

Supplementary Data

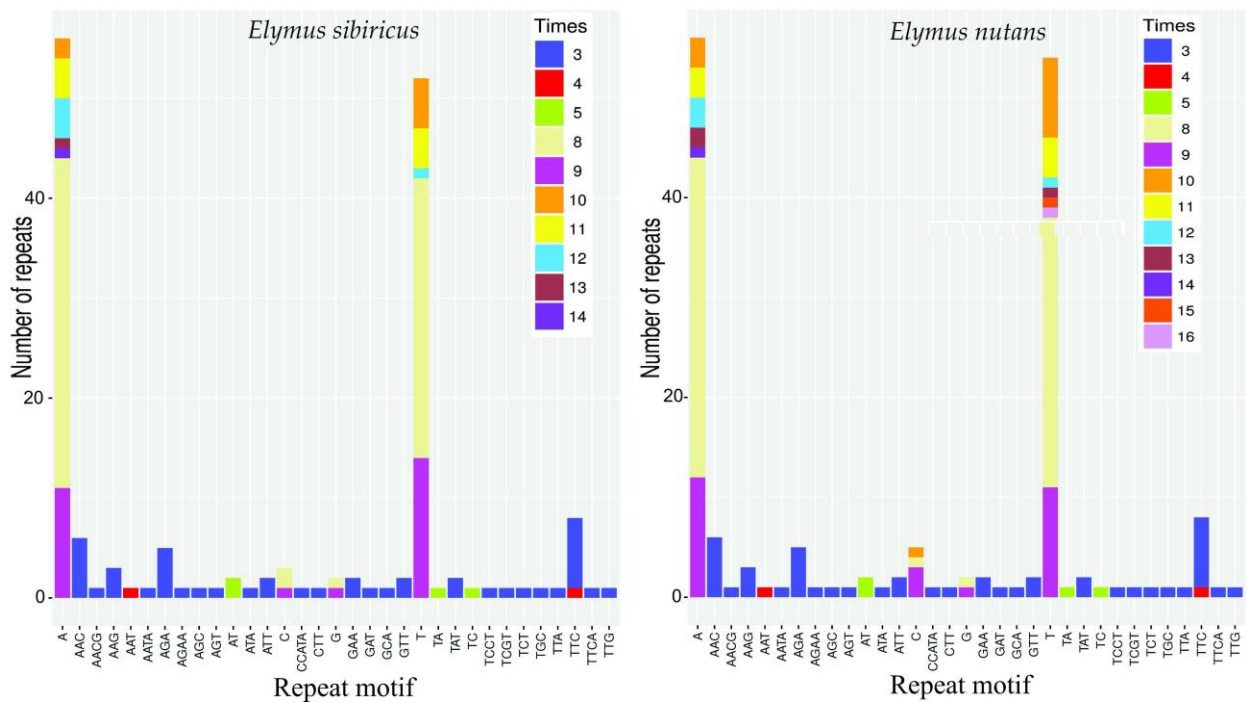


Fig. S1: SSRs (Simple sequence repeats) of the two *Elymus* cp genomes. Types and number distribution of SSRs in the two *Elymus* species.

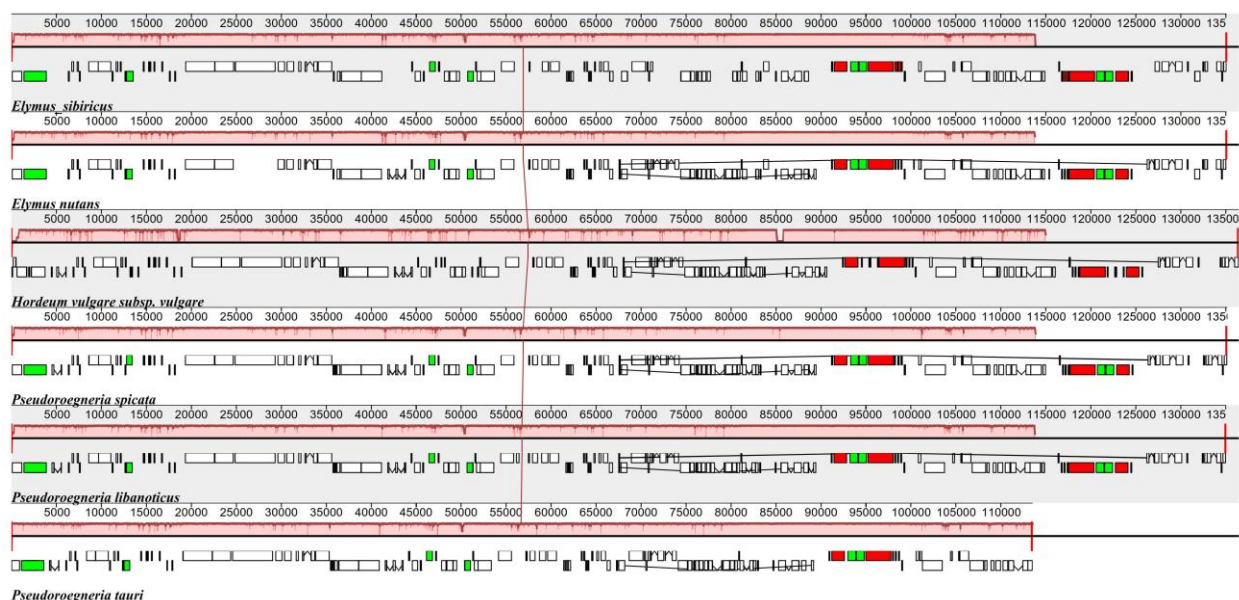


Fig. S2: Synteny comparison of four species chloroplast genomes using Mauve. Rectangular blocks of the same color indicate collinear regions of sequences. Vertical bars inside collinear blocks show degree of sequence identity. Dashed-line boxes indicate discovered plasmid sequence region.

