

The Effect of Temperature on *Trillium grandiflorum* and *Trillium erectum*

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INTRODUCTION

In the early 1940s, Lela V. Barton (1944) did research investigating the dormancy of *Trillium grandiflorum* and *T. erectum* and concluded that both species exhibited double dormancy. Two periods of cold interrupted by a warm period were needed for complete germination — the first period for root emergence and the second for cotyledon emergence. The first period in Barton's experiments was expressed in "months" (3 months for *T. grandiflorum* and 6 months for *T. erectum*). It was the goal of these experiments to more precisely define the first period in days.

MATERIALS AND METHODS

Seeds of *T. grandiflorum* were collected from three sites in Chittendon County in Vermont, cleaned, mixed, and surface sterilized. They were first divided into 12 lots of 160 and then into eight replicates of 20 seeds each. Each replicate was placed in a petri dish lined with filter paper and then half of the petri dishes were wrapped in aluminum foil to exclude light. The wrapped and nonwrapped petri dishes were randomly placed in plastic boxes lined with moistened paper towels and treated at 5C for 62, 69, 76, 83, 91, or 98 days. They were then brought into 20C and germination started 35 to 42 days later (Solt, 1996).

Seeds of *T. erectum* were collected from Leddy Park, Burlington in Chittendon County, Vermont, and cleaned. They were first divided into five lots of 200, then into 10 replicates of 20 seeds each and placed on a moist paper towel. No surface sterilization was done because it was thought that the small amount of sodium hypochlorite in the paper toweling would discourage fungal growth. Each set of 10 replicates was placed in a small heavy-duty freezer bag and put in my refrigerator at 9 to 11C (39 to 42F). The lots were treated for 87, 123, 147, 216, or 240 days. They were then brought into 20 to 23C (68 to 72F) in my basement and germination started approximately 65 days later. Light was not controlled in this experiment.

RESULTS

In the experiment using *T. grandiflorum*, a cold period of 83 days or longer resulted in maximum germination: 79% in the presence of light (Fig. 1) and 73% in the absence of light (Fig. 2) (Solt, 1996). In the experiment using *T. erectum*, a cold period of 216 days resulted in 90% germination (Fig. 3).

DISCUSSION

The length of cold required to break dormancy in *T. grandiflorum* is approximately 83 days while *T. erectum* required approximately 216 days. This suggests that the dormancy of species of trillium varies. Anecdotal information obtained through personal communications with fellow trillium enthusiasts (Denton, 1998; McClements, 1998) suggests that not only does the length of cold period vary but

