

Table S1. Geographical location, collection site of *P. brachystachys* suspected resistant populations

| Populations code | Geographical location | | | Collection Site |
|------------------|-----------------------|----------|----------------------|------------------|
| | County | Province | Coordinate point | |
| AL01 | Aliabad | Golestan | (54.42° N, 36.54°E)" | Wheat field |
| AL02 | Aliabad | Golestan | (54.42°N, 36.56°E)" | Wheat field |
| AL03 | Aliabad | Golestan | (54.43°N, 36.55°E)" | Wheat field |
| AL04 | Aliabad | Golestan | (54.44°N, 36.57°E)" | Wheat field |
| AL05 | Aliabad | Golestan | (54.46°N, 36.55°E)" | Wheat field |
| AL06 | Aliabad | Golestan | (54.48°N, 36.55°E)" | Wheat field |
| AL07 | Aliabad | Golestan | (54.50°N, 36.55°E)" | Wheat field |
| AL08 | Aliabad | Golestan | (54.52°N, 36.55°E)" | Wheat field |
| AL09 | Aliabad | Golestan | (54.48°N, 36.57°E)" | Wheat field |
| AL10 | Aliabad | Golestan | (54.52°N, 36.56°E)" | Wheat field |
| AL12 | Aliabad | Golestan | (54.52°N, 36.56°E)" | Wheat field |
| AL13 | Aliabad | Golestan | (54.53°N, 36.58°E)" | Wheat field |
| AL14 | Aliabad | Golestan | (54.48°N, 36.58°E)" | Wheat field |
| AL15 | Aliabad | Golestan | (54.51°N, 36.53°E)" | Wheat field |
| AL16 | Aliabad | Golestan | (54.50°N, 36.54°E)" | Wheat field |
| AL17 | Aliabad | Golestan | (54.48°N, 36.55°E)" | Wheat field |
| AL18 | Aliabad | Golestan | (54.45°N, 36.57°E)" | Wheat field |
| AL19 | Aliabad | Golestan | (54.49°N, 36.57°E)" | Wheat field |
| AL20 | Aliabad | Golestan | (54.44°N, 36.55°e)" | Wheat field |
| AL21 | Aliabad | Golestan | (54.43°N, 36.56°E)" | Wheat field |
| AL22 | Aliabad | Golestan | (54.44°N, 36.59°E)" | Wheat field |
| AL23 | Aliabad | Golestan | (54.49°N, 36.56°E)" | Wheat field |
| AL24 | Aliabad | Golestan | (54.44°N, 36.57°E)" | Wheat field |
| AL28 | Aliabad | Golestan | (54.48°N, 36.55°E)" | Wheat field |
| AL31 | Aliabad | Golestan | (54.45°N, 36.57°E)" | Wheat field |
| AL32 | Aliabad | Golestan | (54.52°N, 36.00°E)" | Wheat field |
| AL33 | Aliabad | Golestan | (54.47°N, 36.53°E)" | Wheat field |
| AL34 | Aliabad | Golestan | (54.51°N, 36.57°E)" | Wheat field |
| B02 | Bandar Torkman | Golestan | (54.08°N, 36.54°E)" | Wheat field |
| B03 | Bandar Torkman | Golestan | (54.08°N, 36.55°E)" | Wheat field |
| Kr14 | Kordkuy | Golestan | (54.06°N, 36.48°E)" | Wheat field |
| Kr15 | Kordkuy | Golestan | (54.07°N, 36.48°E)" | Wheat field |
| Kr16 | Kordkuy | Golestan | (54.07°N, 36.47°E)" | Wheat field |
| G04 | Gorgan | Golestan | (54.26°N, 36.53°E)" | Wheat field |
| Rm17 | Ramian | Golestan | (55.00°N, 37.04°E)" | Wheat field |
| Rm18 | Ramian | Golestan | (54.59°N, 37.06°E)" | Wheat field |
| S | Gorgan | Golestan | (54.25°N, 36.48°E)" | Uncultivate area |