

Herbicide Evaluation for Weed Control in *Taraxacum kok-saghyz*

Ben Robinson and John Cardina
Department of Horticulture and Crop Science

ABSTRACT

Without adequate weed control, large-scale production of *Taraxacum kok-saghyz* (TK) as a rubber crop will be impossible. We are developing methods for weed control in TK, focusing on the use of conventional herbicides that exhibit the highest level of safety to the TK crop, while suppressing the most common weeds in this region. Only a few promising candidate herbicides have been identified. Among preemergence herbicides, pendimethalin (Prowl H20 formulation) and sulfentrazone cause the least injury. For postemergence applications, thifensulfuron, carfentrazone, and imazamox appear to be safest, but they control only a limited number of species. All postemergence grass herbicides are safe, but no herbicides that control species closely related to dandelion have adequate selectivity.

INTRODUCTION

The *Taraxacum kok-saghyz* (TK) crop will fail unless weeds are controlled effectively. Managing weeds in TK is difficult because:

- TK establishes slowly whereas weeds establish quickly;
- TK leaves lie on or very close to the soil surface and will not shade out weedy species;
- The soil is full of seeds of many weeds, including common dandelion, which are more effective competitors;
- TK and common dandelion are closely related and will respond the same way to any herbicide;
- Other weeds in the dandelion family will respond like TK to most herbicides;
- Most pre-emergence herbicides kill or injure dandelion species; so do most post-emergence broadleaf herbicides;
- TK seedlings will not survive cultivation until at least the 6-leaf stage, by which time weeds will overwhelm the TK crop.

OBJECTIVE

The specific objective of this research is:

To identify preemergence and postemergence herbicides that cause minimal injury to TK when applied at rates high enough to control important weeds.

METHODS

All new herbicides or formulations not labeled for dandelion control are tested. This criterion eliminates many classes of herbicides. Initial screening is done using a track sprayer to achieve accurate dosing. Plants are grown in commercial potting mix and/or field soil in plastic pots. Variables included in early tests include herbicide type, formulation, rate, time of application relative to planting, seed burial depth, seed coating, and adjuvants for postemergence applications. Promising herbicides are evaluated in field experiments with interacting variables such as rate x time, formulation x seed treatment, for example. We use standard field rates to assure adequate weed control; therefore, most of our focus is on injury to the TK plant.



Example rating scale used to evaluate TK growth stage.

RESULTS

Where weeds were not adequately controlled, TK either did not persist or growth of surviving plants was severely suppressed. Preemergence herbicides varied greatly in safety to TK, and only lowest labeled field rates were acceptable. Several postemergence herbicides have potential for use on TK, but all caused injury when applied at labeled rates.



Field plot with no weed control.



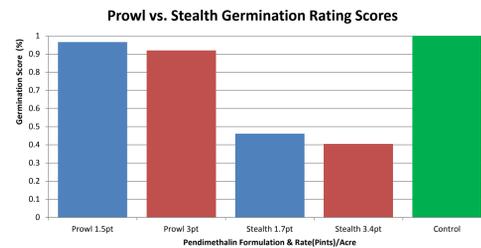
Field plot with weeds controlled.



TK from weedy plot.

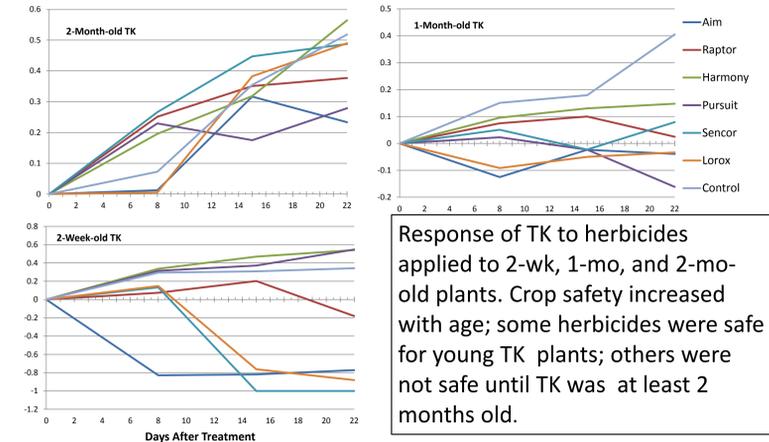


TK from plot with weeds controlled.



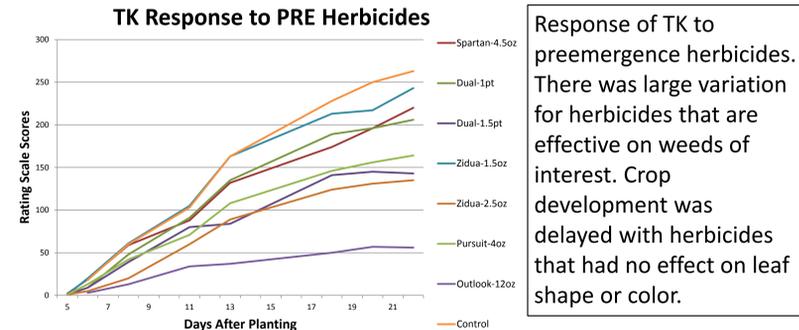
Effect of different formulations of pendimethalin on TK germination rate. Results show higher injury from the "Stealth" formulation.

Herbicide injury depends on growth stage at application.



Response of TK to herbicides applied to 2-wk, 1-mo, and 2-mo-old plants. Crop safety increased with age; some herbicides were safe for young TK plants; others were not safe until TK was at least 2 months old.

Preemergence herbicides without visible injury symptoms often slow development of TK seedlings, especially when applied at higher rates.



Response of TK to preemergence herbicides. There was large variation for herbicides that are effective on weeds of interest. Crop development was delayed with herbicides that had no effect on leaf shape or color.

PRELIMINARY RECOMMENDATIONS

| Herbicides Showing Promise for Control of Annual Weeds in TKS. | | | | |
|--|---------------------------------|-----------|-----------------------|------------------------|
| Application Time | Herbicide Trade Name | Rate/Acre | Main Weeds Controlled | |
| | | | Grasses | Broadleaves |
| PRE | Prowl H2O 3.8 pendimethalin | 3 pt. | annals | lambsquarters pigweeds |
| PRE | Spartan 4F sulfentrazone | 4.5 oz. | annuals | marestail nightshade |
| PRE/POST | Pursuit 2 S imazethapyr | 4 oz. | foxtails j-grass | pigweeds ragweed |
| POST | Harmony SG 50 DF thifensulfuron | 0.25 oz. | | lambsquarters pigweeds |
| POST | Aim 2 EC carfentrazone | 0.8 oz. | | velvetleaf pigweeds |
| POST | Raptor 1 AS imazamox | 4-5 oz. | annuals | lambsquarters pigweeds |

ACKNOWLEDGEMENTS

Funding was provided by the PENRA Consortium, Ohio Third Frontier, OARDC, and federal Hatch funds.