Figures

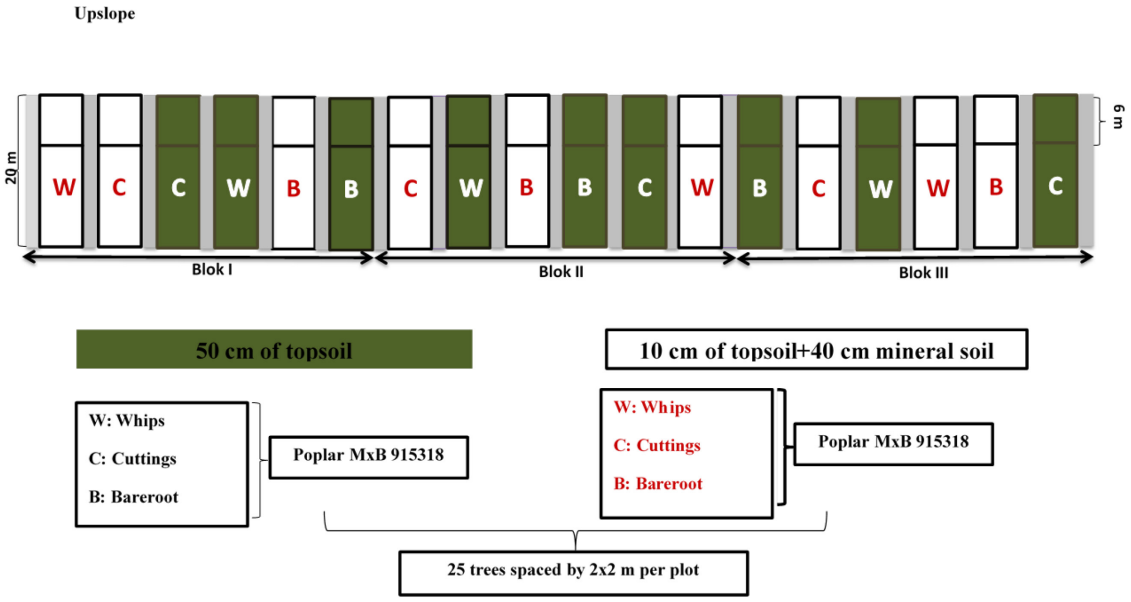


Figure 1: Plantation and experimental design.

