Evaluation of root growth response of salinity tolerant soybean under hydroponic salinity conditions

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Introduction

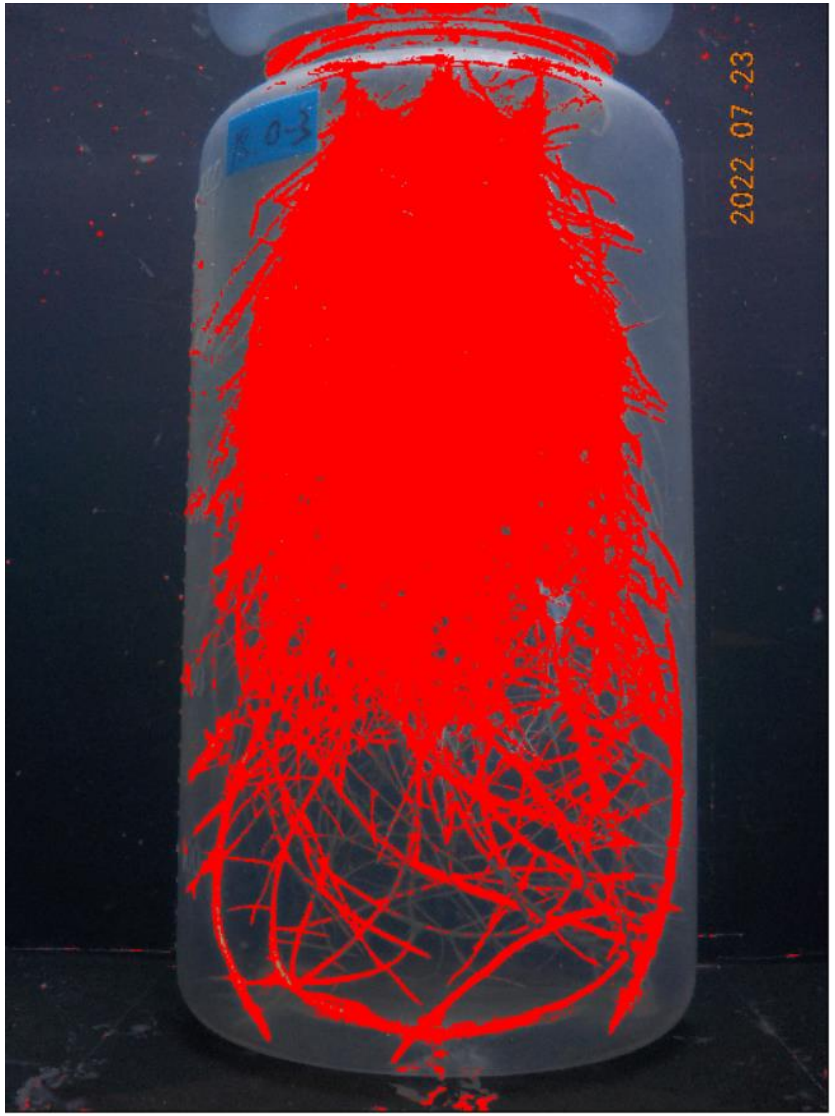
- 1. The self-sufficiency rate of soybeans in Japan is very low, and with the aging population, the number of agricultural workers in Japan is gradually decreasing, raising concerns about the future of soybean production.
- 2. Globally, the impact of salinity is becoming increasingly severe due to climate change.
- 3. For soybeans, the most critical part facing salt stress is the root, but research on the root is limited due to the difficulty of observing roots in the soil.
- To better address salinity issues, we utilize hydroponic cultivation to observe the growth of soybean roots under different salt concentrations. Using image processing methods, we collect root data with the aim of studying the impact of the salt-tolerant gene *Ncl* on soybean root growth.

Materials and methods

- Materials： NILs18-S/NILs18-T、NILs25-S/NILs25-T、NILs72-S/NILs72-T.
- Saline treatments： 0; 10; 20 … 90mmol/ L . Harvest at 30 days after transplanted.

