Potential and actual vegetative regeneration of *Oxalis pes-caprae* as affected by different treatments

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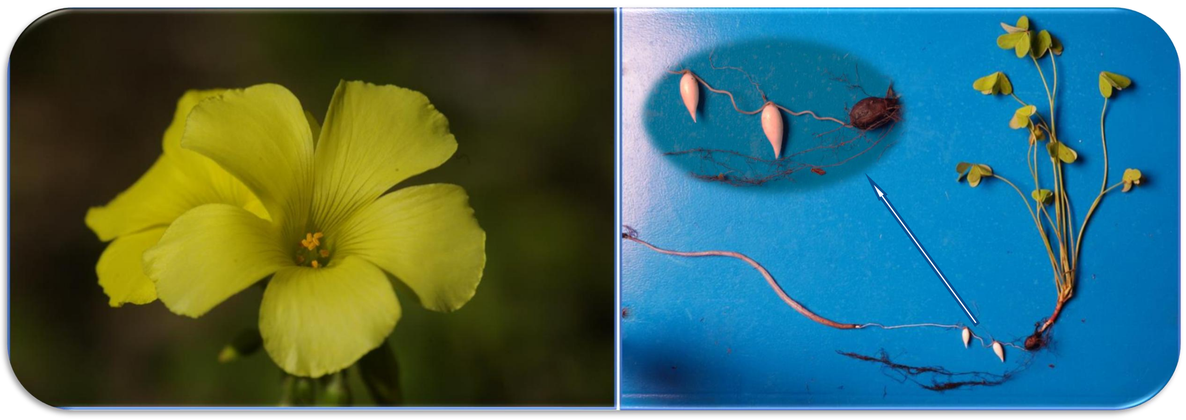
Introduction

Oxalis pes-caprae L. (Bermuda buttercup) is an invasive, perennial geophyte weed native to South Africa that has spread to many regions of the world, including Sardinia (Italy).
O. pes-caprae significantly impacted both ecological processes and agricultural productivity, and basic information is needed to establish integrated methods for a sustainable management of this weed in Mediterranean cereal-farming systems.
In the framework of the Horizon Europe GOOD project, our research aimed at investigating the effectiveness of different control interventions on its vegetative regeneration ability.

Triticale field infested by *Oxalis pes-caprae*



Oxalis pes-caprae organs

Materials and Methods

The study was started in 2023 in a Sardinian rainfed cereal farming system highly infested with *O. pes-caprae* where triticale was the main crop. In a complete randomized block design, the following treatments were compared:

- soil tillage
- interrow mowing
- sulfonylurea and phenoxy herbicides at full and reduced recommended doses (FD, RD)
- intercropping of triticale with self-reseeding annual legume
- untreated control

The vegetative regeneration *O. pes-caprae* was evaluated by quantifying viable bulbs by withdrawing soil cores to a depth of 30 cm during the plant's dormant phase (September 2024). Besides, plant density was determined at fully vegetative stage (January 2025) by counting their number in three sampling areas per plot.

Detail of the Oxalis bulb at 30 cm depth

Sampling of Oxalis bulbs

Results

Soil core sampling (Fig.1) revealed that the level of Oxalis infestation varied significantly across the applied treatments:

- untreated control showed the highest bulb density
- tillage and sulfonylurea herbicide significantly reduced bulb density by 80–90%
- phenoxy herbicide, interrow mowing, and cover cropping did not result in statistically significant differences compared to the untreated plot

Subsequent plant density assessment (Fig.2) showed the same trend, however it revealed lower densities values than bulbs for all treatments.
Significant correlations were found between viable bulbs and plants (Fig.3).

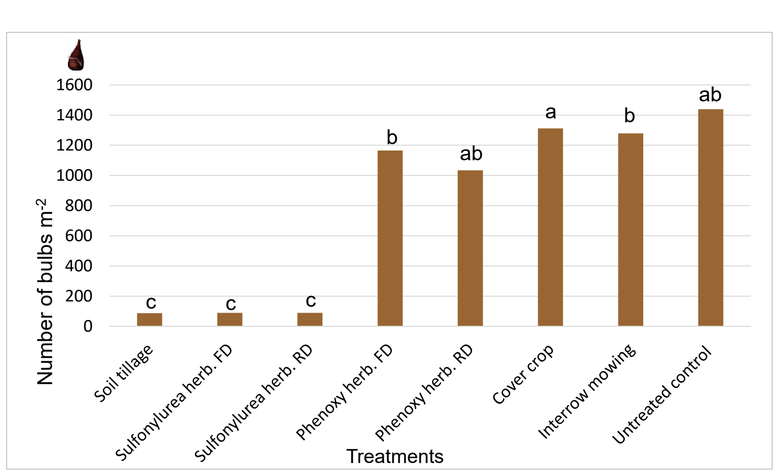


Fig. 1. Effects of treatments on viable bulbs down to 30 cm depth

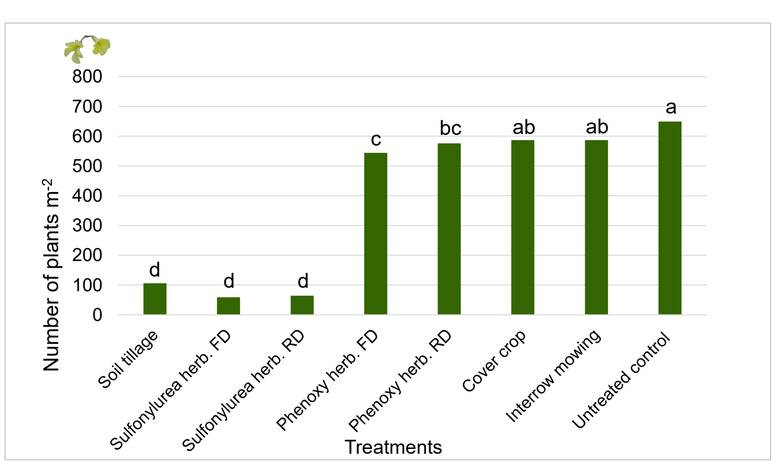


Fig. 2. Effects of treatments on plant density

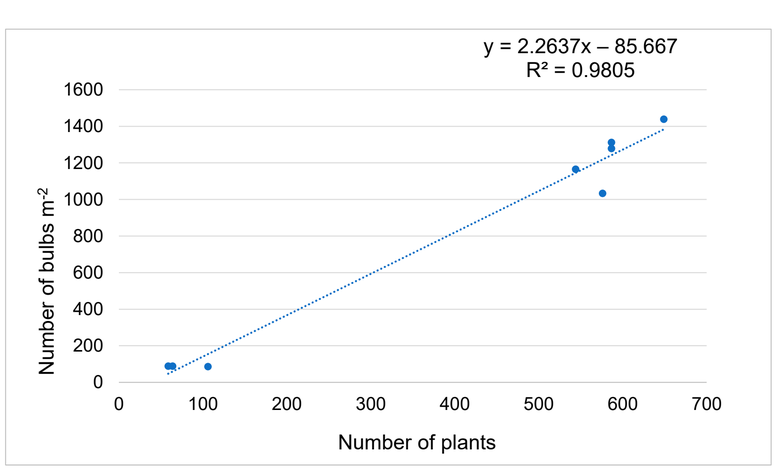


Fig. 3. Correlations (R^2) established between bulb and plant numbers

Conclusions

As contrasting invasive alien species can prove difficult when biological information and propagation dynamics within new habitats are little investigated, our experimental results constitute a basic starting point in the setting up of combined methods for an agroecological management of this invasive weed.

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