Growth and Performance of *Taraxacum kok-saghyz* (Rodin) in Different Soil Types

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**ABSTRACT**

*Taraxacum kok-saghyz* (Rodin) (TK) is a natural rubber-producing root crop. These low-growing plants were grown and harvested for their high-quality rubber in the United States during WWII when the natural rubber supply, grown from the rubber tree (*Hevea brasiliensis* Müll. Arg.) in Southeast Asia, was interrupted. There is little known about optimum TK field growing conditions in Ohio. Studying which soil types TK plants prefer will inform our efforts to domesticate this crop for Ohio farmers and bring more jobs to the state. Using a randomized complete block design, TK was seeded into tree pots filled with one of three different Ohio soil types and the common greenhouse peat-based media, Pro-mix™. Plants were grown in the greenhouse for three months and then transferred outside, still in their pots, for six more months. The plants were hypothesized to grow larger in field soil than in Pro-mix, and they would also produce more rubber. As predicted, the plants grown in field soil were significantly larger than those grown in Pro-mix. Projected rubber yield (rubber concentration x dry root weight) showed that all soil grown plants had significantly greater rubber yields than Pro-mix grown plants. Although this study was performed in pots, it should inform future field trials.

**MATERIALS AND METHODS**

Soil was dug from three Ohio locations (OSU Western (W, silt loam), Moomaw Farms (M, silt loam-flood plain), and Horticulture Research Unit 1 (H, silty/clay loam). Forty tree pots of each soil type (W,M,H) were filled and two from each type, including a set of pots filled with greenhouse media Pro-mix (P), were placed into each of 20 crates using a fully randomized block design. The top 1cm of soil was loosened in each tree pot and multiple seeds from an improved population were sown in each. Pots were thinned to one plant per pot after 4 weeks. After 3 months in the greenhouse all plants (in pots) were transferred outside to better simulate field conditions. Nine month old plants were harvested, photographs (Fig. 2) and phenotypic data (plant weight, root weight, leaf and root morphologies) were taken. Roots were dried, at 50o C, then ground into a fine powder using an IKA A10 grinder. Rubber concentration was determined by a Near Infrared Spectrometer (NIR), using a validated quantification model.

**RESULTS AND DISCUSSION**

As predicted, the TK plants grown in field soils were significantly larger than those grown in soilless greenhouse media (P) (Fig. 3). TK plants in each soil varied in size as expected from a heterozygous population. In general, TK plants in soil W were larger and had larger roots, followed by plants in soils M and H (Figs. 2 and 3). The shoot:root ratios were not significantly affected by soil type (data not shown). However, when the relationship of root size and rubber concentration on overall rubber yield was examined (Fig. 4), it became clear that the highest yields were attained in the largest roots with intermediate to high rubber contents.

**CONCLUSIONS**

- Field soil proved to be better growth media than soilless medium, which requires frequent fertigation to support good growth and plant health.
- Silty loam field soil appeared to be a slightly better soil type for TK than silty clay.
- Soil type should be considered during site selection for field trials.

**REFERENCES**


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