

Development of Relevant Ecological Screening Criteria (RESC) for Petroleum Hydrocarbon-Contaminated Exploration and Production Sites – Annual Report

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Title: Development of Relevant Ecological Screening Criteria (RESC) for Petroleum Hydrocarbon-Contaminated Exploration and Production Sites – Annual Report

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Project Amount: \$117,463

Research Category: Ecorisk Assessment

Description:

Progress Report (Apr-Jun 2001)

The major accomplishments of this quarter were:

- a. Completion of plant toxicity tests with hydrocarbon-contaminated site soils
- b. Completion of solid-phase microextraction analysis of hydrocarbon-contaminated soils

The bioassays with *Schizachyrium scoparium* (Little Bluestem), *Andropogon gerardii* (Big Bluestem), *Lactuca sativa* and *Brassica rapa* have been completed. A significant treatment effect ($p < 0.001$) on *Brassica rapa* above ground biomass and stem height (at day 14) were observed (Figure 1,2). Rather than a toxic effect, there was an increase in above ground biomass and stem height (at day 14), suggestive of hormesis. No other significant effects of soil type were observed on lettuce biomass or plant height (Figures 1, 3). Insufficient germination of Big Bluestem or Little Bluestem biomass precluded the use of these species in assessment of the soils.

Solid-phase microextraction (SPME) analysis of the bioavailable petroleum hydrocarbon in the soils has been conducted and data is currently being analyzed. Nitrification assays of the soils are also being completed.

Plans for the current quarter include the development and application of the derivation process for Relevant Ecological Screening Criteria to the available data to derive a RESC for hydrocarbons in prairie soil.

Supplemental Keywords: hydrocarbon, soil, soil invertebrates, plants, soil screening levels, bioavailability, exposure assessment, toxicity tests