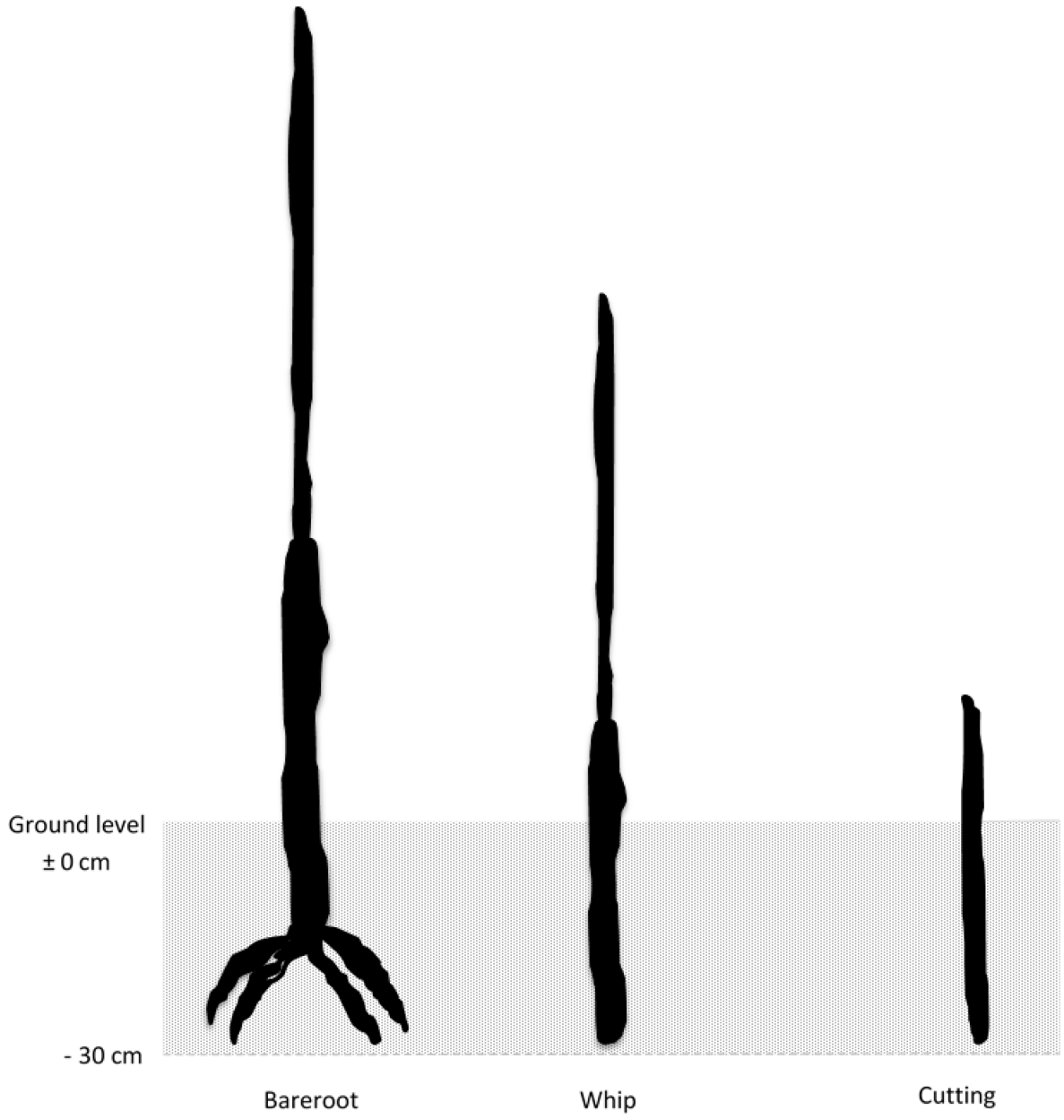


Figure 2: Illustration of the three planting material types.

Figure 3: Trenches made with a mechanical shovel to determine the maximum rooting depth.

$$\textbf{Stability index 1}(I_1) = \frac{\sum_0^n (x_n\, d_n)}{\sum_0^n d_n}$$

$$= \frac{\sum_0^n (L\, d_n \sin A_n)}{\sum_0^n d}$$

$$\textbf{Stability index 2 } (I_2) = \sum_0^n (x_n d_n)\left(\frac{P}{\text{soil depth}}\right)$$

