Natural interspecific hybrids in the genus *Lactuca* fished in nature and germplasm collections

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Within the genus *Lactuca* L. (lettuce, Asteraceae) comprising about 100 species, the autogamy is the predominating breeding system, especially in the marginal parts of distribution area (Feráková 1977). Stebbins (1957) estimated a higher occurrence of allogamy in the centre of distribution. The hybridization can occur not only within one species, but also between species (Zohary 1991).

Interspecific hybrids in *Lactuca* spp. samples collected in natural habitats

More than 1 500 seed samples of twelve wild *Lactuca* species were collected in the years 1995 - 2011 by members of the Department of Botany (Palacký University in Olomouc) in 25 countries around the world (Doležalová et al. 2001, Lebeda et al. 2001, 2012a). One sample is represented by achenes from one individual plant. Since 1997 approximately 1 000 of wild *Lactuca* spp. samples were grown in the greenhouse and morphologically assessed according to the descriptor list elaborated by Doležalová et al. (2002). Taxonomical status of samples was verified by comparing obtained data to the description of *Lactuca* species in floras (e.g. Danin 2004, Tuisl 1968) and monographs (e.g. Feráková 1977). Almost ten cases of natural interspecific hybrids of the genus *Lactuca* were identified according to the plant phenotypes. The phenotype and fertility of interspecific hybrids bring new theoretic information on the evolution of wild and cultivated *Lactuca* species, and can inspire lettuce breeders as well. In the following part of this poster are shown three examples of these hybrids.

1.

Lactuca serriola (× *Lactuca sativa*)

were acquired from natural populations *L. serriola* f. *serriola* in northern Moravia in 1995.

Traits of *L. sativa* were expressed by vertical undulations of rosette and cauline leaves, and by more shallow incisions of leaf laminae than was observed on mother plant *L. serriola* (Figures 1c,d), and by the intermediate position of involucral bracts at time of fruit maturity.

2.

Lactuca aculeata (× *Lactuca serriola*)

originated from natural population *L. aculeata* collected in Israel in 2005.

Influence of *L. serriola* as donor of pollen was expressed by lobed cauline leaves and by the quality and colour of trichomes on the stem (Figure 2). Hybrid character of plant was confirmed by protein markers (Lebeda et al. 2012b). Hybrid plant was fully self-fertile.

3.

Hybrid character of *Lactuca saligna* (× *L. serriola*)

was observed on plant raised from *L. saligna* achenes collected in Jordan in 2007.

Absence of anthocyanine in anther tubes, high number of florets in heads observed in putative hybrid plant are traits attributed to *L. serriola*, contrasting to presence of anthocyanine in anther tubes and low number of florets typical for *L. saligna*. Hybrid plant was partly sterile (Figure 3).

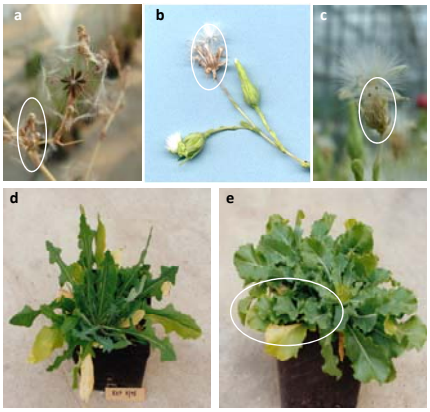

Figure 1. Position of involucral bracts - illustrations: reflect for *L. serriola* no. 377-10 (a), intermediate for *L. serriola* (× *L. sativa*) no. PI 289064 W6 (b), compressed for *L. sativa* cv. Atrakce (c); vertical undulation and depth of lobes on *L. serriola* no. 8/95 (c) and *L. serriola* (× *L. sativa*) raised from some achenes within identical sample (d).

