

**Table S1.** Information of six *Elymus sibiricus* accessions used in this study.

| Genotype | Full name | Origin               | Longitude/°E | Latitude/°N | Altitude/m | Status |
|----------|-----------|----------------------|--------------|-------------|------------|--------|
| ZN       | ZHN03     | Zhuoni, Gansu, China | 103.5692     | 34.5856     | 2605       | Wild   |
| XH       | XH09      | Xiahe, Gansu, China  | 102.5586     | 34.7528     | 3171       | Wild   |
| MQ       | MQ01      | Maqu, Gansu, China   | 102.1114     | 34          | 3475       | Wild   |
| HZ       | HZ02      | Hezuo, Gansu, China  | 102.9083     | 35.0614     | 2900       | Wild   |
| LQ       | LQ03      | Luqu, Gansu, China   | 102.6422     | 34.5511     | 3032       | Wild   |
| LT       | LT04      | Lintan, Gansu, China | 103.6658     | 34.9192     | 2571       | Wild   |

**Table S2.** Expression stability values of *E. sibiricus* potential reference genes calculated using NormFinder (The tabulated data of Figure 5).

| Rank | Different<br>genotypes  | Different<br>developmental<br>stages | Different<br>tissues    | Salt<br>stress          | Heat<br>stress          | Cold<br>stress          | Drought<br>stress       | All<br>samples          |
|------|-------------------------|--------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1    | <i>TBP2</i><br>(0.10)   | <i>PP2A</i><br>(0.11)                | <i>TBP2</i><br>(0.07)   | <i>ACT2</i><br>(0.15)   | <i>ACT2</i><br>(0.13)   | <i>PP2A</i><br>(0.23)   | <i>ACT2</i><br>(0.22)   | <i>PP2A</i><br>(0.29)   |
| 2    | <i>eIF-3A</i><br>(0.14) | <i>TUA2</i><br>(0.20)                | <i>CYP19</i><br>(0.08)  | <i>PP2A</i><br>(0.23)   | <i>TUA2</i><br>(0.19)   | <i>ACT2</i><br>(0.43)   | <i>CYP19</i><br>(0.28)  | <i>TBP2</i><br>(0.45)   |
| 3    | <i>TUA2</i><br>(0.15)   | <i>TUB3</i><br>(0.31)                | <i>eIF-3A</i><br>(0.12) | <i>TBP2</i><br>(0.24)   | <i>PP2A</i><br>(0.23)   | <i>DNAJ</i><br>(0.48)   | <i>HIS3</i><br>(0.29)   | <i>CYP19</i><br>(0.46)  |
| 4    | <i>PP2A</i><br>(0.17)   | <i>HIS3</i><br>(0.32)                | <i>PP2A</i><br>(0.12)   | <i>TUA2</i><br>(0.48)   | <i>CYP19</i><br>(0.27)  | <i>HIS3</i><br>(0.53)   | <i>PP2A</i><br>(0.33)   | <i>TEF2</i><br>(0.61)   |