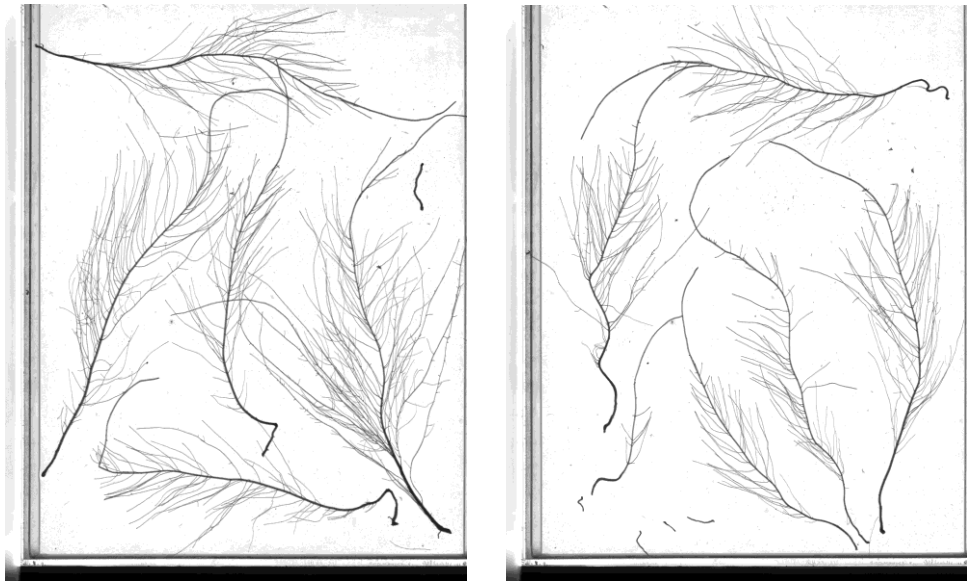
Measurement

- Dry weight
- Root volume
- Root length
- Lateral root number
- Root surfaces area
- Root cross-section
- Xylem sap

