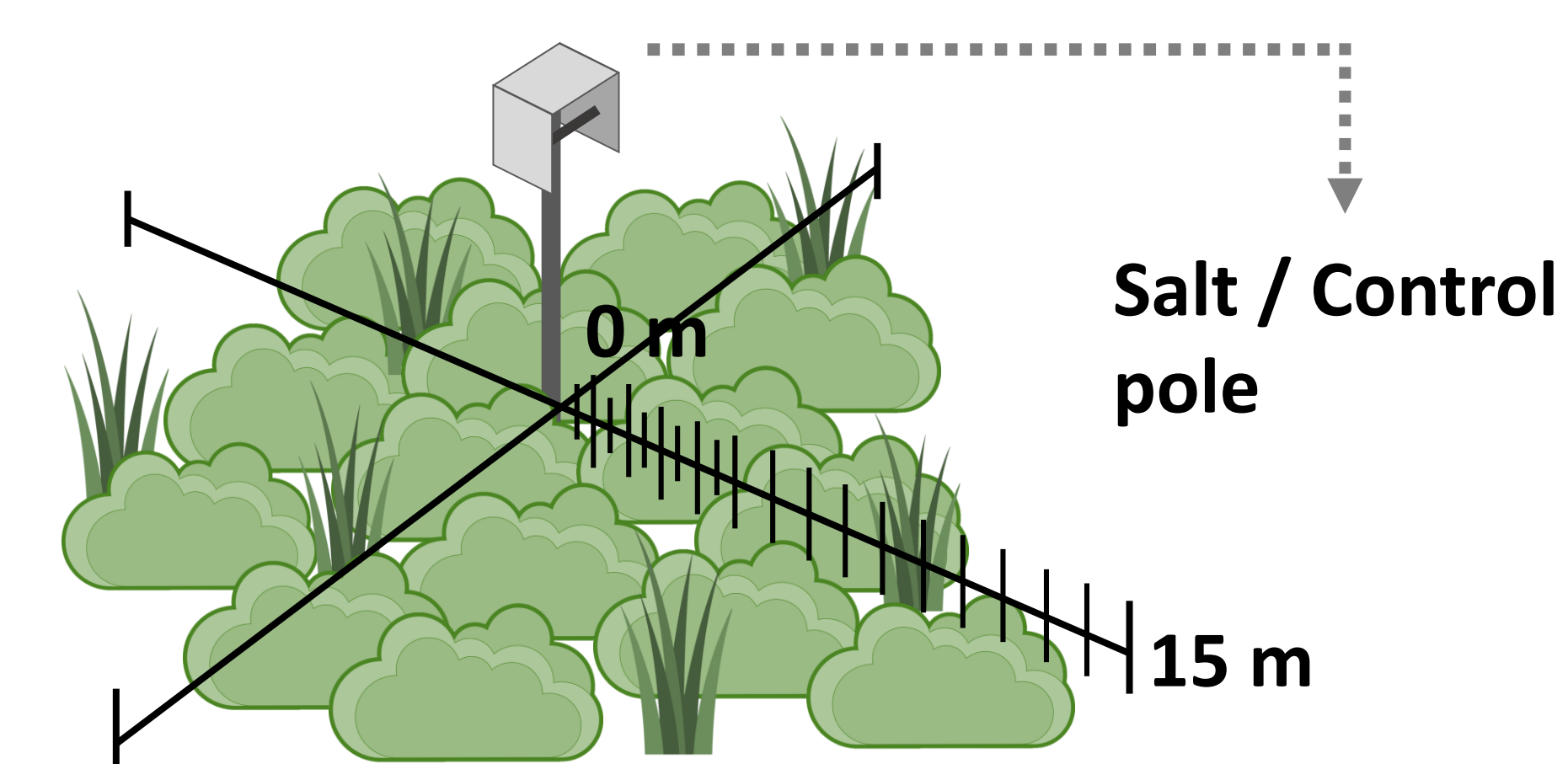


Figure 2 - Graphic representation of the vegetation survey in a 15-m radius around the poles