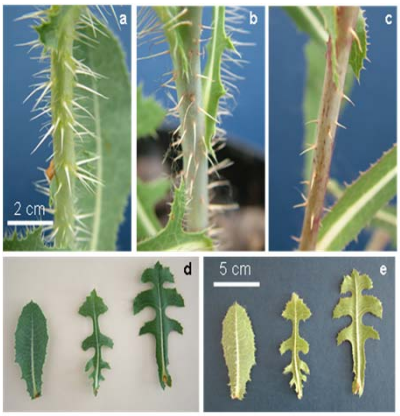

Figure 2. Trichomes on stems of *L. aculeata* no. 376-15 (a), *L. aculeata* (× *L. serriola*) no. 343-8 (b), *L. serriola* f. *serriola* no. 377-8 (c); stem leaves of *L. aculeata* no. 376-15, *L. aculeata* (× *L. serriola*), *L. serriola* f. *serriola* no. 377-8 from abaxial (d), and adaxial sides (e) (Lebeda et al. 2012b).

Figure 3. Inflorescence (a) and achenes (b) of hybrid *Lactuca saligna* (× *L. serriola*) no. 77/97; for comparison - inflorescence of *L. serriola* no. 365-10 (c) and *L. saligna* no. 235-1 (d).

Interspecific hybrids within *Lactuca* spp. accessions in germplasm collections

Phenotypes of interspecific hybrids were recorded in 10 germplasm accessions within the set of 95 *Lactuca* spp. accessions, provided by six world gene banks (Czech Republic, Germany, The Netherlands, The United Kingdom, The USA). Species *L. sativa*, *L. serriola*, *L. saligna*, *L. dregeana* and *L. virosa* very probably participated in interspecific hybridizations in various combinations (Figure 4) (Lebeda et al. 2007).

Standards for regeneration of accessions in the gene banks should be followed. Technical isolation is highly recommended also for primarily self-pollinated *Lactuca* species. The taxonomic status of germplasm material provided by the gene banks should be verified before its exploitation in scientific experiments.

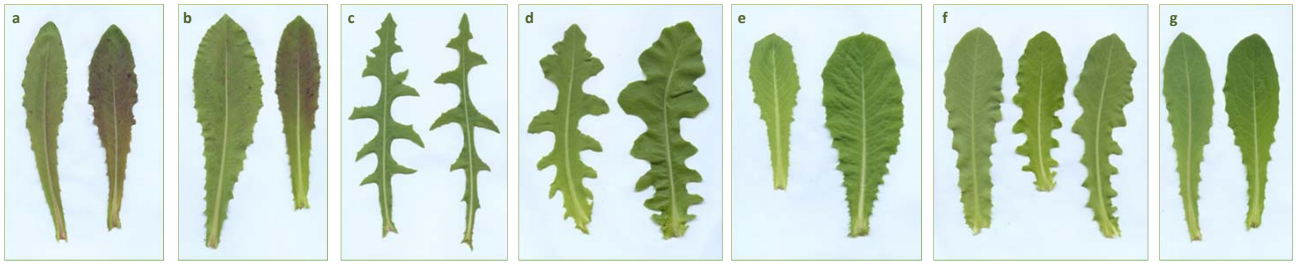

Figure 4. Stem leaves of *Lactuca* spp. germplasm accessions with hybrid phenotypes (acc. number and species declared in passport data, in brackets - species likely involved in interspecific hybridization): a) PI 274901 W6 *L. virosa* (*L. dregeana* × *L. serriola*), b) CGN 04808 *L. serriola* (*L. dregeana* × *L. sativa* × *L. serriola*), c) PI 271940aLET *L. saligna* (*L. saligna* × *L. serriola*), d) PI 289064W6 light seed coat *L. serriola* (*L. serriola* f. *serriola* × *L. sativa*), e) PI 289064bLET *L. serriola* (*L. sativa* × *L. virosa* × *L. serriola*), f) PI 289064cLET *L. serriola* (*L. sativa* × *L. serriola*), g) PI 289064eLET *L. serriola* (*L. serriola* f. *integrifolia* × *L. sativa*).

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