



# Phenotype of *Lactuca serriola* L. from Central Chile and Argentina

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## Background and aims

Prickly lettuce (*Lactuca serriola* L., Asteraceae), an allochthonous species in South America, is recently widely distributed in the Central Chile (Lebeda et al. 2022), and occurs also in Argentina. Data on wild *Lactuca* spp. distribution in South America are very limited (Lebeda et al. 2004). Mountains of Andes influence climate of both geographically close areas. The climate in Central Chile is typically Mediterranean, climate in Mendoza district in Argentina is arid with continental characteristics. Andes represent a natural barrier for dispersal of prickly lettuce achenes, however transport corridors enable them spreading across Andes in elevation about 4 000 m a.s.l. in studied region. Complex study of prickly lettuce populations could elucidate their history and relations.

In recent study we compared the phenotype of plants from both areas from the viewpoint of original eco geographic conditions.

## Methods

The set of 182 seed samples of prickly lettuce was acquired on 129 sites in Central Chile in 2016 and 2017 (Lebeda et al. 2022), and 70 samples originated from 53 sites in Argentina from 2020 (Fig.1). Each collecting site (population) was represented by 1-3 (exceptionally by 4-5) samples. Collecting sites in Chile cover area of 31°55'S - 35°49'S, 70°13'W - 71°60'W, with elevation of 18 – 2 365 m a.s.l., in Argentina 31°20'S - 33°55'S, 67°32'W - 69°54'W, and elevation of 504 – 2 726 m a.s.l.

In 2021 plants were cultivated in the greenhouse of Palacký University in Olomouc (Fig. 2). Each sample was represented by 2-3 plants. Plants were assessed for 18 morphological traits on leaves, stems and flowers, and for 2 developmental characteristics during whole vegetation period according to the descriptor list of Doležalová et al. (2002).

## Key results

1. Cauline leaves of all samples were divided (Fig. 3), their taxonomic status was precised to *Lactuca serriola* f. *serriola*.
2. Eleven samples representing 2 sites in Chile and 6 sites in Argentina developed leaf rosette (Fig. 2 B,C). Plants develop leaf rosette in locations with long vegetation season and comfortable access to ground water, and this trait is genetically fixed. Surprisingly, formation of leaf rosette was observed in plants from Argentina from elevation of 2 726 m a.s.l.
3. Presence of trichomes on the whole stem and in the inflorescence (Fig. 5), a trait developed typically in dry areas and/or in higher elevations, was recorded in 59 sample from Chile and 7 samples from Argentina. These samples are classified as *L. serriola* var. *coriacea* by Feráková (1977).
4. Developmental characteristics, i.e. beginning of bolting, beginning of flowering, and the period between both developmental stages, were treated with respect to latitude of collecting sites (Fig. 4). Higher percentage of samples from Argentina were early in the beginning of bolting and flowering than those from Chile. The period between both developmental stages was 20 – 98 days for samples from Chile, and 20 – 63 days for samples from Argentina. Our preliminary data correspond to results from analogous studies of prickly lettuce from the North America (Lebeda et al. 2019).
5. Obtained data on plant phenotype and developmental characteristics will be treated with respect to exact data on original eco geographical conditions of each sample. They will be compared to DNA profiles of samples and other biological characteristics (e.g. disease resistance).

## Conclusions

Our observations proved very interesting variation in morphological traits and developmental characteristics among studied samples of *Lactuca serriola* L. from Central Chile and Mendoza region in Argentina. Some populations are already well adapted to local environmental conditions, reaching high altitude and modifying length of life cycle to the short vegetation period in mountains, so that they may survive in newly acquiring areas (Lebeda et al. 2022). This may represent serious threat to local flora, as prickly lettuce is considered an invasive weedy plant species.

On the other hand, new valuable traits potentially useful in lettuce breeding may develop.

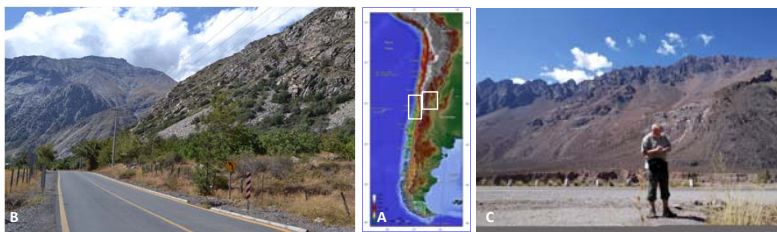


Fig. 1. Investigated area (A) in Central Chile (B) and Argentina (C).



Fig. 2. Prickly lettuce in greenhouse: variation in the position of basal leaves (A), formation of leaf rosette (B), variation in developmental stages (B, C).



Fig. 3. Variation in the shape (depth of incisions, shape of terminal lobe, shape of lateral lobes, presence of trichomes, anthocyanin in midrib), and size of cauline leaves of prickly lettuce from Argentina (first row), and Central Chile (second row).



Fig. 4. Developmental stages of prickly lettuce from Central Chile and Argentina – percentage of samples in each elevation category). bolting: early (41-60 d.a.s.), medium (61 – 80 d.a.s.), late (> 80 d.a.s.); flowering: early (75-90 d.a.s.), medium (91-120 d.a.s.), late (> 120 d.a.s.); period: short (20-35 days), medium (36-60 days), long (> 60 days). (d.a.s. – days after sowing)



Fig. 5. Variation of trichomes colour and distribution of leaves and stems; variation in anthocyanin presence in stems of prickly lettuce from Central Chile and Argentina.

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