

# Spatial distribution and habitat characteristics of a novel population of the endangered Taylor's Checkerspot butterfly

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## Part 1. Introduction

Taylor's Checkerspot (*Euphydryas editha* spp. *taylori*) (see Figure 1) butterfly occurred historically in coastal meadows and other open habitats in the Georgia Basin, as well as in Washington and Oregon. It is a charismatic and well-studied butterfly which has declined throughout its range and is now listed as Endangered in Canada. Taylor's Checkerspot is a resource specialist that occurs in a variety of habitats, but requires adequate larval host plant resources to sustain a population.

We report on two components of recent studies by Parks Canada and BC Ministry of Environment on the spatial distribution and habitat characteristics of a large Taylor's Checkerspot population in recently logged areas on Denman Island, BC. This population is thriving in moist, disturbed habitats where checkerspot larvae use several species of *Veronica* as host plants (Figure 2). This is a previously unrecorded group of host plants for Taylor's Checkerspot in BC; most historic populations used non-native *Plantago* species (Figure 2) in dry coastal meadows.



Fig. 1. Taylor's Checkerspot is a distinctive butterfly with red, black and white wing markings.

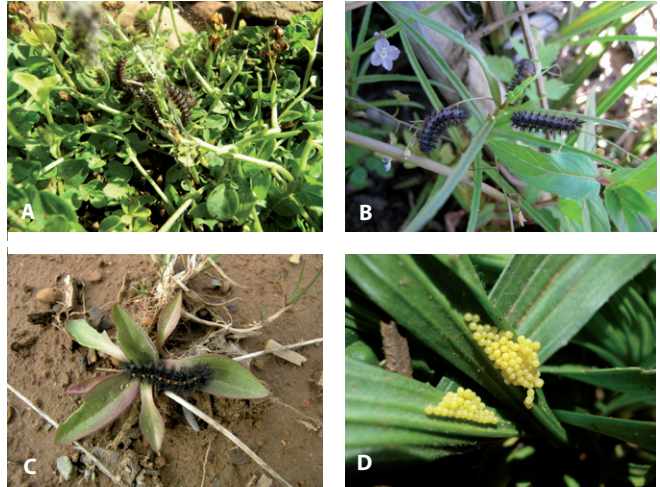


Fig. 2. Known host plants for checkerspot larvae on Denman Island, BC include *Veronica serpyllifolia* (A: pre-diapause larvae), *Veronica scutellata* (B: older pre-diapause larvae), *Plantago major*, (C: post-diapause larvae) and *Plantago lanceolata* (D: egg clusters).

## Part 2. Spatial Distribution

We assessed the spatial distribution of adult Taylor's Checkerspot butterflies in 2007 and 2008. We used wandering transects to efficiently cover a range of habitats. In 2007, 88 km of wandering transects were undertaken (April 28-June 13) encompassing 168 hrs of field time. In 2008, 73 km of transects were traversed (May 10-June 16) encompassing 64 hrs of field time. Transects focused on disturbed moist habitats in which Taylor's Checkerspot was abundant, but also included a range of other habitats includes meadows, pastures, sedge marshes, and dry clearcuts. The distribution of Taylor's Checkerspot on Denman Island is shown in Figure 3 (red dots). Figure 4 shows typical habitats in which adult Taylor's Checkerspot butterflies were found. One butterfly was found on Vancouver Island (Figure 3).

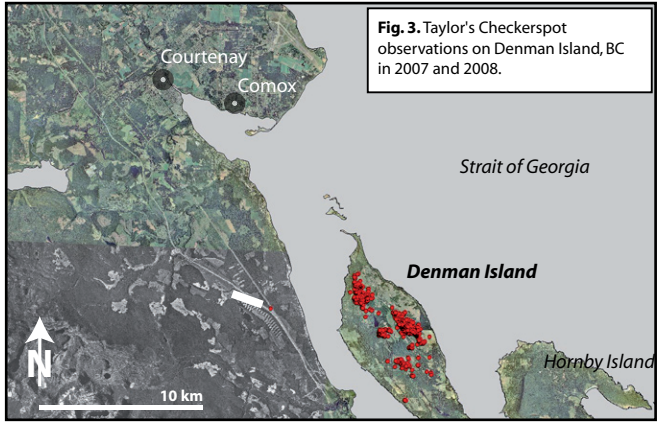


Fig. 3. Taylor's Checkerspot observations on Denman Island, BC in 2007 and 2008.



Fig. 4. The Taylor's Checkerspot population on Denman Island is found in moist disturbed clearcuts (age <10 years) that support *Veronica* species. Patches of soil or gravel are often used for thermal basking (C: road bed and D: exposed soil).

## Part 3. Pre-diapause Larval Habitat Use

We used paired known and random plots (24 pairs) to characterize the habitats (vegetation and substrates) used by pre-diapause larvae relative to proportion of these habitats in the landscape. Diapause is a physiological state of dormancy used by invertebrates to avoid environmental stress.

During the pre-diapause period, larvae live colonially within silken webs and grow rapidly by consuming host plant resources prior to plant species senescence from summer drought (Figure 5). Larval checkerspots feed on a limited suite of host plants which contain iridoid glycosides.

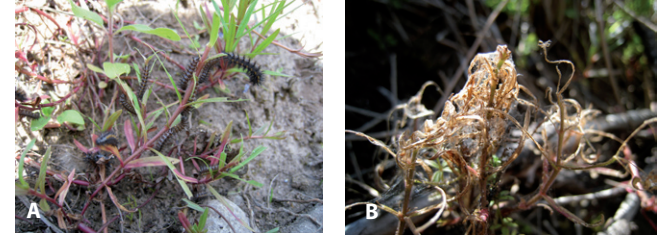


Fig. 5. Active (A) and abandoned (B) larval webs on *Veronica scutellata*.

**Results.** 356 pre-diapause larvae were counted within the 24 pairs of sampled plots. The number of larvae per plot among the 25 occupied plots ranged from one to 50 (0.25-12.5 larvae/m<sup>2</sup>), with an average of 14.2 larvae/plot (ave. larval density = 3.6 larvae/m<sup>2</sup>).

Pre-diapause larvae were observed feeding on four plant species: *Veronica scutellata*, *Veronica serpyllifolia*, *Veronica beccabunga*, and *Plantago major*. The majority of feeding larvae were found feeding on *V. scutellata* (171; 86% of observations), with fewer larvae feeding on *V. serpyllifolia* (20; 10%), *V. beccabunga* (5; 3%) and *P. major* (4; 2%). Our observations confirm pre-diapause use of *V. scutellata* and other *Veronica* species by Taylor's checkerspot on Denman Island, BC.

Disturbed seasonally wet areas appear to be the highest quality habitats for pre-diapause checkerspot larvae, with logging roads, landings, and ditches offering more marginal habitat. Open habitat and seasonally wet conditions appear to be important characteristics for supporting larval use, but other conditions, such as disturbance and site exposure (for thermal habitats), are also important.

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