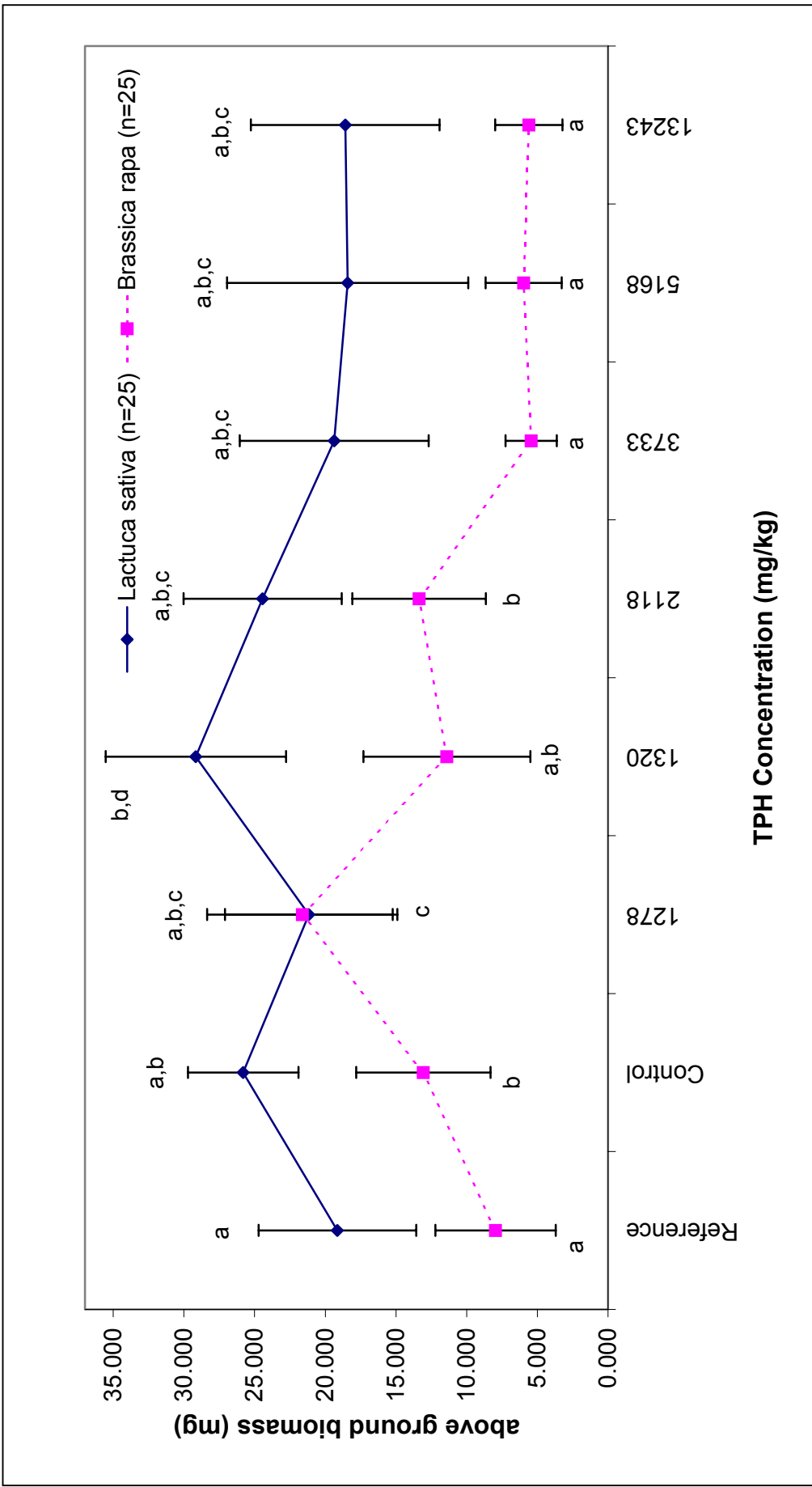


Figure 1. Lettuce (*Lactuca sativa*) and mustard (*Brassica rapa*) above ground dry-weight biomass (mean \pm SD). Means with a common letter are not significantly different ($p > 0.05$).

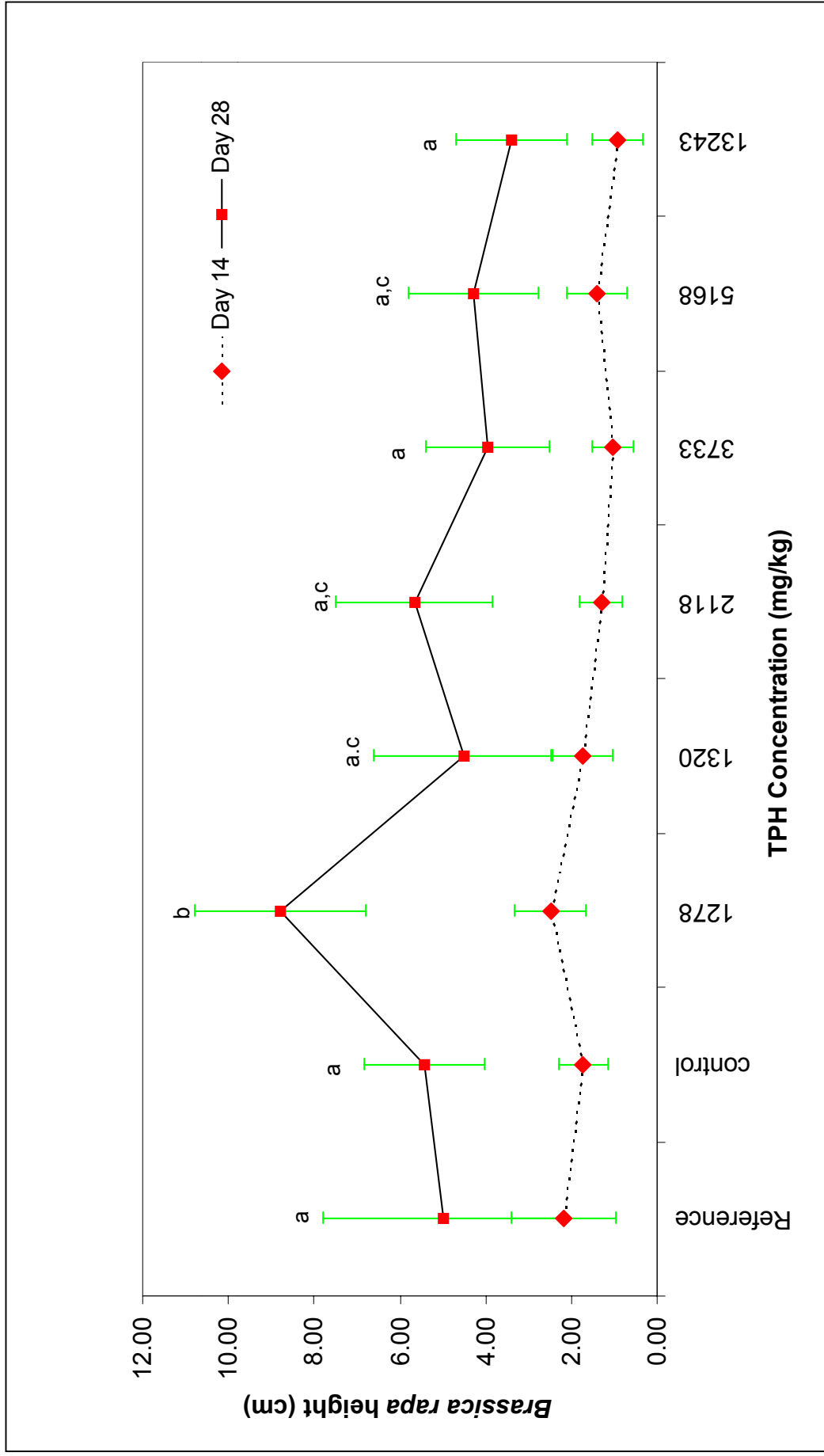


Figure 2. Mustard (*Brassica rapa*) stem height at day 14 and day 28 (mean \pm SD). Means with a common letter are not significantly different ($p > 0.05$).