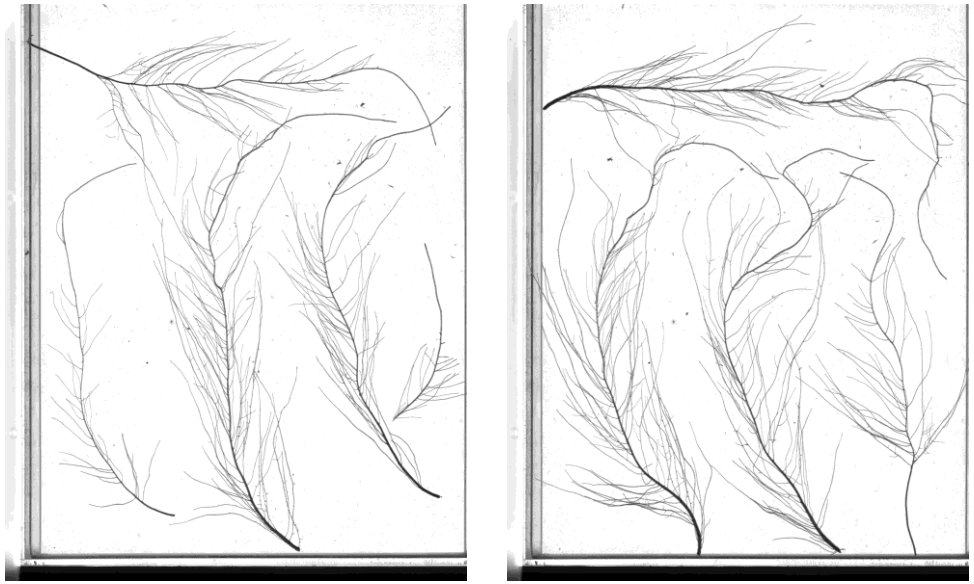


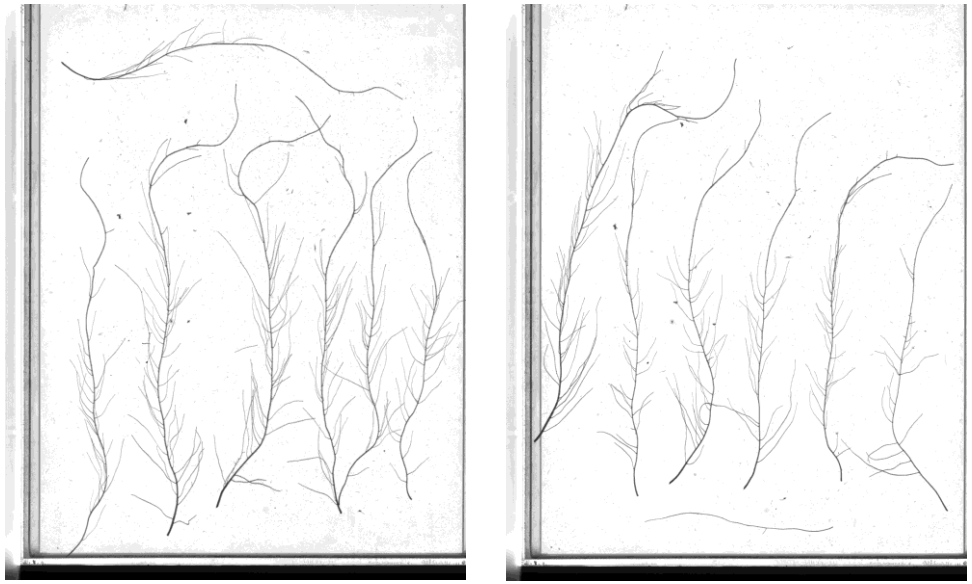
- Analyzing root growth through image processing allows for data collection at various stages.