| 5    | <i>CYP19</i><br>(0.17)  | <i>DNAJ</i><br>(0.35)                | <i>TEF2</i><br>(0.22)   | <i>HIS3</i><br>(0.58)   | <i>DNAJ</i><br>(0.32)   | <i>TEF2</i><br>(0.55)   | <i>TUB3</i><br>(0.51)   | <i>HIS3</i><br>(0.67)   |
| 6    | <i>TEF2</i><br>(0.18)   | <i>CYP19</i><br>(0.46)               | <i>DNAJ</i><br>(0.45)   | <i>CYP19</i><br>(0.78)  | <i>TBP2</i><br>(0.50)   | <i>TBP2</i><br>(0.56)   | <i>DNAJ</i><br>(0.51)   | <i>TUA2</i><br>(0.71)   |
| 7    | <i>HIS3</i><br>(0.19)   | <i>eIF-3C</i><br>(0.48)              | <i>eIF-3C</i><br>(0.49) | <i>TUB3</i><br>(0.89)   | <i>TUB3</i><br>(0.57)   | <i>CYP19</i><br>(0.58)  | <i>TBP2</i><br>(0.52)   | <i>DNAJ</i><br>(0.74)   |
| 8    | <i>ACT2</i><br>(0.21)   | <i>ACT2</i><br>(0.48)                | <i>HIS3</i><br>(0.52)   | <i>TEF2</i><br>(0.95)   | <i>HIS3</i><br>(0.68)   | <i>U2AF</i><br>(0.62)   | <i>TUA2</i><br>(0.55)   | <i>TUB3</i><br>(0.79)   |
| 9    | <i>DNAJ</i><br>(0.24)   | <i>GAPDH</i><br>(0.53)               | <i>GAPDH</i><br>(0.59)  | <i>U2AF</i><br>(0.97)   | <i>U2AF</i><br>(0.76)   | <i>TUA2</i><br>(0.63)   | <i>U2AF</i><br>(0.62)   | <i>ACT2</i><br>(0.86)   |
| 10   | <i>eIF-3C</i><br>(0.24) | <i>TEF2</i><br>(0.61)                | <i>TUA2</i><br>(0.85)   | <i>DNAJ</i><br>(1.16)   | <i>TEF2</i><br>(0.84)   | <i>TUB3</i><br>(0.87)   | <i>TEF2</i><br>(0.75)   | <i>U2AF</i><br>(1.40)   |
| 11   | <i>TUB3</i><br>(0.24)   | <i>eIF-3A</i><br>(0.69)              | <i>U2AF</i><br>(1.09)   | <i>eIF-3A</i><br>(1.19) | <i>eIF-3A</i><br>(1.27) | <i>eIF-3C</i><br>(1.14) | <i>eIF-3C</i><br>(1.44) | <i>eIF-3A</i><br>(1.57) |
| 12   | <i>GAPDH</i><br>(0.35)  | <i>TBP2</i><br>(0.69)                | <i>TUB3</i><br>(1.11)   | <i>eIF-3C</i><br>(1.87) | <i>eIF-3C</i><br>(1.38) | <i>GAPDH</i><br>(1.43)  | <i>eIF-3A</i><br>(1.55) | <i>eIF-3C</i><br>(1.59) |
| 13   | <i>U2AF</i><br>(0.78)   | <i>U2AF</i><br>(0.90)                | <i>ACT2</i><br>(2.38)   | <i>GAPDH</i><br>(3.34)  | <i>GAPDH</i><br>(1.55)  | <i>eIF-3A</i><br>(1.77) | <i>GAPDH</i><br>(2.96)  | <i>GAPDH</i><br>(1.96)  |

**Table S3.** Expression stability of candidate reference genes calculated by BestKeeper (The tabulated data of Figure 6).

