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From wild plant to biostimulant: effects of *Silene inflata* extracts on lettuce growth and quality

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INTRODUCTION & AIM

Plant biostimulants are pivotal to develop more sustainable agricultural systems, enhancing crop performance and reducing the use of synthetic inputs. Among them, botanical extracts are still underexplored, especially when derived from wild plant species. In this study, *Silene inflata* (Fig.1), a spontaneous herbaceous plant typical of Mediterranean grasslands, was investigated for its biostimulant potential on lettuce.

1. Biochemical composition of *Silene inflata* leaf (L) and root (R) tissue?
2. Have leaf and root extracts from *Silene inflata* biostimulant effects in lettuce?

Fig.1. *S. inflata* plants grown under greenhouse conditions

METHOD

Leaves and roots of *S. inflata* were collected from greenhouse-grown plants, frozen at - 80°C and analyzed for polyphenols, ascorbate, proteins, chlorophylls and carotenoids. Leaf (LES) and root (RES) extract were prepared via ultrasound-assisted green extraction. A pilot study indicated irrigation was more effective than foliar spraying. Three-week-old *Lactuca sativa* L. cv. Canasta seedlings were grown in pots under greenhouse conditions and daily irrigated. Once per week for three weeks, plants received 10 mL water followed 1 h later by 10 mL of LES or RES at 1 or 10 mL/L; controls received water or PBS (Fig.2).

Seven days after the last treatment, plants were harvested for fresh/dry weight measurements and biochemical analyses.

RESULTS & DISCUSSION

Leaves and roots of *S. inflata* characterization

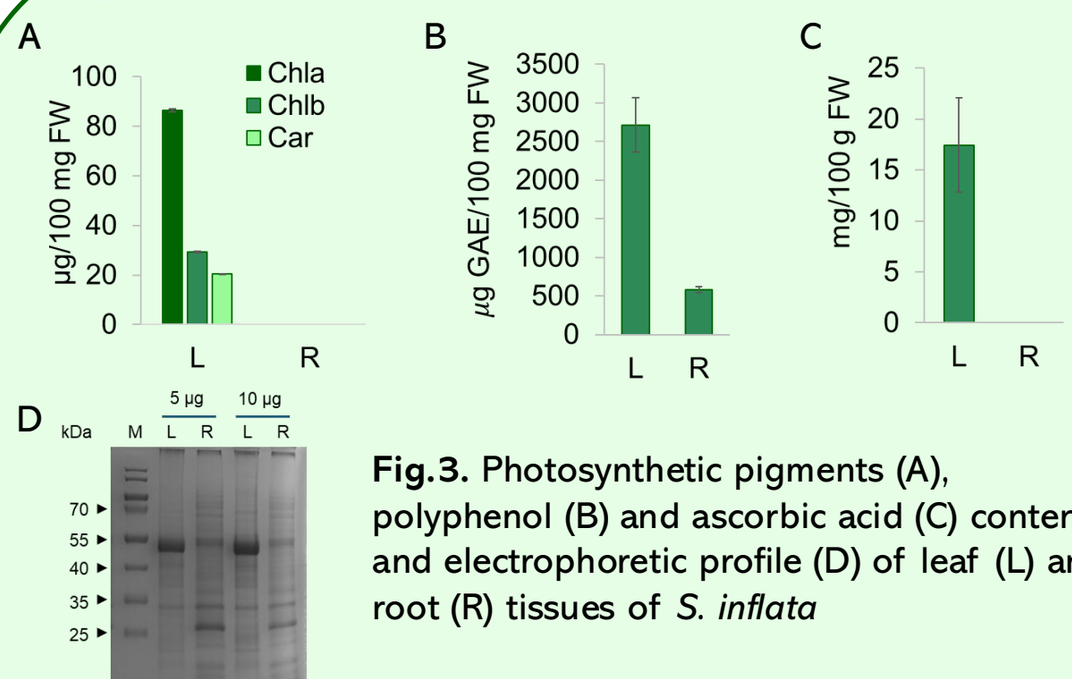

Fig.3. Photosynthetic pigments (A), polyphenol (B) and ascorbic acid (C) contents and electrophoretic profile (D) of leaf (L) and root (R) tissues of *S. inflata*