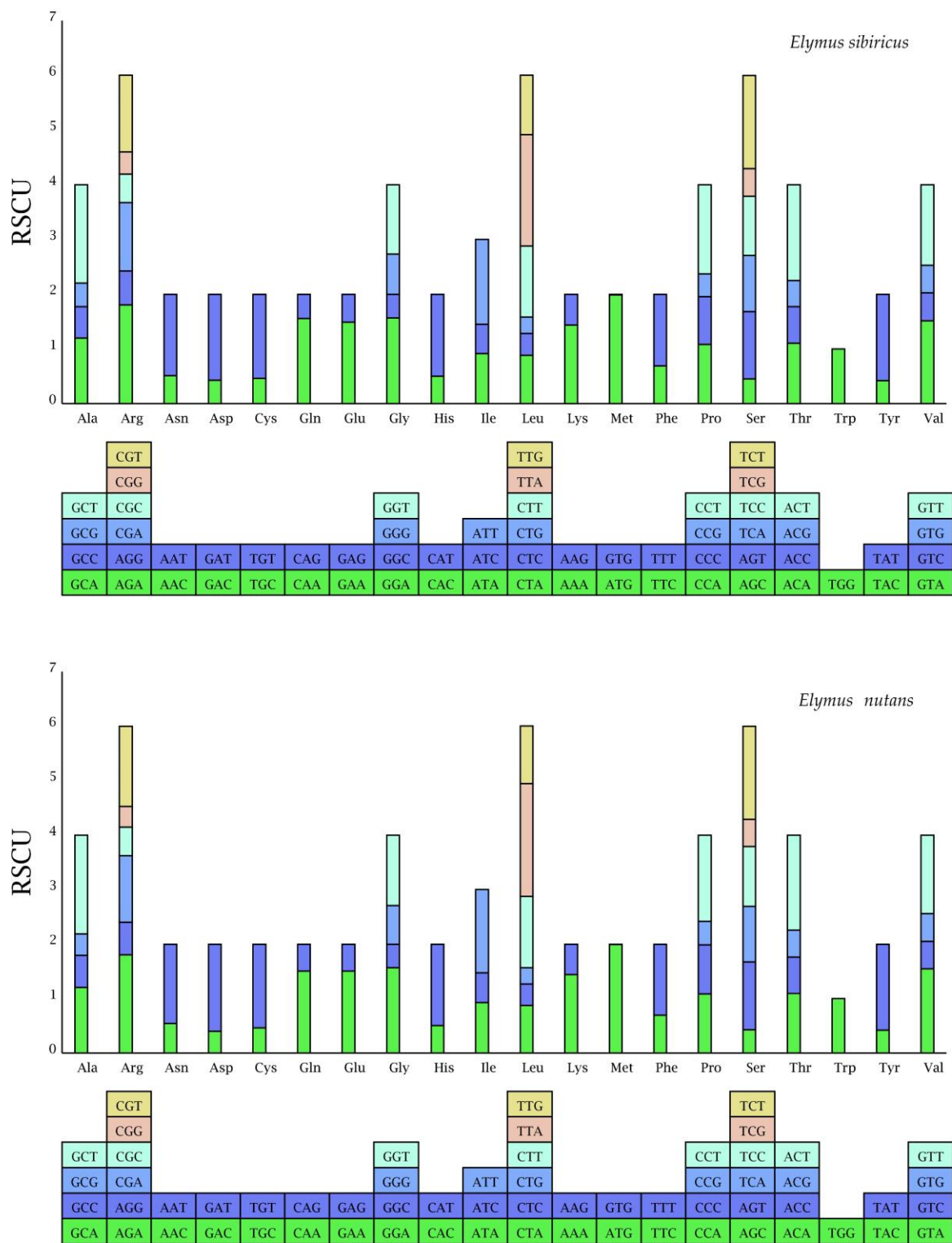


Fig. S3: Relative synonymous codon usage of the two *Elymus* species. The characters in the box represent the codon subtype and the corresponding bar chart shows the frequency of codon usage.

Table S1: GenBank number of each *Elymus* species

| Type | Species | GenBank number |
|-------------------|---|----------------|
| outgroup | <i>Avena sativa</i> | NC_027468.1 |
| | <i>Sorghum bicolor</i> | NC_008602.1 |
| | <i>Saccharum spontaneum</i> | LN_896360.1 |
| Triticeae species | <i>Aegilops cylindrica</i> | KF_534489 |
| | <i>A. tauschii</i> | JQ_754651 |
| | <i>A. geniculata</i> | KF_534490 |
| | <i>A. speltoides</i> | JQ_740834 |
| | <i>Triticum monococcum</i> | NC_021760.1 |
| | <i>T. urartu</i> | NC_021762.1 |
| | <i>T. aestivum</i> | KC_912694.1 |
| | <i>Secale cereal</i> | KC_912691 |
| | <i>Pseudoroegneria spicata</i> | MH_285855.1 |
| | <i>P. libanotica</i> | KX_822019 |
| | <i>P. tauri</i> | KY_636131 |
| | <i>Hordeum vulgare</i> subsp. <i>spontaneum</i> | KC_912688.1 |
| | <i>H. vulgare</i> subsp. <i>vulgare</i> | KT_962228.1 |
| | <i>H. jubatum</i> | NC_027476.1 |