| Rank | Different<br>genotypes | Different<br>developmental<br>stages | Different<br>tissues | Salt<br>stress | Heat<br>stress | Cold<br>stress | Drought<br>stress | All<br>samples |
|------|------------------------|--------------------------------------|----------------------|----------------|----------------|----------------|-------------------|----------------|
| 1    | <i>HIS3</i>            | <i>DNAJ</i>                          | <i>TBP2</i>          | <i>eIF-3C</i>  | <i>eIF-3C</i>  | <i>eIF-3C</i>  | <i>eIF-3C</i>     | <i>eIF-3C</i>  |
| SD   | 0.28                   | 0.16                                 | 0.24                 | 0.70           | 2.10           | 1.71           | 0.81              | 1.14           |
| 2    | <i>ACT2</i>            | <i>TUA2</i>                          | <i>DNAJ</i>          | <i>DNAJ</i>    | <i>TEF2</i>    | <i>TUB3</i>    | <i>TEF2</i>       | <i>DNAJ</i>    |
| SD   | 0.29                   | 0.22                                 | 0.33                 | 0.77           | 2.17           | 1.97           | 1.45              | 1.60           |
| 3    | <i>CYP19</i>           | <i>HIS3</i>                          | <i>PP2A</i>          | <i>U2AF</i>    | <i>U2AF</i>    | <i>TBP2</i>    | <i>U2AF</i>       | <i>U2AF</i>    |
| SD   | 0.37                   | 0.27                                 | 0.38                 | 1.10           | 2.41           | 2.07           | 1.60              | 1.80           |
| 4    | <i>DNAJ</i>            | <i>ACT2</i>                          | <i>eIF-3C</i>        | <i>TUB3</i>    | <i>TUB3</i>    | <i>DNAJ</i>    | <i>DNAJ</i>       | <i>TBP2</i>    |
| SD   | 0.38                   | 0.31                                 | 0.48                 | 1.13           | 2.52           | 2.49           | 1.73              | 1.85           |
| 5    | <i>eIF-3C</i>          | <i>CYP19</i>                         | <i>eIF-3A</i>        | <i>TEF2</i>    | <i>TBP2</i>    | <i>ACT2</i>    | <i>TUB3</i>       | <i>TUB3</i>    |
| SD   | 0.40                   | 0.38                                 | 0.54                 | 1.24           | 2.52           | 2.59           | 1.81              | 1.87           |
| 6    | <i>TBP2</i>            | <i>eIF-3C</i>                        | <i>CYP19</i>         | <i>PP2A</i>    | <i>PP2A</i>    | <i>TEF2</i>    | <i>TBP2</i>       | <i>TEF2</i>    |
| SD   | 0.41                   | 0.42                                 | 0.55                 | 1.61           | 2.95           | 2.66           | 1.81              | 2.06           |
| 7    | <i>TUA2</i>            | <i>PP2A</i>                          | <i>HIS3</i>          | <i>TBP2</i>    | <i>DNAJ</i>    | <i>TUA2</i>    | <i>PP2A</i>       | <i>PP2A</i>    |
| SD   | 0.41                   | 0.43                                 | 0.61                 | 1.83           | 2.98           | 2.66           | 2.06              | 2.24           |
| 8    | <i>TEF2</i>            | <i>TUB3</i>                          | <i>TEF2</i>          | <i>ACT2</i>    | <i>ACT2</i>    | <i>U2AF</i>    | <i>ACT2</i>       | <i>ACT2</i>    |
| SD   | 0.45                   | 0.54                                 | 0.65                 | 2.04           | 3.44           | 2.80           | 2.28              | 2.32           |
| 9    | <i>TUB3</i>            | <i>GAPDH</i>                         | <i>GAPDH</i>         | <i>TUA2</i>    | <i>TUA2</i>    | <i>PP2A</i>    | <i>HIS3</i>       | <i>CYP19</i>   |
| SD   | 0.47                   | 0.73                                 | 0.71                 | 2.70           | 3.46           | 2.88           | 2.53              | 2.55           |
| 10   | <i>eIF-3A</i>          | <i>TBP2</i>                          | <i>TUA2</i>          | <i>HIS3</i>    | <i>CYP19</i>   | <i>CYP19</i>   | <i>CYP19</i>      | <i>TUA2</i>    |
| SD   | 0.49                   | 0.79                                 | 1.08                 | 2.82           | 3.49           | 2.89           | 2.61              | 2.75           |
| 11   | <i>PP2A</i>            | <i>TEF2</i>                          | <i>U2AF</i>          | <i>CYP19</i>   | <i>HIS3</i>    | <i>HIS3</i>    | <i>TUA2</i>       | <i>HIS3</i>    |
| SD   | 0.49                   | 0.99                                 | 1.18                 | 3.01           | 3.99           | 3.33           | 2.88              | 2.99           |
| 12   | <i>GAPDH</i>           | <i>eIF-3A</i>                        | <i>TUB3</i>          | <i>eIF-3A</i>  | <i>eIF-3A</i>  | <i>GAPDH</i>   | <i>eIF-3A</i>     | <i>eIF-3A</i>  |
| SD   | 0.64                   | 1.05                                 | 1.22                 | 3.38           | 4.55           | 4.04           | 3.34              | 3.91           |
| 13   | <i>U2AF</i>            | <i>U2AF</i>                          | <i>ACT2</i>          | <i>GAPDH</i>   | <i>GAPDH</i>   | <i>eIF-3A</i>  | <i>GAPDH</i>      | <i>GAPDH</i>   |
| SD   | 0.94                   | 1.08                                 | 2.36                 | 5.36           | 4.62           | 4.51           | 5.09              | 4.04           |

