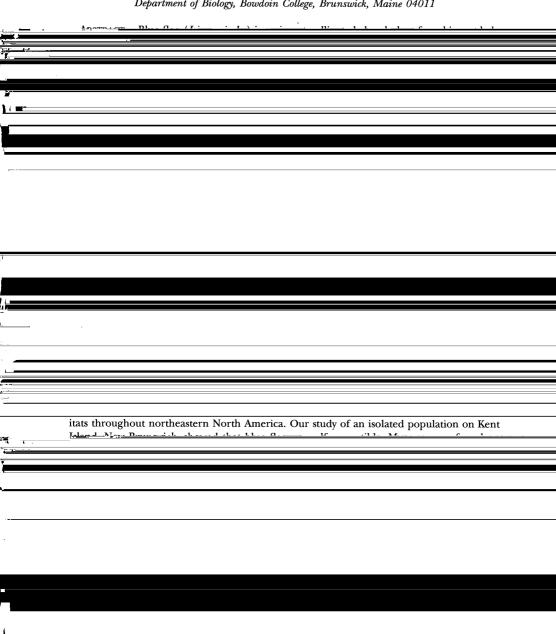


Facultative Self-pollination in Island Irises

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through a female phase. Kron *et al.* (1993) suggested that the final stage, in which the stigmas curl down and sometimes contact the anthers, could lead to autonomous self-pollination.

In the present study our aim was to determine the extent of self-compatibility and inbreeding depression in an isolated population of *Iris versicolor* occurring on an oceanic island. We also measured the amount of time that individual flowers spent in different phases to test whether pollination influenced subsequent floral behavior and to investigate the mechanisms behind autonomous self-pollination.

METHODS

Our study was conducted in June and July 1994 and 1995, at the Bowdoin Scientific Station, located on Kent Island, in the Bay of Fundy, New Brunswick, Canada (44°35′N, 66°46′W). The 80-ha island is isolated from the mainland of Maine and Nova Scotia by 20 km and from the island of Grand Manan, the nearest large body of land, by 9 km.

Trie regressed and common in moist onen grass on Kent Island and most of the larger islands

in the Grand Manan Archipelago. A native perennial, it reproduces both asexually, through

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	designated as controls and were allowed to be visited by insects network (free mallimation
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	treatment). The other 20 flowers were bagged for the duration of the experiment (autonomous self-pollination treatment). We removed the bags once the flowers had obviously senesced and the stigmas were no longer receptive (within 10 days of opening, Kron et al., 1993). Mature-sized fruits were collected at the end of July. In the third experiment, a sample of 45 additional irises was established in an open field to investigate whether pollen deposited on the stigma influenced floral behavior, specifically the closing or reflexing downward (curling) of the stigma flap. All flowers were bagged in the bud stage. Fifteen flowers were hand-pollinated as soon as the stigma flap opened and
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were 20 in Experiment 2, by the time of fruit set they were reduced because of damage by herbivores.

difference in fruit set between bagged and freely pollinated flowers in exposed sites (P = 0.45), but freely pollinated flowers had higher fruit set than bagged flowers in protected

(Fruit set was not monitored in Experiment 1.)

Free pollination—exposed sites

Autonomous self-pollination Anthers removed, flowers bagged

Free pollination—protected sites

Autonomous self-pollination—exposed sites

Autonomous self-pollination—protected sites

Experiment 2

Experiment 3 Hand-outcrossed

sites (Table 1: P = 0.02).

70.6

61.1

52.6

17.7

73.3

40.0

6.7

17

18

19

17

15

15

15

were closed. Overall, more

Overall, more than 70% of hand-outcrossed flowers set fruit, compared to 40% for autonomous self-pollinated flowers. Only one emasculated flower (7%) set fruit. The effect of treatment on fruit set was statistically significant (chi-square test: P < 0.001). However.

against petals of the same flower where pollen has settled, or by causing neighboring flowers to come into contact with each other.

One possible artifact introduced by our bagging experiments was the fact that once the anthers dehisced, pollen could not be removed by insects. Much of the pollen therefore remained in the anthers or fell on petals beneath the stigmas, where it may have been more

other words, the rate of autonomous self-pollination could be somewhat lower under natural conditions if insects remove pollen from flowers but are inefficient in depositing it on stigmas. We should also point out that we measured inbreeding depression only in terms of fruit set, capsule size, and seeds per capsule. To establish definitively that self-pollination

mediated pollination in the clonal species *Iris versicolor. Can. J. Bot.*, 71:1503–1509.

LANDE, R. AND D. W. SCHEMSKE. 1985. The evolution of self-fertilization and inbreeding depression in