$$= \sum_0^n (L\, d_n \sin A_n)\left(\frac{P}{\text{soil depth}}\right)$$

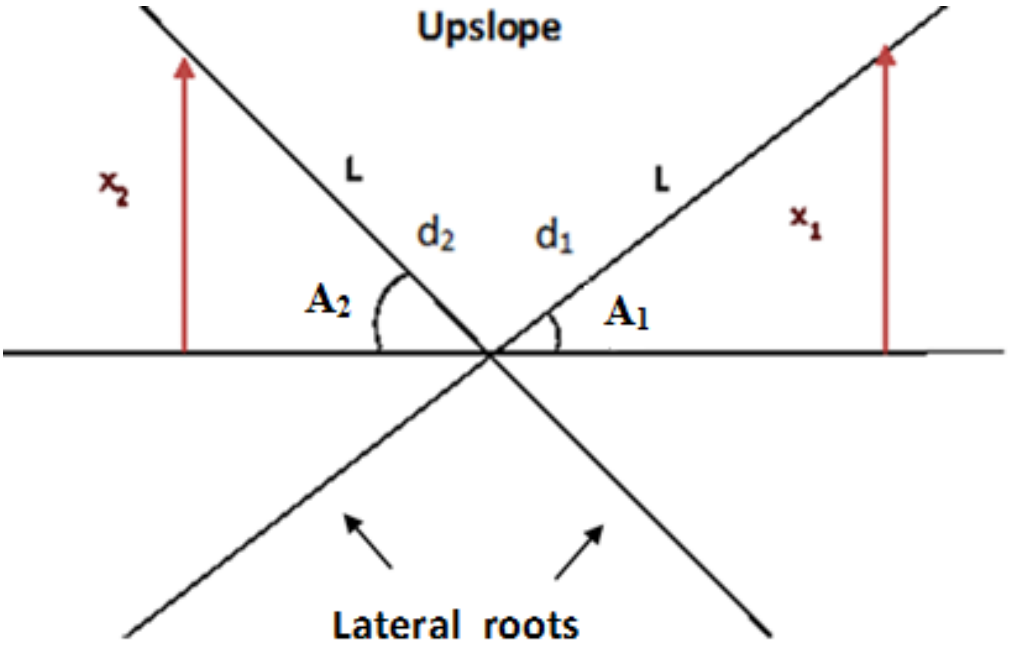
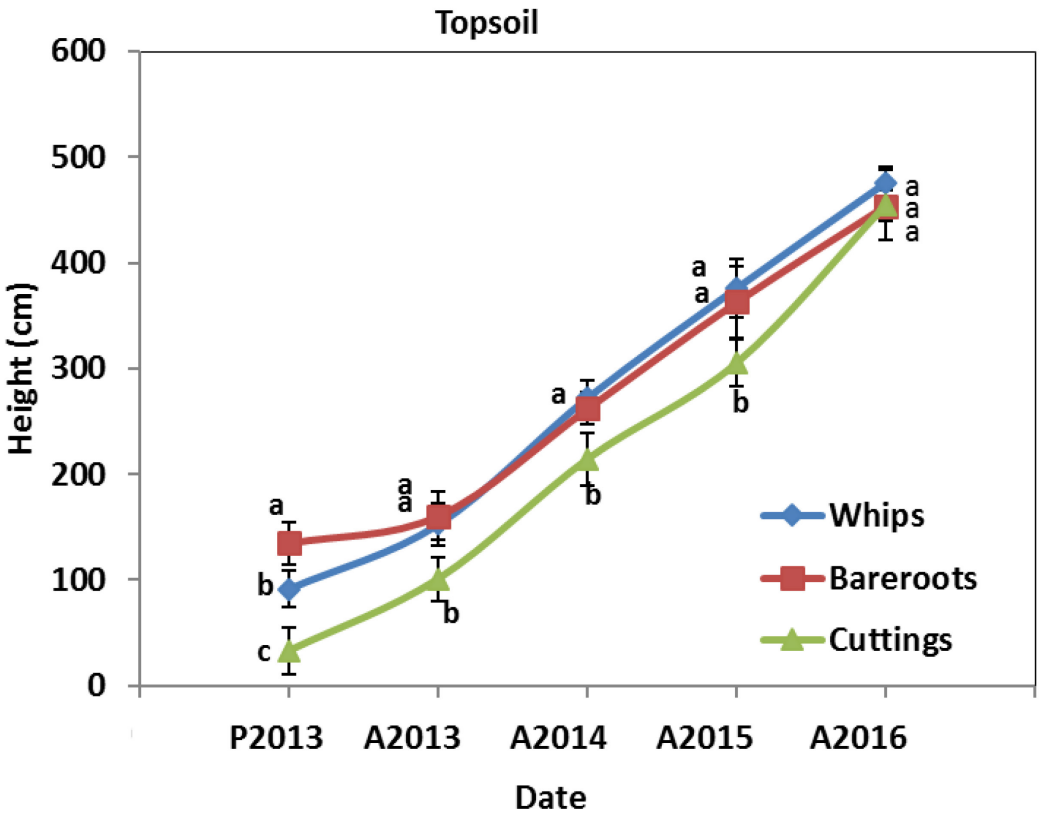


Figure 4: Equations used to calculate the root anchorage indexes, A_n: angle between the main lateral roots of the upslope side and the line separating upper and lower slope, d_n: diameter of the corresponding structural roots (cm), L: length of the root, P: maximum rooting depth (cm).


Topsoil
600
500
400
300
200
100
0
Height (cm)
P2013
A2013
A2014
A2015
A2016
Date
Whips
Bareroots
Cuttings
a
b
c
a
a
b
a
b
a
a
b
a
a
a