**Table S4.** Expression stability values for 13 candidate reference genes calculated via Delta Ct  
(The tabulated data of Figure 7).

| Rank | Different<br>genotypes | Different<br>developmental<br>stages | Different<br>tissues | Salt<br>stress | Heat<br>stress | Cold<br>stress | Drought<br>stress | All<br>samples |
|------|------------------------|--------------------------------------|----------------------|----------------|----------------|----------------|-------------------|----------------|
| 1    | <i>TBP2</i>            | <i>PP2A</i>                          | <i>PP2A</i>          | <i>ACT2</i>    | <i>ACT2</i>    | <i>PP2A</i>    | <i>DNAJ</i>       | <i>PP2A</i>    |
| SD   | 0.40                   | 0.76                                 | 1.03                 | 1.55           | 1.11           | 1.23           | 1.36              | 1.43           |
| 2    | <i>HIS3</i>            | <i>TUA2</i>                          | <i>TBP2</i>          | <i>PP2A</i>    | <i>TUA2</i>    | <i>ACT2</i>    | <i>PP2A</i>       | <i>TBP2</i>    |
| SD   | 0.43                   | 0.77                                 | 1.03                 | 1.57           | 1.12           | 1.27           | 1.38              | 1.50           |
| 3    | <i>CYP19</i>           | <i>HIS3</i>                          | <i>eIF-3A</i>        | <i>TBP2</i>    | <i>PP2A</i>    | <i>DNAJ</i>    | <i>ACT2</i>       | <i>CYP19</i>   |
| SD   | 0.44                   | 0.82                                 | 1.04                 | 1.60           | 1.14           | 1.33           | 1.38              | 1.55           |
| 4    | <i>eIF-3A</i>          | <i>DNAJ</i>                          | <i>CYP19</i>         | <i>TUA2</i>    | <i>CYP19</i>   | <i>TBP2</i>    | <i>TUB3</i>       | <i>TEF2</i>    |
| SD   | 0.44                   | 0.83                                 | 1.11                 | 1.75           | 1.14           | 1.35           | 1.39              | 1.63           |
| 5    | <i>ACT2</i>            | <i>TUB3</i>                          | <i>TEF2</i>          | <i>HIS3</i>    | <i>DNAJ</i>    | <i>TEF2</i>    | <i>CYP19</i>      | <i>DNAJ</i>    |
| SD   | 0.45                   | 0.85                                 | 1.15                 | 1.80           | 1.16           | 1.36           | 1.45              | 1.66           |
| 6    | <i>PP2A</i>            | <i>CYP19</i>                         | <i>DNAJ</i>          | <i>TUB3</i>    | <i>TBP2</i>    | <i>TUA2</i>    | <i>U2AF</i>       | <i>HIS3</i>    |
| SD   | 0.45                   | 0.93                                 | 1.19                 | 1.88           | 1.19           | 1.38           | 1.45              | 1.67           |
