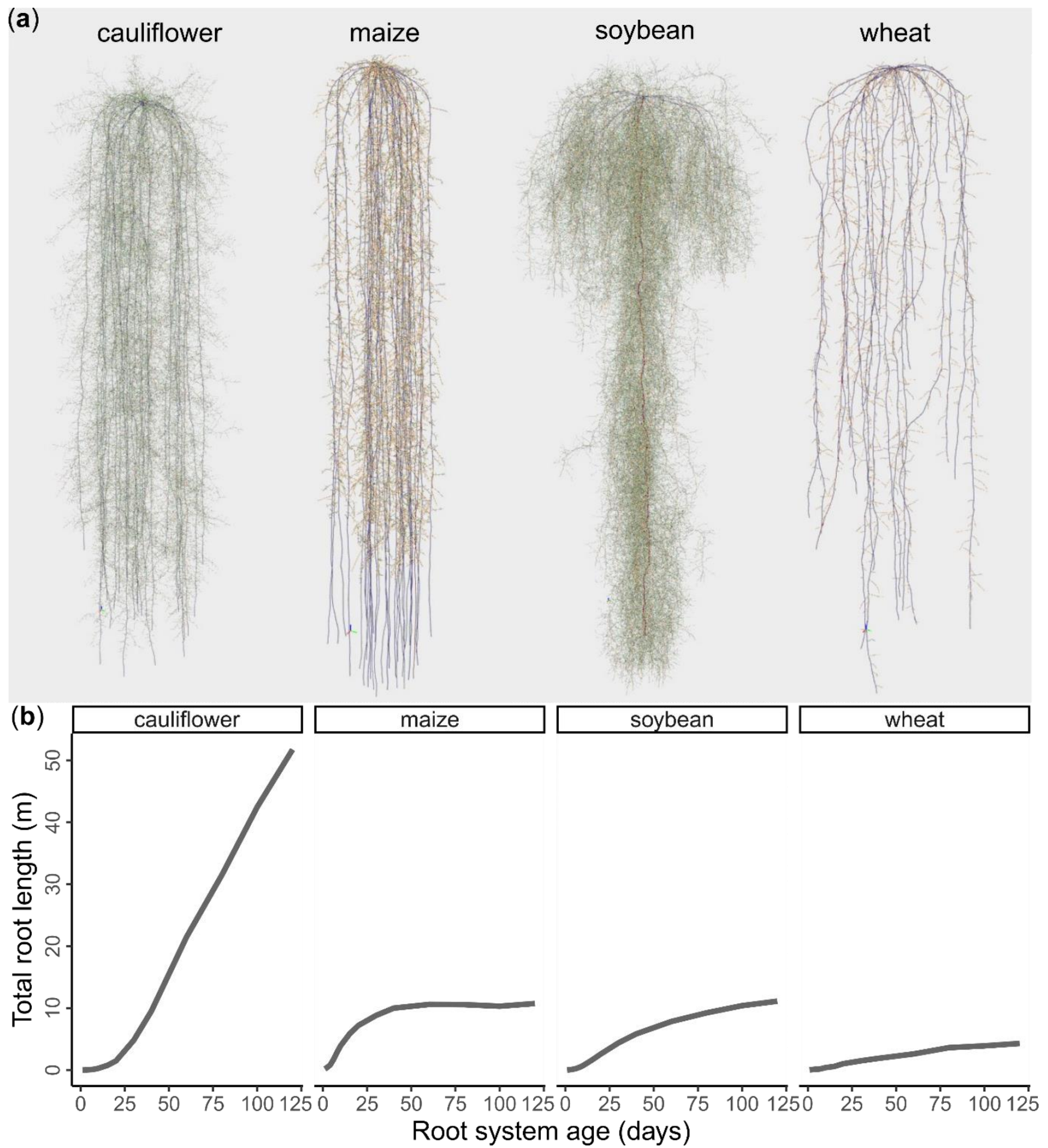


**Figure S1: Spatial gradients in root hydraulic properties.** Spatial variation in radial conductivity ( $k_r$ ) (a) and axial conductance ( $k_x$ ) (b) alongside roots (from tip to base), for different root types in monocot (green) and dicot (yellow) herbaceous species. The data corresponds to published studies on segment-scale root hydraulic properties (Ahmed *et al.* 2018; Bramley *et al.* 2007; Bramley *et al.* 2009; Doussan *et al.* 1998; Doussan *et al.* 2006; Frensch & Steudle, 1989; Huang & Steudle, 1992; Knipfer & Fricke, 2011; Meunier *et al.* 2018; Nobel *et al.* 1993; Ranathunge *et al.* 2017). The different line types indicate different references.



**Figure S2: Root architecture and root size of different crops.** Root architecture at day 120 (a) and total root length development during a 120-day period (b) for four different crop species: cauliflower (dicot herbaceous crop), maize (C<sub>4</sub> grass), soybean (legume crop) and wheat (C<sub>3</sub> grass). Root architecture development was simulated with CPlantBox (Schepf *et al.* 2018), based on available XML-files from the literature (Leitner *et al.* 2010; Moraes *et al.* 2021; Morandage *et al.* 2021; Vansteenkiste *et al.* 2014).

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