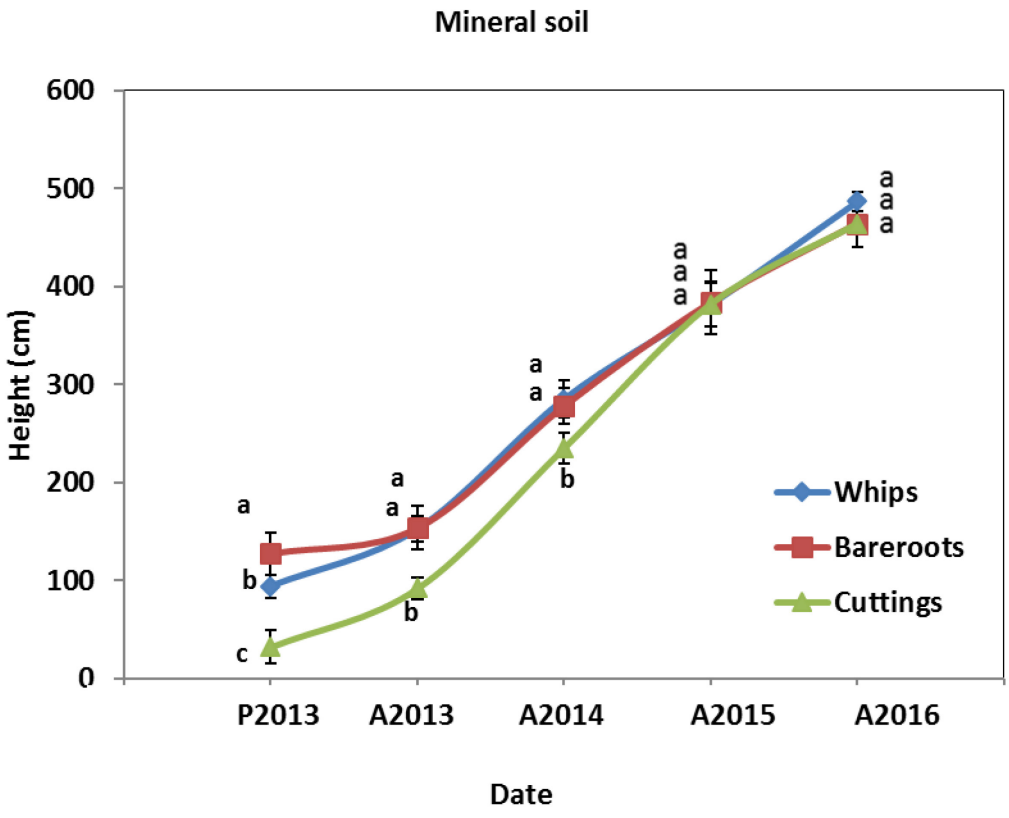


Figure 5: Maximum height (cm) of whips, cuttings, and bareroots on topsoil and mineral soil at planting (spring 2013) and at the end of each growing season from 2013 to 2016. P: Spring; A: autumn. Mean ± SE, N=75. Mean values that differed significantly at $P < 0.05$ are marked with different letters at each date, a> b.

Figure 6: Picture showing herringbone root system of hybrid poplar planted on waste rock slopes

