

Hieracium subgen. Pilosella: progenies diversity in facultative apomictic and sexual taxa



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Introduction

Hieracium subgen. *Pilosella* is one of the most taxonomically complicated groups of vascular plants. Variability of its taxa is caused namely by variation in ploidy level and different reproduction modes, including sexuality, apomixis (= agamospermy, asexual seed formation), haploid parthenogenesis and vegetative reproduction by stolons. The apomixis of aposporic type is facultative, and sexual embryo sac is mostly substituted by aposporous embryo sac during the formation of embryo. In apomictic taxa, sexual and apomictic seed production in the same capitulum is common. Apomictic plants may also serve as pollen donors. Hybridization is very frequent in localities with sympatric occurrence of more taxa or ploidy levels.

Aims

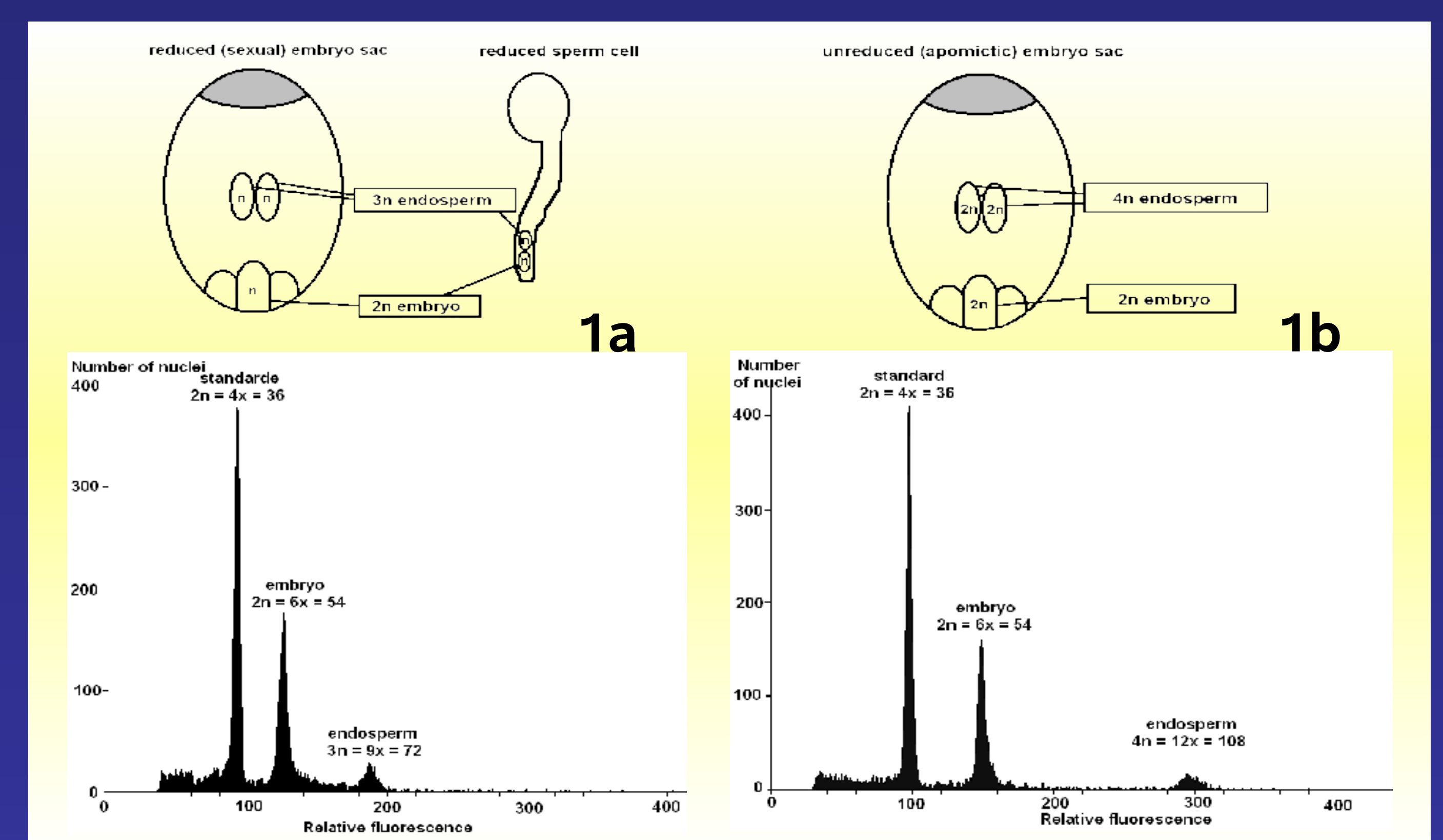
- To describe karyological variation of achenes from the field in sexual and apomictic plants.
