

Tracing the origins of Timothy species (*Phleum* sp.)

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Introduction The section Phleum of the genus *Phleum* contains 3 species groups and, depending on the taxonomic classification used, these may be treated as 3 or 6 individual species (Joachimiak & Kula, 1997; Joachimiak, 2004). Firstly, there is the *P. pratense* group consisting of a series of diploid, tetraploid, hexaploid and octoploid forms. The diploid ($2n=14$) is usually known as *Phleum bertolonii* (syn. *P. pratense* spp *bertolonii*: syn *P. nodosum*) and/or *P. hubbardii*, while the tetraploid, hexaploid and octoploid are known as *P. pratense*. Secondly there is the *P. alpinum* group consisting of 2 contrasting diploid species, *P. rhaeticum* and *P. commutatum*, and a tetraploid *P. commutatum*. Finally there is the lesser known Mediterranean annual, *Phleum echinatum*, with a reduced chromosome number of 10.

Materials and methods A collection of natural populations of *P. bertolonii*, *P. hubbardii*, *P. pratense* 4x, 6x and 8x, *P. echinatum* and the 3 entities within the *P. alpinum* group. *P. commutatum* 2x and 4x and *P. rhaeticum* 2x, were studied using the sequences of the trnL (UAA) gene intron of chloroplast DNA (cpDNA) and the internal transcribed spacer (ITS) region of nuclear ribosomal DNA.

Results CpDNA sequences accurately discriminate between the 4 diploid species; *P. bertolonii*; *P. commutatum* and *P. rhaeticum*, as well as *P. echinatum*. They also provide an insight into the origin of some polyploids.

Both ITS and chloroplast sequences are able to discriminate between all of the diploid species. They also enable some of the genomes of the polyploids to be identified as well as revealing geographic patterns of variation. Although ITS sequences exhibit more variation than chloroplast DNA the patterns revealed are almost identical.

References

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