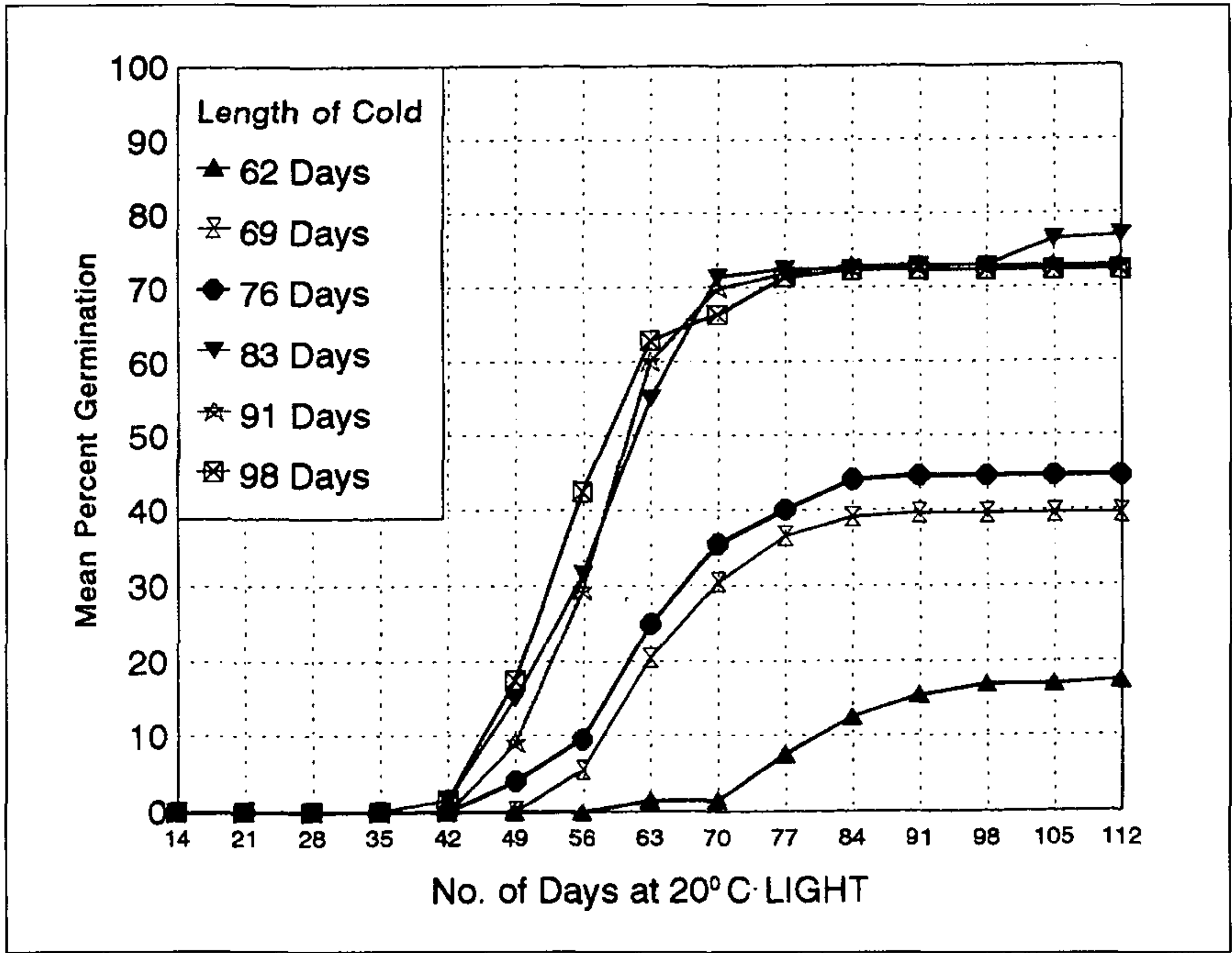


Figure 1. The effect of cold period length at 5C on the germination of *Trillium grandiflorum* in the light.

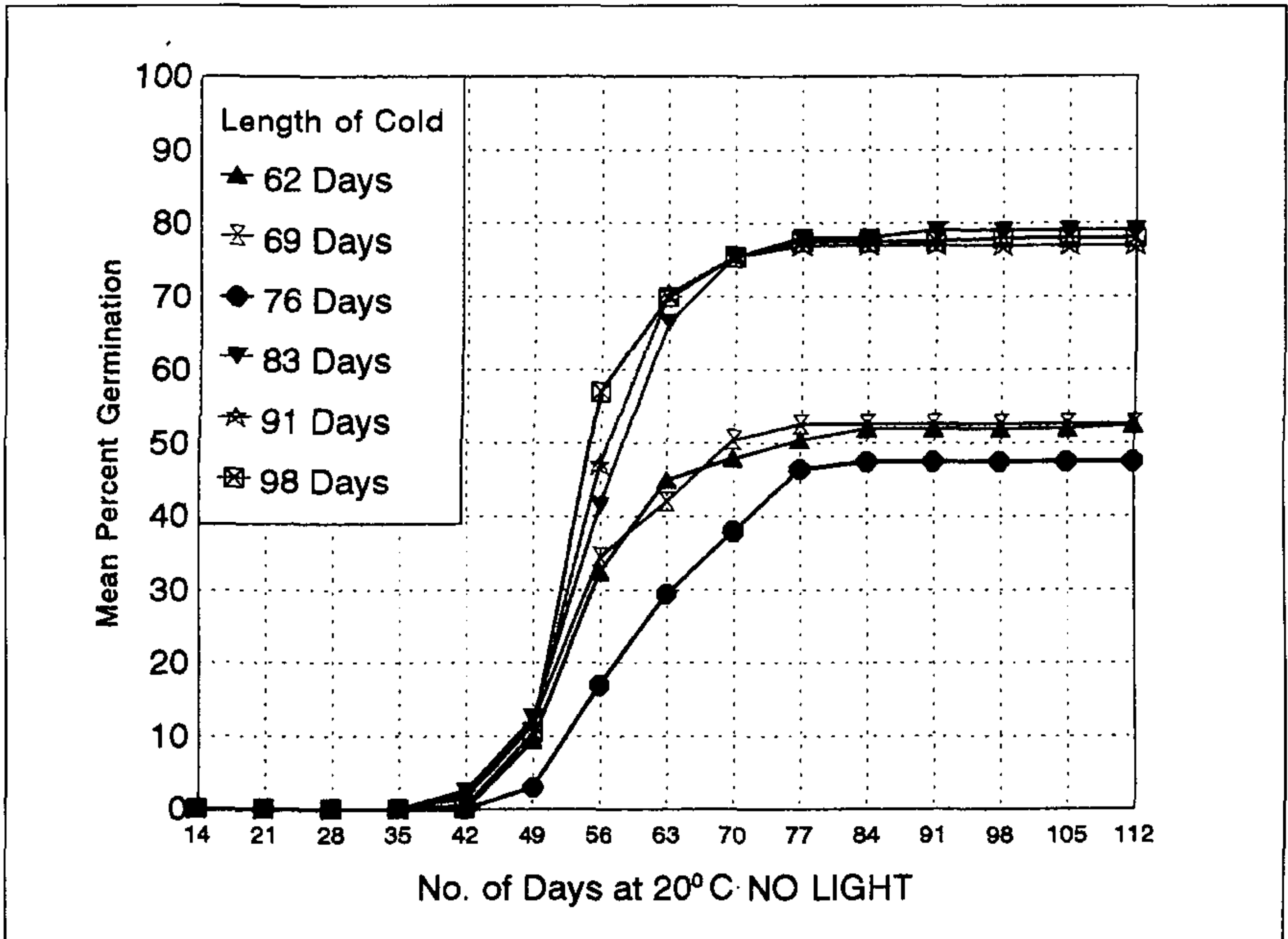


Figure 2. The effect of cold period length at 5C on the germination of *Trillium grandiflorum* in the dark.