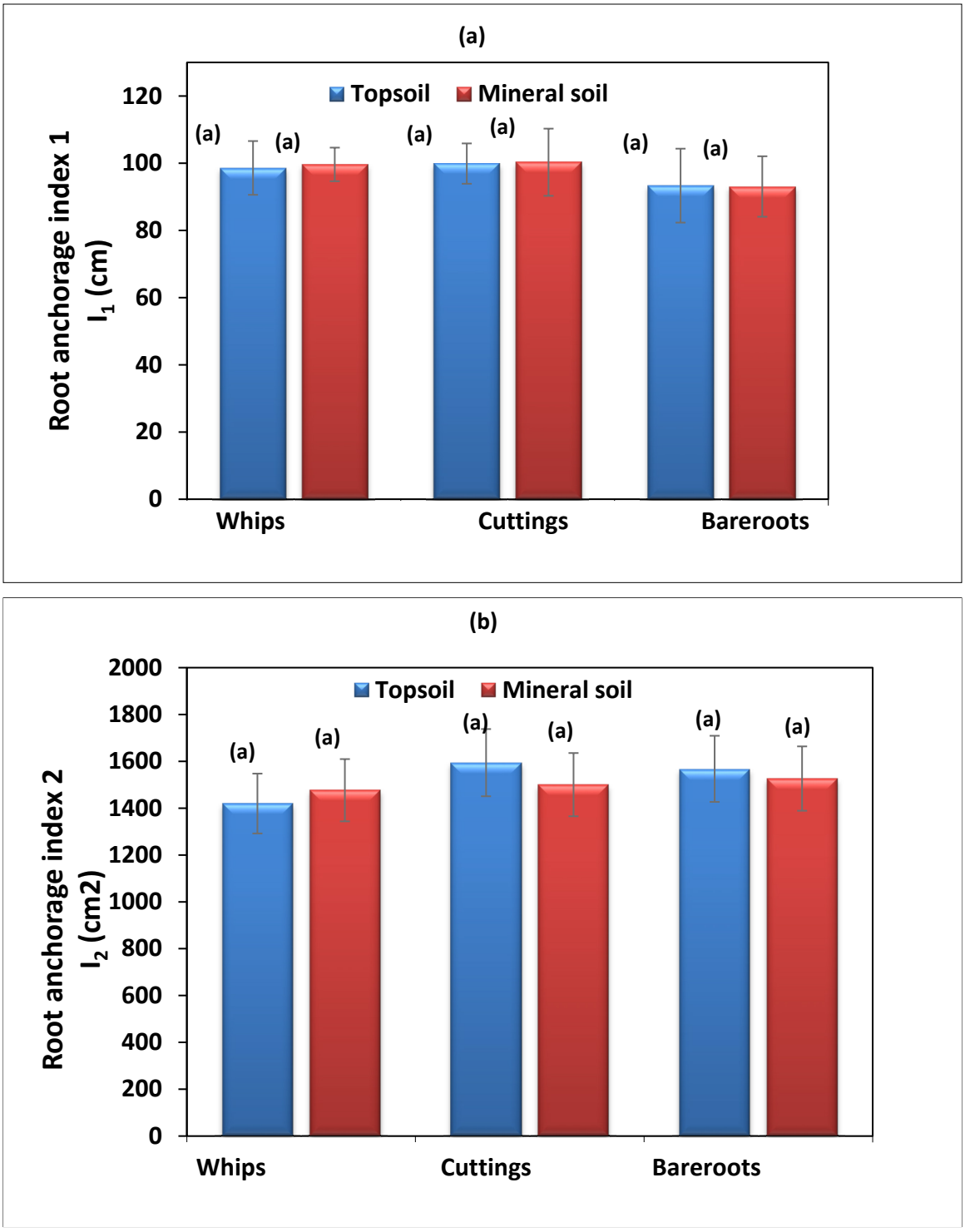


Figure7: Comparison of root anchorage indexes I1(a) and I2 (b) for the three types of planting material (whips, cuttings, and bareroots) on topsoil and mineral soil, after four growing seasons (2016). Mean ± SE, N =3. Mean values that differed significantly at $P < 0.05$ are marked with different letters, a> b.