Biochemical characterization of lettuce plants treated with leaf (LES) and root (RES) extracts of *S. inflata*

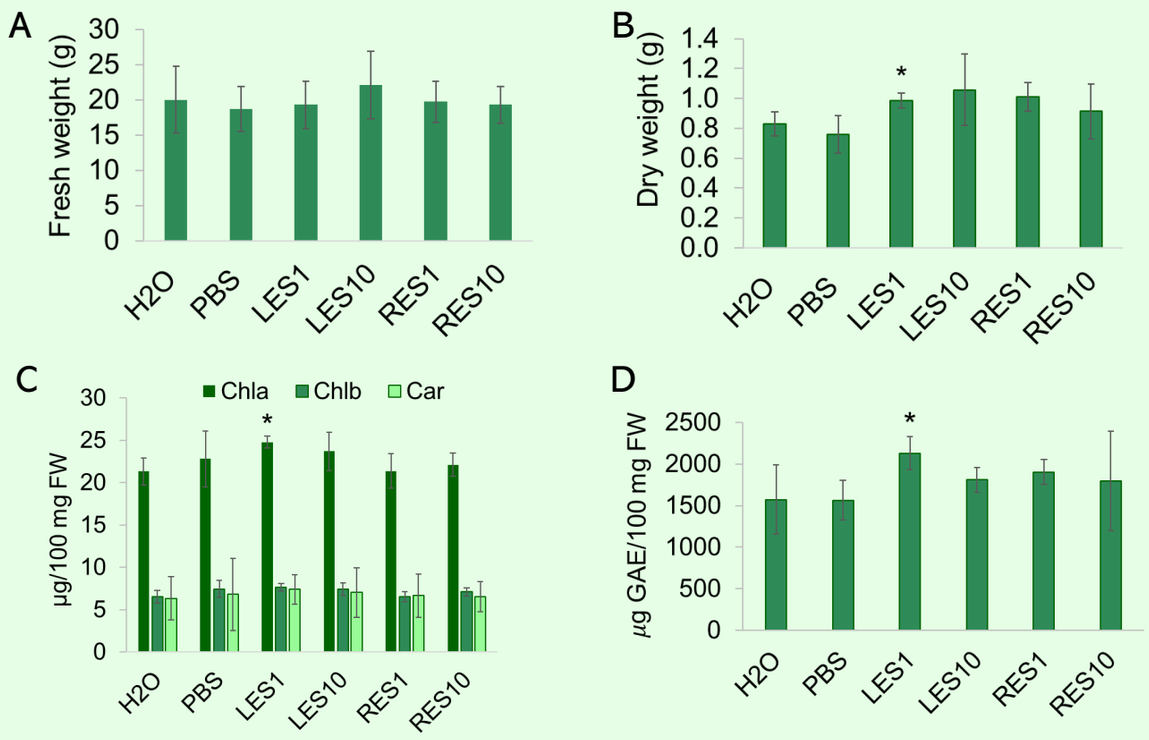

Fig.4. Fresh (A) and dry weight (B), photosynthetic pigments (C) and polyphenol content (D) of lettuce plants treated with leaf (LES) and root (RES) extracts of *S. inflata* at 1 or 10 mL/L.

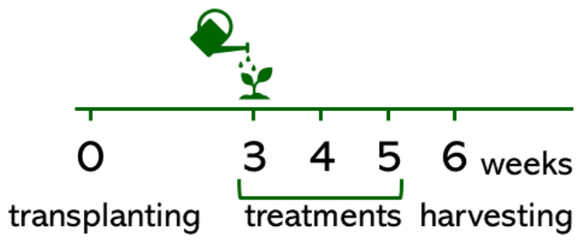

Fig.2. Representative scheme of lettuce treatment with leaf and root extracts of *S. inflata*

CONCLUSION

S. inflata leaf extract, particularly at 1 mL/L (LES1), displays promising biostimulant activity. The most consistent positive effects were observed on dry weight, photosynthetic pigments, and polyphenol content in lettuce. In contrast, root extracts showed weaker or nonsignificant responses. Future work will focus on purifying and characterizing the leaf protein fraction as a potential bioactive component, and on conducting additional assays on metabolically active baby-leaf lettuce to better detect potential growth-promoting effects.

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