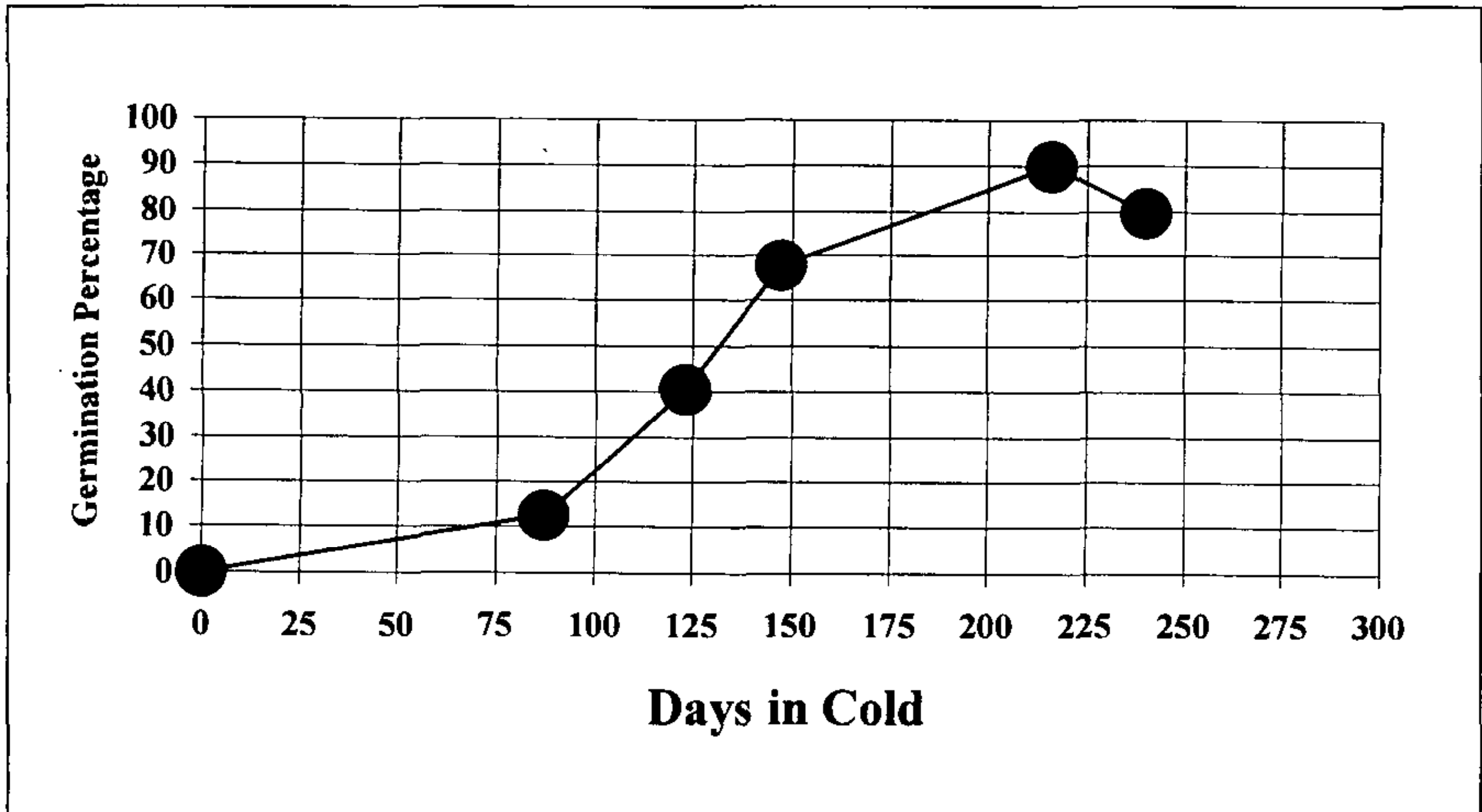


Figure 3. The effect of cold period length at 9 to 11C on the germination of *Trillium erectum*.

that some species do not require cold. It is also to be noted that under these experimental conditions, germination was completed after the first cold period. This suggests that *T. grandiflorum* and *T. erectum* exhibit an embryo dormancy, one period of cold needed for embryo maturation with germination being completed during the following warm period (Solt, 1996). Light did not appear to be a factor in either experiment.

A current experiment is attempting to further define the length of cold required for the first period for *T. erectum*. Treatments are 150, 172, 194, and 216 days.

LITERATURE CITED

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