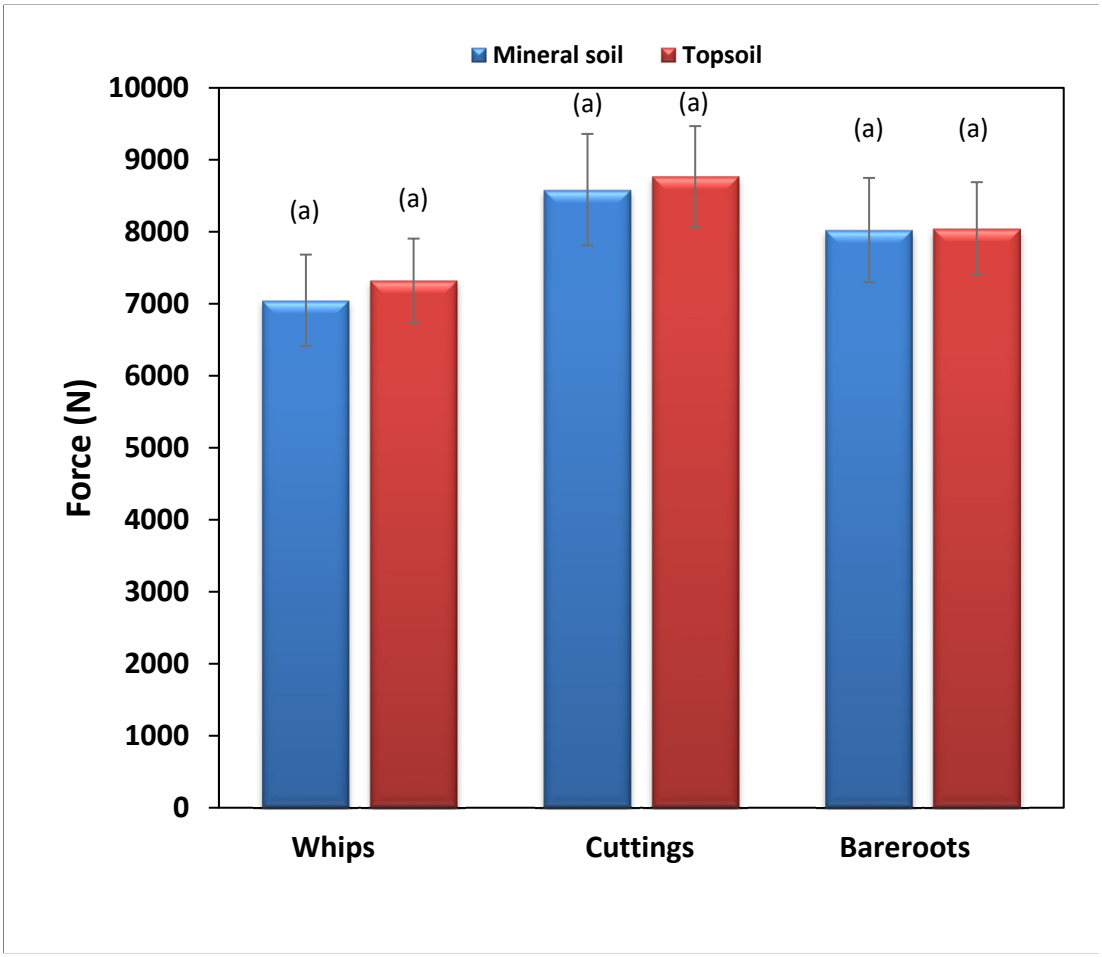


Figure8: Comparison of the maximum resistance force for the three types of planting material (whips, cuttings, and bareroots) on topsoil and mineral soil, after four growing seasons (2016). Mean ± SE, N =3. Mean values that differed significantly at $P < 0.05$ are marked with different letters, a> b.

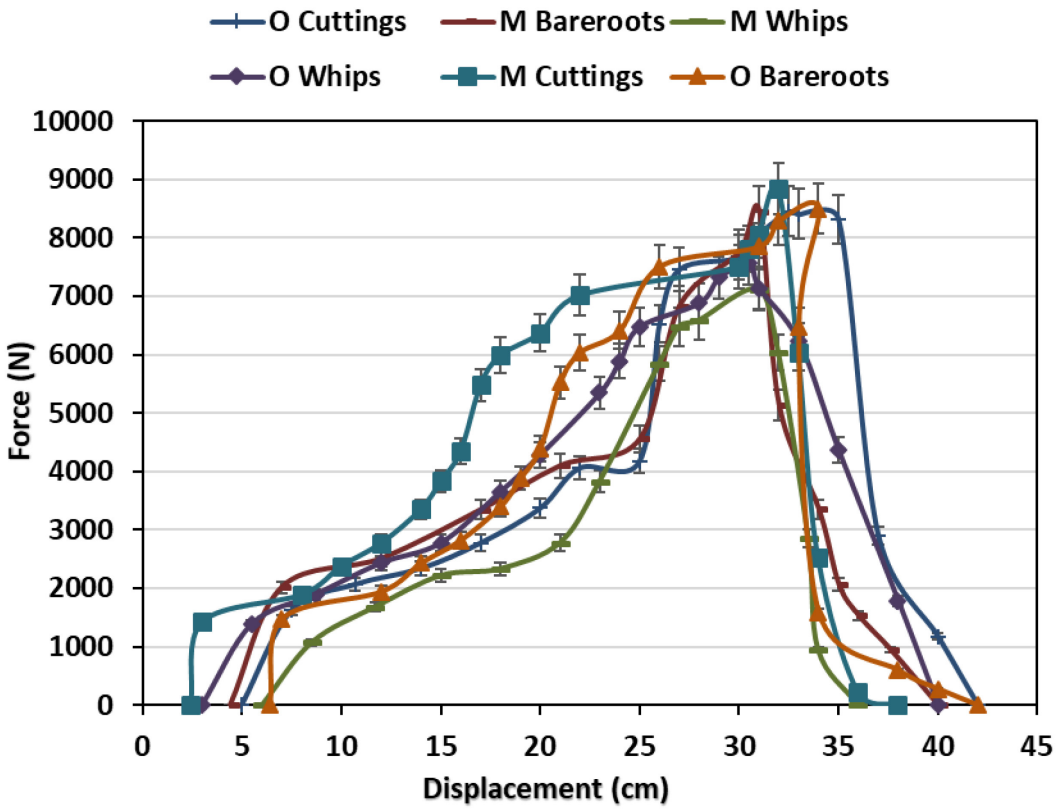


Figure9: Effect of treatments (Topsoil: whips, cuttings, and bareroots; Mineral soil: whips, cuttings, and bareroots) on the uprooting force according to displacement after four growing seasons (2016). N = 3.