- To detect frequency of sexual reproduction in apomictic plants.
- To find haploid parthenogenesis in apomictic and sexual plants.

Material

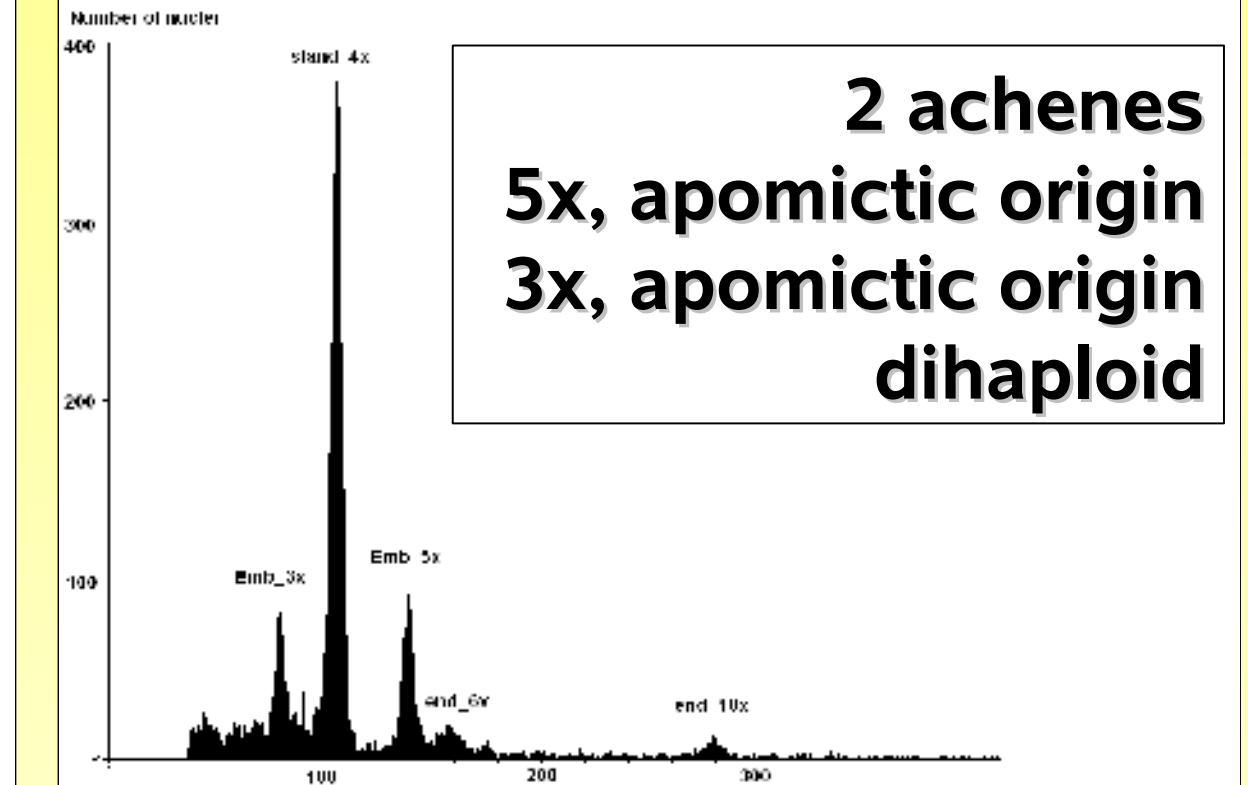
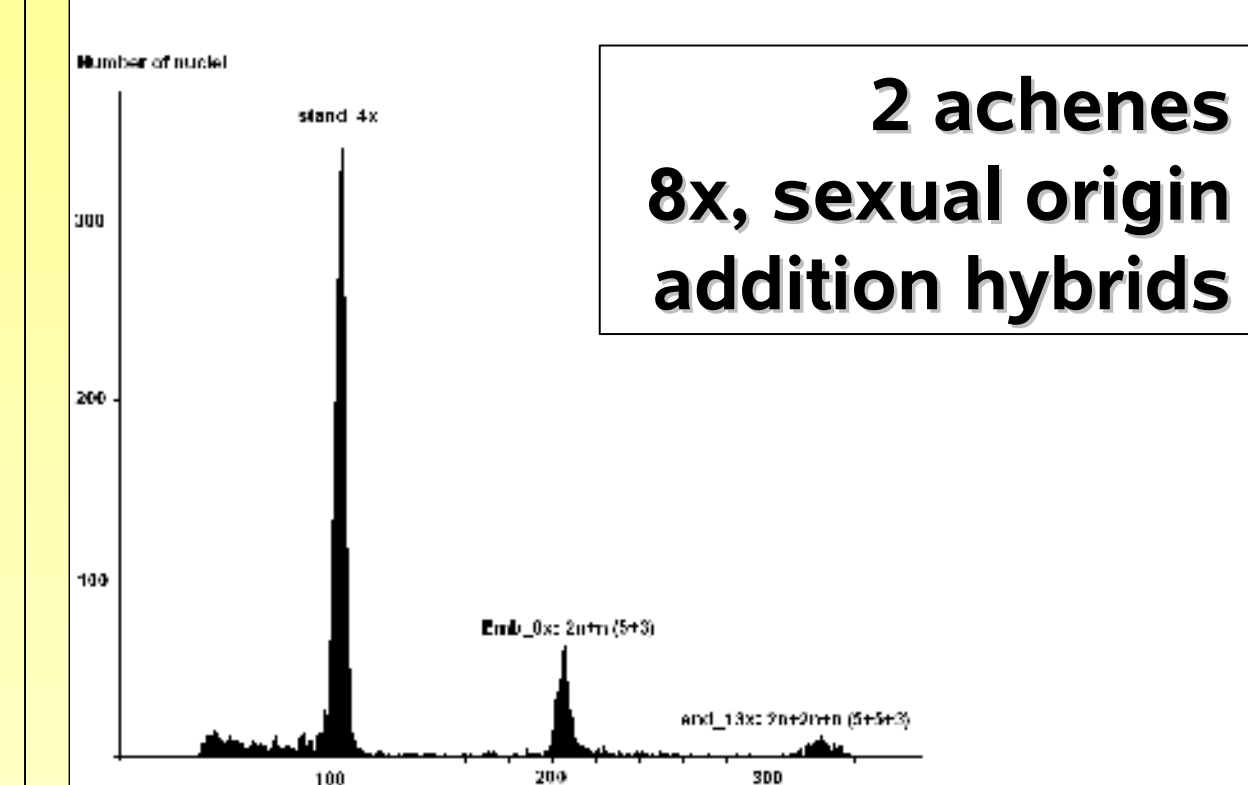
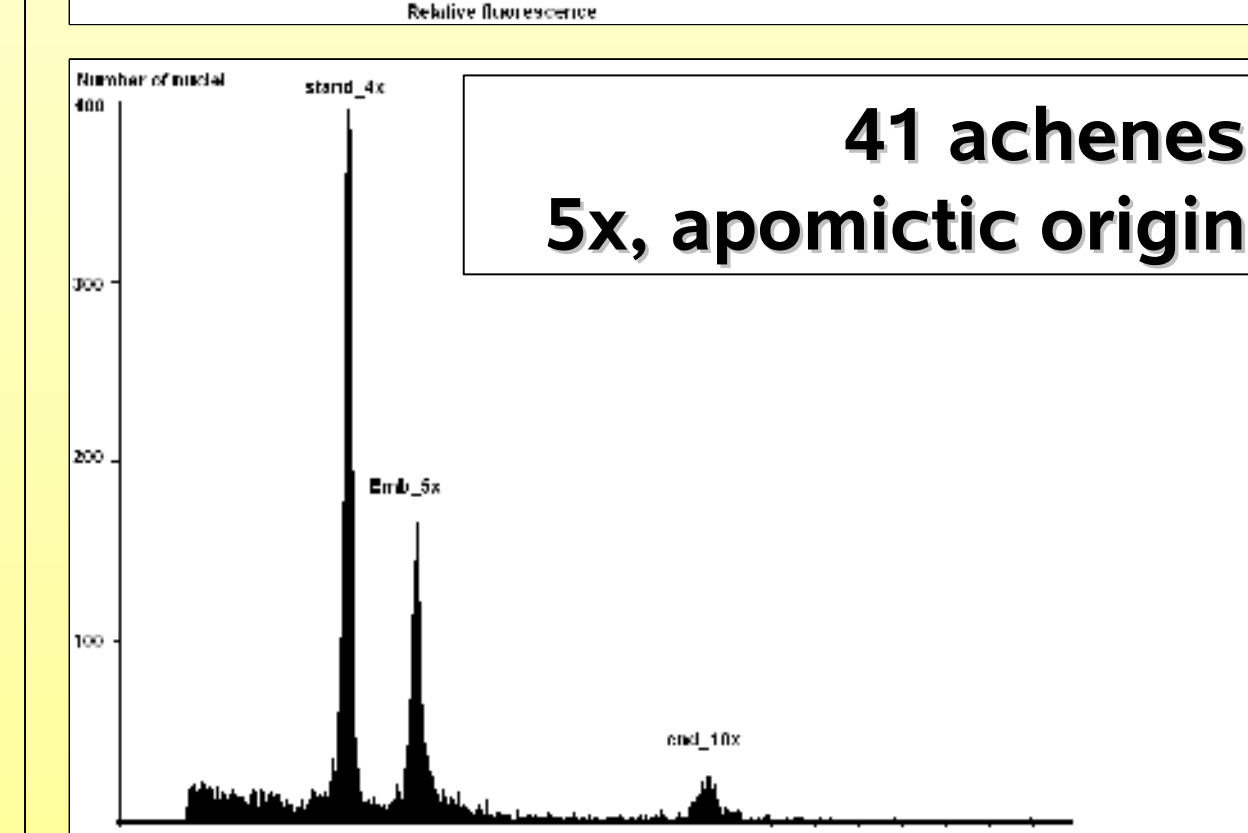
