# *Supplementary Material*

## Evaluation of Variation in Seedling Root Architectural Traits and Their Potential Association with Nitrogen Fixation and Agronomic Traits in Field Pea Accessions

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## Supplementary Figure

**Figure S1:** Images of root systems of selected pea lines belonging to the G1 group: E4, and E20 and for the G2 group: F5 and F9 at 4 days after transplantation**.**

## Supplementary Tables

**Table S1**: Field experiment information for G2 pea lines

| Locations | *Soil type | $^{\Psi}$Mean seasonal temperature (°C) $T_{MS}/T_{HS}$ (°C) | $^{\Psi}$Total seasonal rainfall (mm) $P_{MS}/P_{HS}$ (mm) | Previous crop | Seeding date |
|---|---|---|---|---|---|
| 2020 | | | | | |
| Rosthern | Orthic black Chernozem | 15.4/15.7 | 231.0/224.0 | Wheat | May 25, 2020 |
| Sutherland | Orthic dark brown Chernozem | 15.8/16.3 | 217.0/196.0 | Chem-fallow | May 19, 2020 |
| 2021 | | | | | |
| Rosthern | Orthic black Chernozem | 16.3/15.7 | 89.0/224.0 | Wheat | May 11, 2021 |
| Floral | Orthic dark brown Chernozem | 16.8/15.7 | 133.0/196.0 | Chem-fallow | May 13, 2021 |
| Field experimental design at all sites: RCBD, Number of replications: 2, Plot dimensions: 1m x 1m, Seeding density: 80m$^2$. | | | | | |

*Note:* Soil type* information extracted from SKSIS, Saskatchewan soil information system, https://app.sksis.ca/map, $^{\Psi}$ = Information extracted from Environment Canada website, https://weather.gc.ca/,

Abbreviations: $T_{MS}$/ $T_{HS}$ = Average temperature at a site-year during the growing season,/ average historic temperature at a site-year during the growing season, $P_{MS}$/ $P_{HS}$ = Cumulative precipitation at a site-year during the growing season/Total historic precipitation at a site-year during the crop season, RCBD: Randomized Complete Block Design.

**Table S2:** Average field trait data for pea lines in G1 and G2

| Entry | Height (cm) | LS | %Ndfa | Protein (%) | Yield (kg/ha) | Entry | Height (cm) | LS | %Ndfa | Protein (%) | Yield (kg/ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E1 | 70 | 4 | 60.0 | 24.0 | 2759 | F1 | 87 | 5 | 34.2 | 24.0 | 2588 |
| E2 | 74 | 4 | 62.9 | 24.9 | 2771 | F2 | 103 | 7 | 40.8 | 29.3 | 1389 |
| E3 | 75 | 3 | 63.8 | 24.1 | 2932 | F3 | 93 | 7 | 23.4 | 28.7 | 1463 |
| E5 | 74 | 5 | 58.9 | 23.4 | 2850 | F4 | 62 | 7 | 33.5 | 25.6 | 1665 |
| E6 | 67 | 4 | 57.4 | 23.8 | 2794 | F5 | 67 | 8 | 36.4 | 26.3 | 1168 |
| E7 | 76 | 4 | 66.6 | 25.4 | 2789 | F6 | 78 | 6 | 29.5 | 26.5 | 2107 |
| E8 | 67 | 5 | 59.1 | 24.8 | 2535 | F7 | 76 | 6 | 19.5 | 24.7 | 968 |
| E9 | 76 | 5 | 67.8 | 24.7 | 2857 | F8 | 64 | 6 | 30.0 | 26.7 | 1918 |
| E10 | 71 | 5 | 65.1 | 26.4 | 2783 | F9 | 44 | 8 | 41.7 | 28.6 | 1338 |
| E11 | 68 | 5 | 58.5 | 24.4 | 2830 | F10 | 67 | 6 | 26.1 | 26.1 | 2397 |
| E12 | 74 | 5 | 62.6 | 24.8 | 3015 | F11 | 67 | 5 | 25.0 | 25.9 | 2195 |
| E13 | 74 | 4 | 63.8 | 25.5 | 2844 | F12 | 73 | 5 | 27.2 | 26.2 | 2357 |
| E14 | 73 | 5 | 64.3 | 24.0 | 2772 | F13 | 53 | 7 | 24.6 | 26.8 | 2095 |
| E15 | 74 | 4 | 61.9 | 23.9 | 2612 | F14 | 106 | 8 | 29.0 | 26.3 | 2085 |
| E16 | 74 | 4 | 66.0 | 25.4 | 2727 | F15 | 81 | 8 | 33.9 | 26.2 | 1955 |
| E17 | 59 | 6 | 65.3 | 25.1 | 2705 | F16 | 58 | 7 | 28.4 | 26.1 | 1672 |
| E18 | 72 | 5 | 60.9 | 25.2 | 2887 | F17 | 62 | 6 | 20.3 | 26.3 | 2084 |
| E19 | 74 | 4 | 64.8 | 24.6 | 2880 | F18 | 67 | 5 | 28.7 | 26.1 | 1864 |
| E20 | 72 | 6 | 56.3 | 23.6 | 2751 | | | | | | |
| E21 | 67 | 5 | 60.7 | 23.8 | 2763 | | | | | | |
| E22 | 72 | 4 | 57.7 | 23.8 | 2789 | | | | | | |
| E23 | 76 | 4 | 61.9 | 25.0 | 2885 | | | | | | |
| E24 | 70 | 5 | 56.1 | 24.4 | 2718 | | | | | | |

Abbreviations: LS: lodging score (1-9, where one means completely upright and 9 means completely horizontal); %Ndfa = % nitrogen derived from air.

**Table S3:** List of 18 pea lines in G2 with country of origin.

| Entry | Name | Origin |
|---|---|---|
| F1 | NDP080111 | USA |
| F2 | Melrose | USA |
| F3 | Moravsky Hrotoick Krajova | Czech Republic |
| F4 | Stupicka jarni | Czech Republic |
| F5 | Kapucin | Czech Republic |
| F6 | KASPA | Australia |
| F7 | PBA OURA | Australia |
| F8 | Kahuna NIAB | UK |
| F9 | Cameor | France |
| F10 | CDC Bronco | Canada |
| F11 | CDC Golden | Canada |
| F12 | CDC Striker | Canada |
| F13 | Terese | France |
| F14 | Naparnyk | Ukraine |
| F15 | Trapper | Canada |
| F16 | Radley | UK |
| F17 | CDC Vienna | Canada |
| F18 | Hardy | France |