0-2cm on taproot

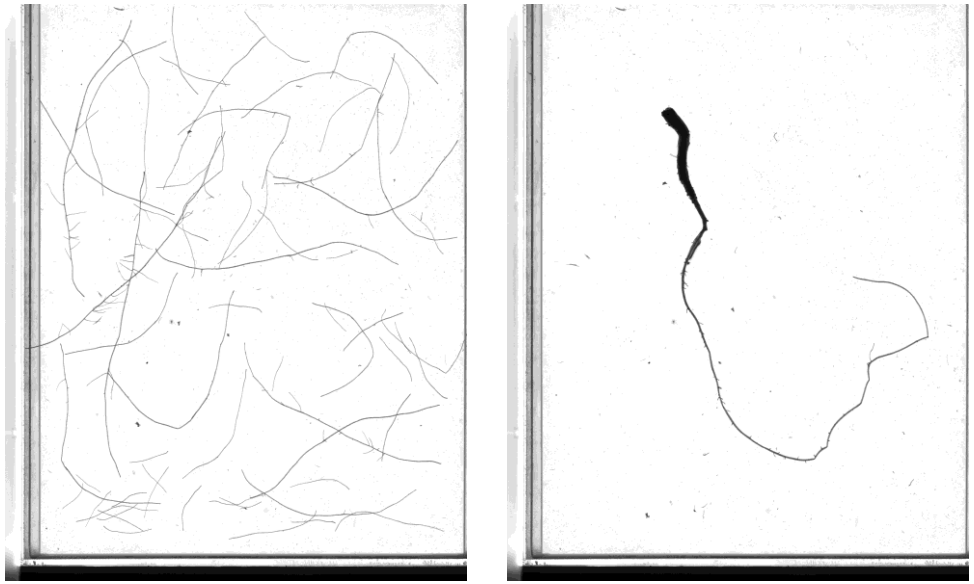


2-4cm



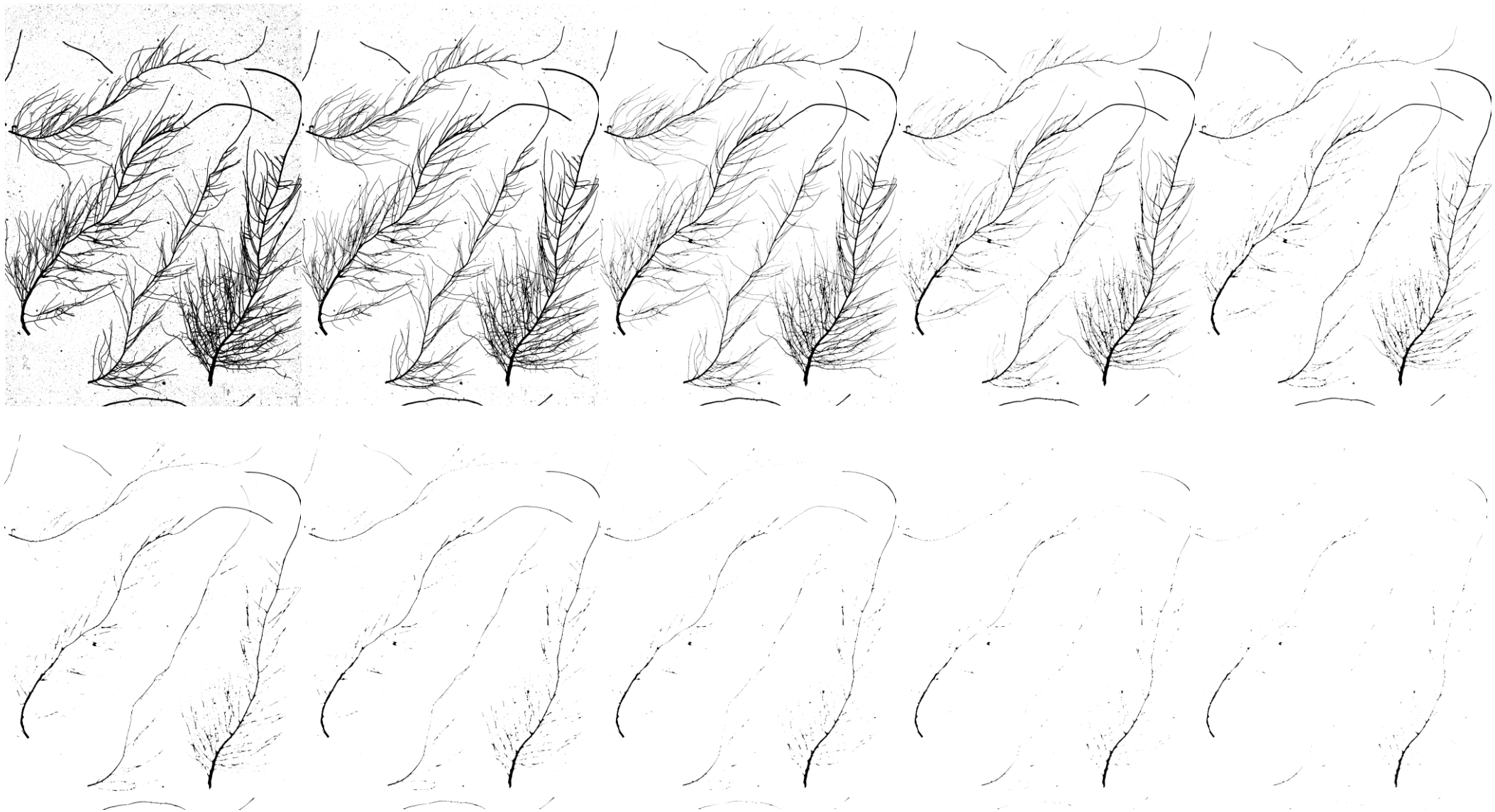


4-6cm



The rest part and taproot

- After harvesting, scan each part of the root.



- Using scanned images can calculate the root length.

Prospect

- The image processing method utilizing hydroponics to observe plant roots allows for obtaining comprehensive and effective root information at various growth stages.
- This method can be applied to other crops in different regions and can be used to study root growth under various stress conditions.
- If you are interested in my research, please feel free to contact me.

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