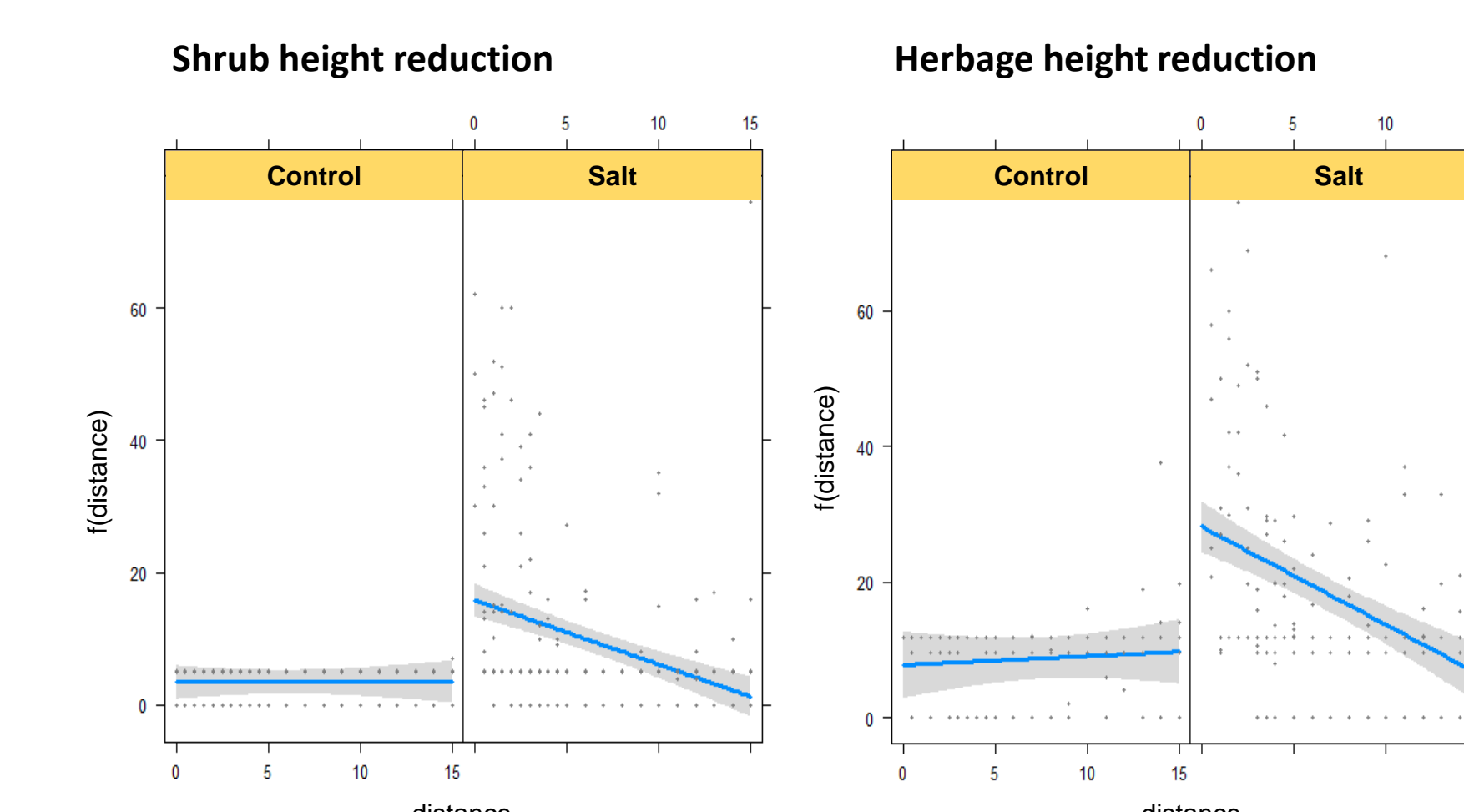
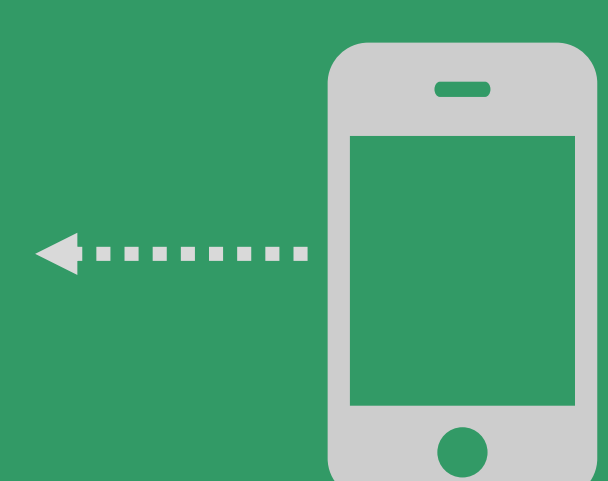


Figure 3 - The interaction Distance x Treatment for shrub and herbage height reductions



Figure 4 - The vegetation around a salt pole before and after grazing



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