| 7    | <i>TUA2</i>            | <i>ACT2</i>                          | <i>HIS3</i>          | <i>U2AF</i>    | <i>TUB3</i>    | <i>CYP19</i>   | <i>TBP2</i>       | <i>TUA2</i>    |
| SD   | 0.45                   | 0.94                                 | 1.25                 | 1.92           | 1.24           | 1.38           | 1.46              | 1.71           |
| 8    | <i>TEF2</i>            | <i>eIF-3C</i>                        | <i>GAPDH</i>         | <i>CYP19</i>   | <i>U2AF</i>    | <i>HIS3</i>    | <i>HIS3</i>       | <i>TUB3</i>    |
| SD   | 0.46                   | 0.94                                 | 1.29                 | 1.94           | 1.42           | 1.42           | 1.49              | 1.76           |
| 9    | <i>DNAJ</i>            | <i>GAPDH</i>                         | <i>eIF-3C</i>        | <i>TEF2</i>    | <i>HIS3</i>    | <i>U2AF</i>    | <i>TEF2</i>       | <i>ACT2</i>    |
| SD   | 0.49                   | 1.03                                 | 1.33                 | 1.94           | 1.43           | 1.43           | 1.55              | 1.83           |
| 10   | <i>eIF-3C</i>          | <i>TEF2</i>                          | <i>TUA2</i>          | <i>DNAJ</i>    | <i>TEF2</i>    | <i>TUB3</i>    | <i>TUA2</i>       | <i>U2AF</i>    |
| SD   | 0.49                   | 1.12                                 | 1.56                 | 2.05           | 1.51           | 1.60           | 1.62              | 1.86           |
| 11   | <i>TUB3</i>            | <i>TBP2</i>                          | <i>U2AF</i>          | <i>eIF-3A</i>  | <i>eIF-3A</i>  | <i>eIF-3C</i>  | <i>eIF-3C</i>     | <i>eIF-3C</i>  |
| SD   | 0.51                   | 1.18                                 | 1.81                 | 2.31           | 2.02           | 1.91           | 2.28              | 2.26           |
| 12   | <i>GAPDH</i>           | <i>eIF-3A</i>                        | <i>TUB3</i>          | <i>eIF-3C</i>  | <i>eIF-3C</i>  | <i>GAPDH</i>   | <i>eIF-3A</i>     | <i>eIF-3A</i>  |
| SD   | 0.61                   | 1.2                                  | 1.85                 | 2.84           | 2.11           | 2.29           | 2.62              | 2.55           |
| 13   | <i>U2AF</i>            | <i>U2AF</i>                          | <i>ACT2</i>          | <i>GAPDH</i>   | <i>GAPDH</i>   | <i>eIF-3A</i>  | <i>GAPDH</i>      | <i>GAPDH</i>   |
| SD   | 1.16                   | 1.46                                 | 3.52                 | 4.88           | 2.34           | 2.71           | 4.38              | 3.02           |