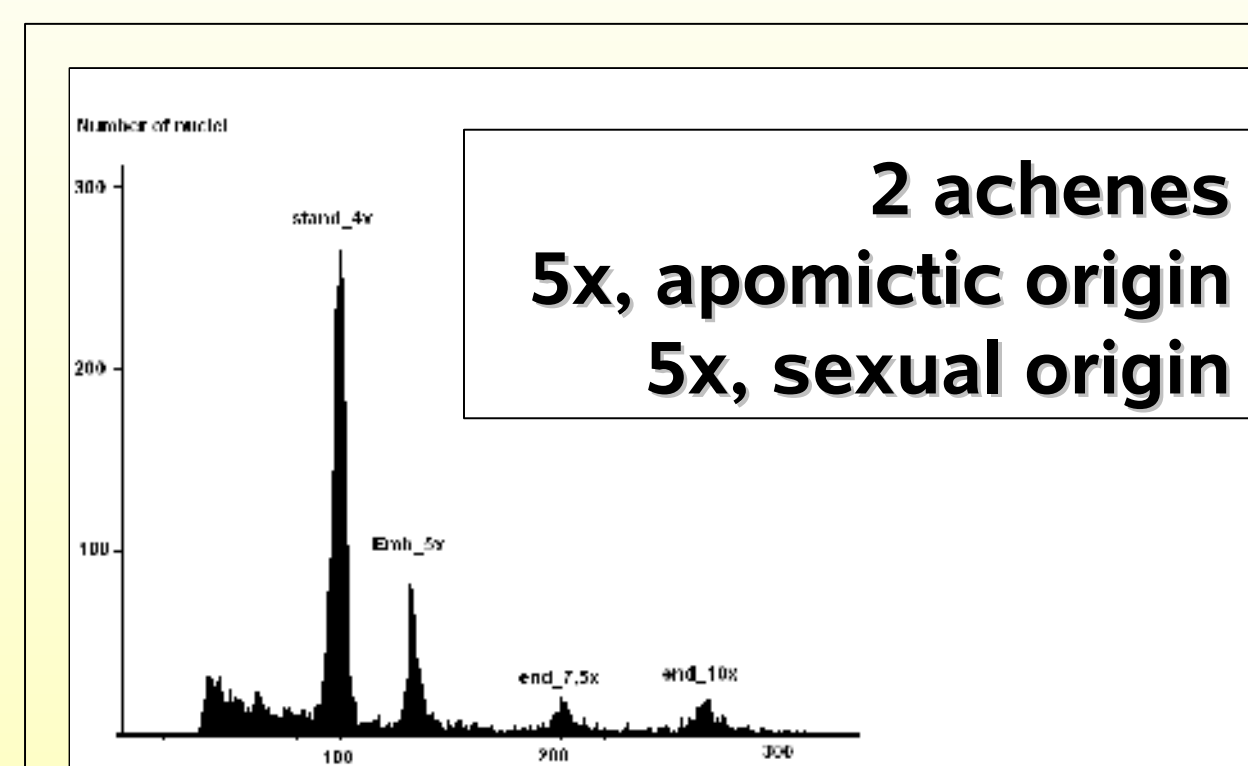
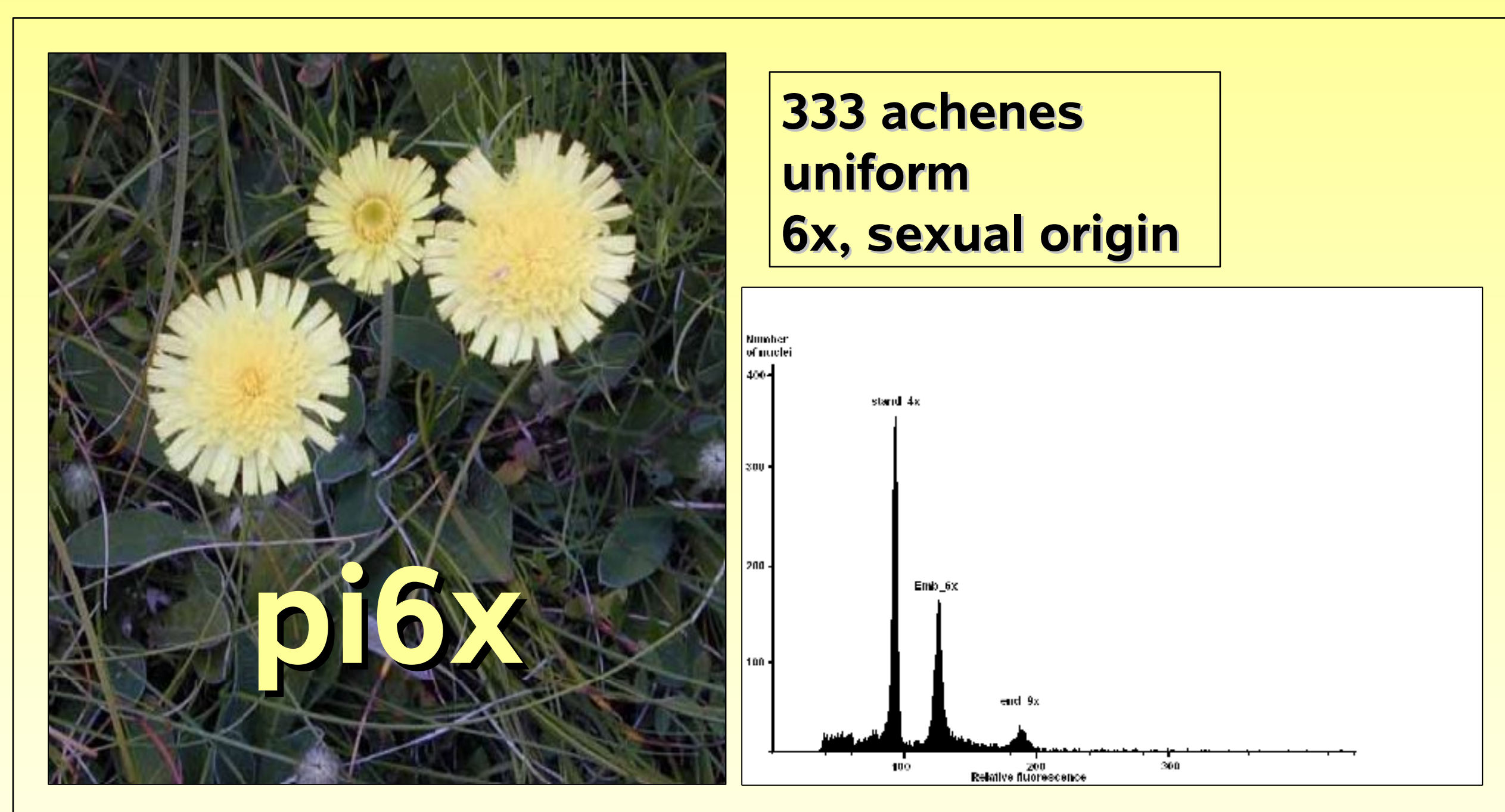
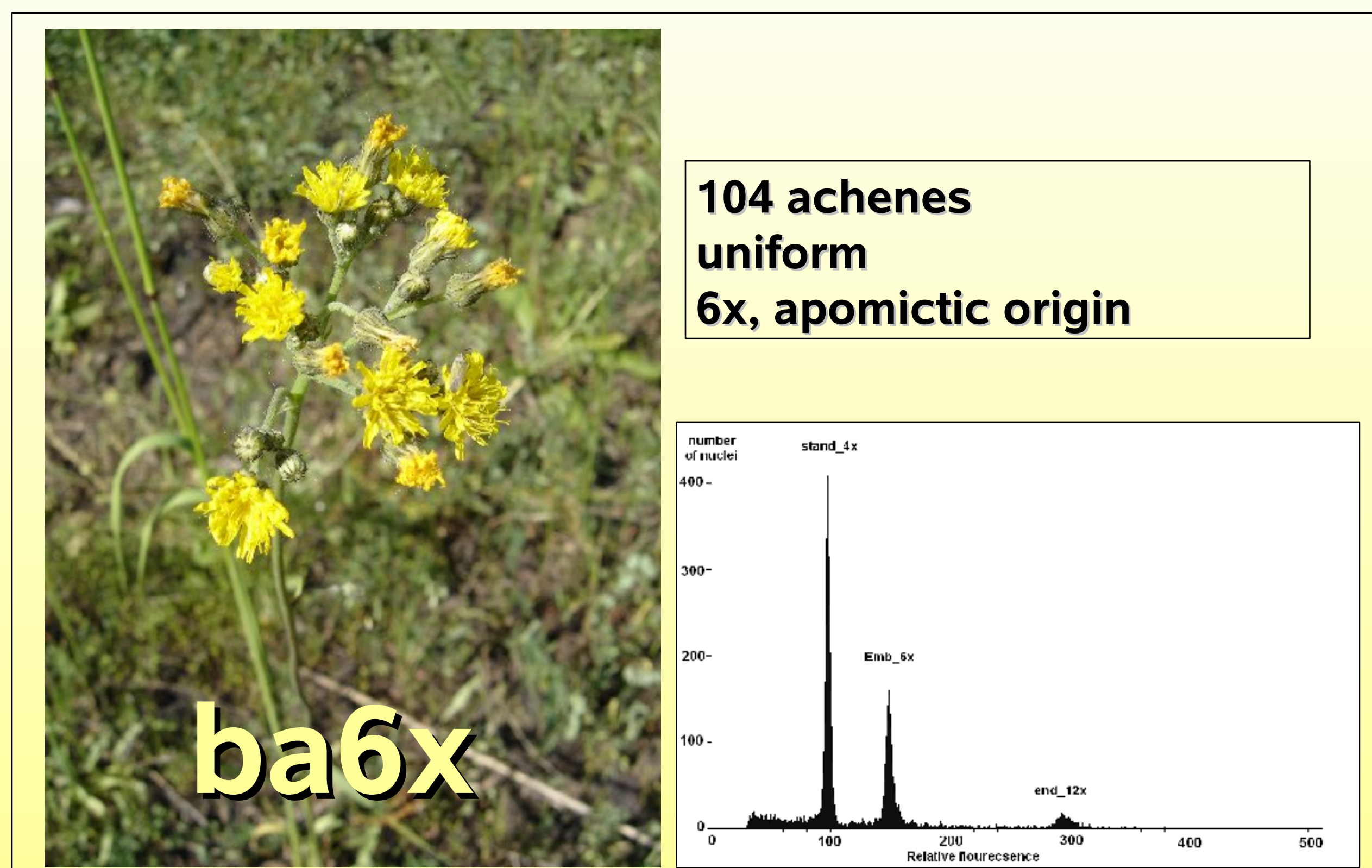
The achenes of *Hieracium bauhini* (pentaploid $ba5x$ and hexaploid $ba6x$), and *H. pilosella* (hexaploid $pi6x$) in a site on the periphery of Brno (Czech Republic) were analyzed by flow cytometry with respect to karyological variation and seed origin.

Method

Determination of the ploidy level and origin of achenes was based on flow cytometric seed screen (FCSS) of well developed fresh achenes and the comparison of embryo/endosperm ploidy level ratio (Matzk et al. 2000), which is different in sexual and apomictic species. This difference is caused by the different origin of endosperm in sexual and aposporic taxa. In sexual taxa, endosperm is formed by the fusion of two polar nuclei of the central cell with reduced sperm cells, therefore, embryo/endosperm ratio in allogamy or homoploid crossing is 2:3 (Fig. 1a). In aposporic taxa, endosperm is autonomous, and so embryo/endosperm ratio in seeds is 2:4 (Fig. 1b).



Results



four groups of progenies were detected:
apomictic progenies
sexual progenies
addition hybrids
dihaploid progeny

Sexual reproduction of apomictic plants including formation of normale and addition hybrids and haploid parthenogenesis substantially increase the variability of progenies in mixed populations of the taxa from *Hieracium* subgen. *Pilosella*.