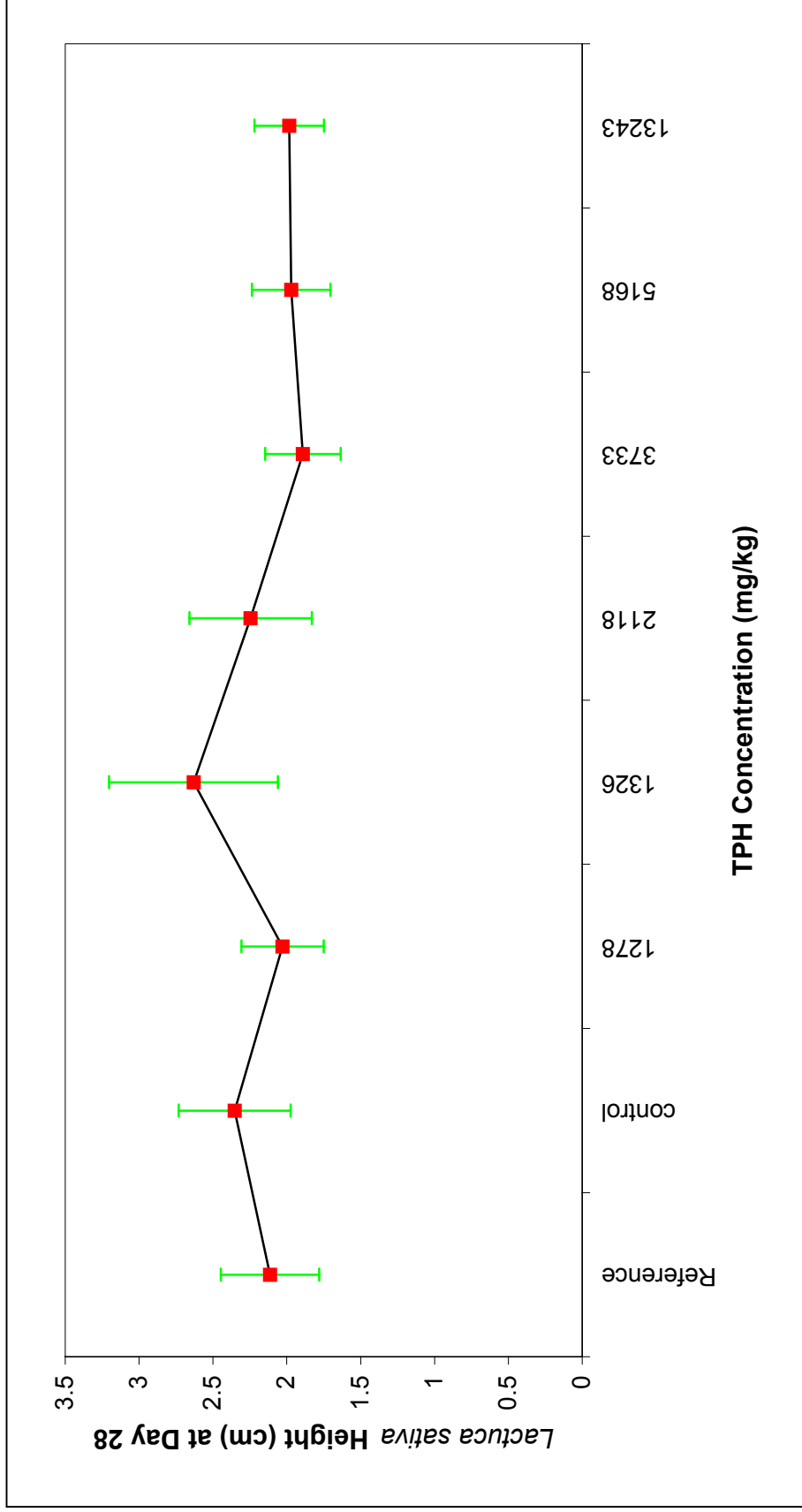


Figure 3. Lettuce (*Lactuca sativa*) stem height at day 28. Stem height was indeterminate on day 14 due to a lack of differentiation between beginning of leaf buds and end of stem.