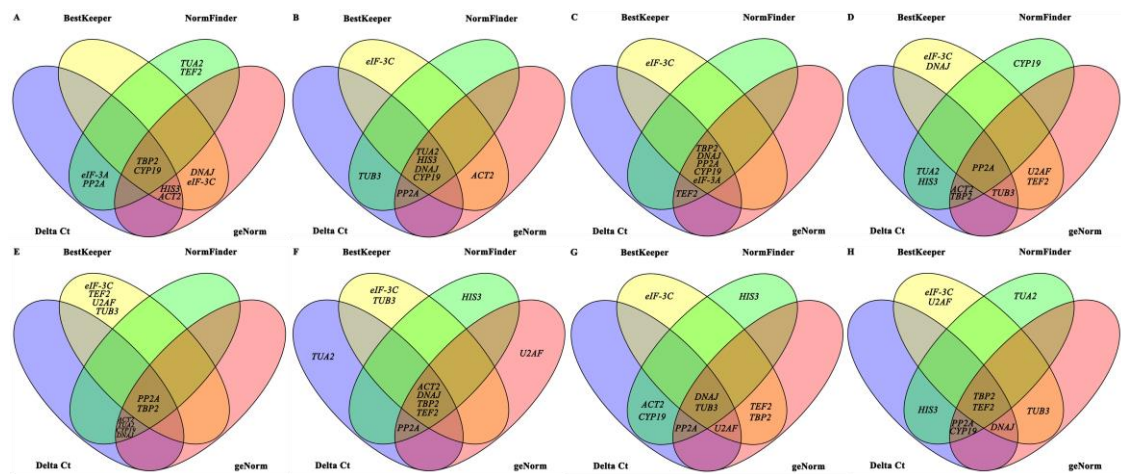


Figure S1

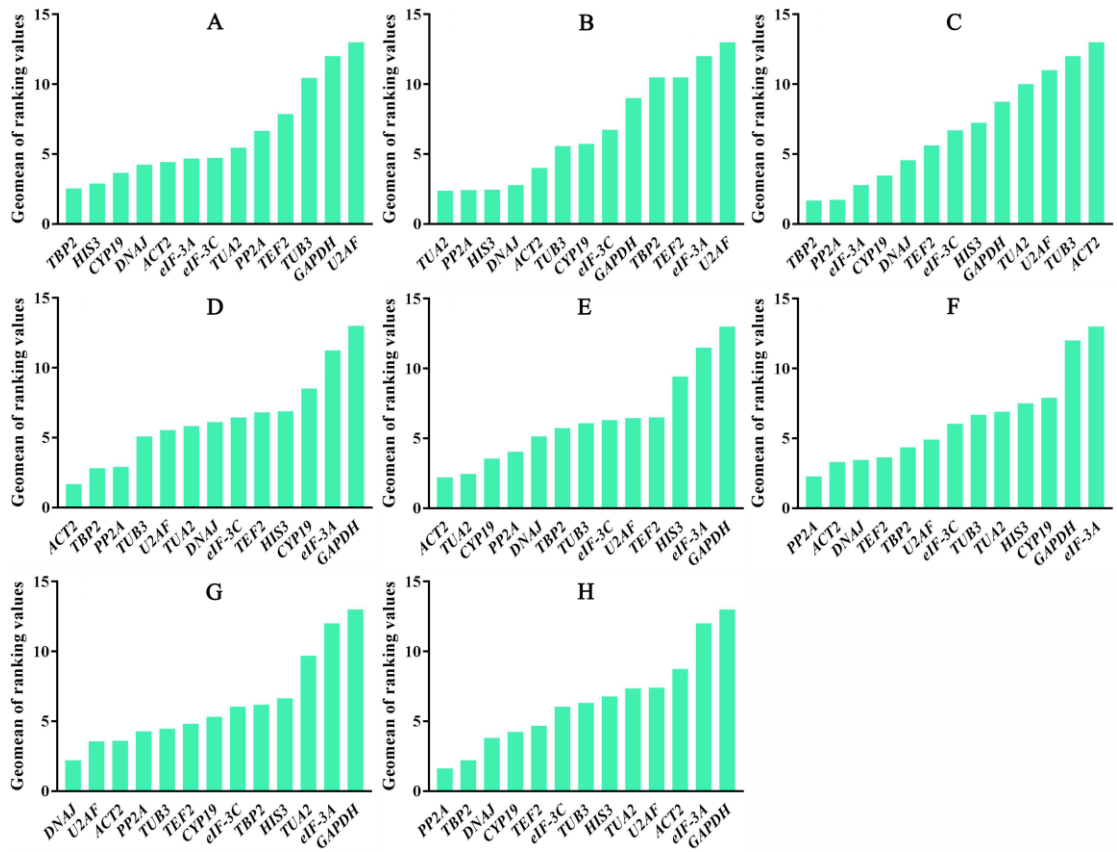


Figure S2