# The Influence of Dilution on the Hatching Activity of Sugarbeet-Root Diffusate[1]

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Steele and Fife (2)[3] reported results of a series of tests designed to develop standardized methods for the conduct of hatching tests. They found that sugarbeet-root diffusate concentrated 50 fold or dried by vacuum distillation retained its activity for hatching of larveae of *Heterodera schachtii* Schmidt 1871, and that the active principle of diffusate is dialyzable. As a continuation of these studies, a test was undertaken to determine the effects of dilution on the hatching activity of sugarbeet diffusate.

## Materials and Methods

Sugarbeet-root diffusate was leached from 6-inch clay pots containing three seedlings of *Beta vulgaris* L. growing in steam-sterilized soil. Diffusate was collected during a 24 hour period by adding 200 ml of tap water to the soil around the base of the plants. The diffusate was diluted with tap water to 75, 50, 25, 10, 5, 1, and 0.1%. These solutions and undiluted diffusate were tested for their effects on hatching and emergence of larvae from cysts of *H. schachtii*. Cysts were obtained by washing and screening infested soil; they were then transferred to tap water, and stored for 10 days at 10 C. Forty cysts and 15 ml of each diffusate solution were placed in Syracuse watch glasses and incubated 4 weeks at 24 C. At weekly intervals the cysts were transferred to fresh solutions. Treatments were replicated 4 times and arranged in a completely randomized design.

## Results and Discussion

This test demonstrated that diffusate can be diluted to as much as 10% of its original concentration without greatly affecting its hatching activity. Consequently, with collection techniques used in this test, concentration of hatch factor is not considered to be of critical importance to the standardization of hatching tests. Figure 1 illustrated that cumulative hatch from cysts of *H. schachtii* is proportional to the log of the concentra-

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[3] Numbers in parentheses refer to literature cited.

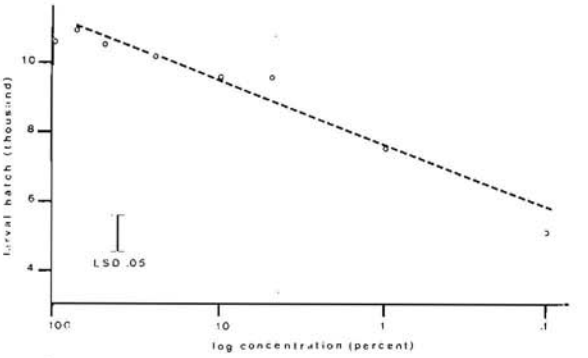


**Figure 1.—The influence of concentration of sugarbeet-root diffusate on hatching of *H. schachtii*.**

tion of sugarbeet-root diffusate. The correlation coefficient (r) for the data was found to be —.756 and was significant at the 5% level. Fenwick (1) reported equivalent results for *H. rostochiensis* treated with serial dilutions of potato-root diffusate. Although both beet and potato-root diffusates are highly specific in their activity, i.e., *H. schachtii* and *H. rostochiensis* respond only to their respective host-root diffusates, they show the same mathematical relationship between concentration and effect. This suggests that while their direct primary influences may differ, they may ultimately affect the same physiological process essential to hatching.

## Acknowledgment

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### Literature Cited

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(2) STEELE, A. E. and J. M. FILE. 1969. Effect of liquid nutrient culture, vacuum distillation and dialysis on hatching activity of sugarbeet root diffusate for *Heterodera schachtii*. Nematologica. 1: 223-226.