### SI Table. The diploid wheat accessions used in this study. The wild einkorn accessions, except for KU-10725, were used to generate the AABBA<sup>m</sup>A<sup>m</sup> synthetic hexaploid lines.

| Species                     | Accession number | Longitude     | Latitude      | Country   |
|-----------------------------|------------------|---------------|---------------|-----------|
| *Triticum monococcum*       | KU-101-2         | 33.60021263   | 44.50019923   | Ukraine   |
| ssp. aegilopoides           | KU-101-3         | 51.42305149   | 35.69611582   | Iran      |
|                             | KU-1501          | 44.51620226   | 40.18420457   | Armenia   |
|                             | KU-1507          | 44.72284657   | 40.11954847   | Armenia   |
|                             | KU-1516          | 44.72284657   | 40.11954847   | Armenia   |
|                             | KU-3620          | 32.85603022   | 39.94477358   | Turkey    |
|                             | KU-3630          | 19.84678983   | 39.79691512   | Greece    |
|                             | KU-3646          | 38.79299849   | 37.15120472   | Turkey    |
|                             | KU-8001          | 45.45028086   | 35.5551134    | Iraq      |
|                             | KU-8111*         | 44.64717134   | 36.08438954   | Iraq      |
|                             | KU-8116          | 44.64724517   | 36.08439408   | Iraq      |
|                             | KU-8120          | 44.6473035    | 36.08439867   | Iraq      |
|                             | KU-8122          | 44.64739401   | 36.08439501   | Iraq      |
|                             | KU-8125          | 44.35082629   | 36.40061086   | Iraq      |
|                             | KU-8136          | 44.35028295   | 36.40062703   | Iraq      |
|                             | KU-8139          | 44.35036366   | 36.40062703   | Iraq      |
|                             | KU-8143          | 44.35048243   | 36.40062703   | Iraq      |
|                             | KU-8162          | 44.54039534   | 36.65050752   | Iraq      |
|                             | KU-8186          | 44.35064338   | 36.40062703   | Iraq      |
|                             | KU-8201          | 44.35079709   | 36.40062703   | Iraq      |
|                             | KU-8223          | 41.73398655   | 36.61756221   | Syria     |
|                             | KU-8241          | 43.48892794   | 37.09297549   | Iraq      |
|                             | KU-8266          | 43.48866064   | 37.09324742   | Iraq      |
|                             | KU-8267*         | 42.68332093   | 37.1499768    | Iraq      |
|                             | KU-8269          | 42.68342374   | 37.15002361   | Iraq      |
|                             | KU-8276*         | 40.74409963   | 37.31315101   | Turkey    |
|                             | KU-8279          | 40.22573554   | 37.91612383   | Turkey    |
|                             | KU-8287          | 40.22605428   | 37.91612066   | Turkey    |
|                             | KU-8297          | 39.22299452   | 38.6756018    | Turkey    |
|                             | KU-8315          | 38.31520099   | 38.34750116   | Turkey    |
|                             | KU-8322          | 39.22269996   | 38.67560746   | Turkey    |
|                             | KU-8332          | 40.67609577   | 39.04110576   | Turkey    |
|                             | KU-8345          | 40.67637342   | 39.04130576   | Turkey    |
|                             | KU-8381          | 43.37325669   | 38.50122343   | Turkey    |
|                             | KU-8404          | 46.99492983   | 35.31871231   | Iran      |
|                             | KU-8405          | 46.99502177   | 35.31871004   | Iran      |
|                             | KU-8414          | 46.24696566   | 34.28032449   | Iran      |
|                             | KU-10603         | 32.32070473   | 40.07931297   | Turkey    |
|                             | KU-10653         | 41.00138477   | 38.14222317   | Turkey    |
|                             | KU-10725         | 32.85409987   | 39.92077215   | Turkey    |
|                             | KU-10830         | 38.30946155   | 38.3551938    | Turkey    |
|                             | KU-10859         | 36.93332881   | 37.58333508   | Turkey    |
|                             | PI427634         | 39.49985      | 37.717213     | Turkey    |
| *Triticum urartu*           | KU-199-16        | 36.16941521   | 34.02132731   | Lebanon   |

Asterisks indicate the HDW-showing ABA<sup>m</sup> hexaploid lines.