

Lady beetles on the Lake Manitoba beach*

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In 1987, the Eurasian seven-spotted lady beetle, *Coccinella septempunctata* (C7), was spreading rapidly through the USA (Schaeffer *et al.* 1987). This species was first found in North America in New Jersey and Quebec in 1973. It had proven to be a vigorous disperser and its spread through eastern and central USA was aided by releases by USDA for the biological control of aphids. C7 had been recovered in Minnesota in 1987 and could be expected to appear soon in Manitoba. Dr. Glen Wylie recognized an opportunity to document the invasion of a new species and the impact of this species on the native lady beetles. In 1983, he and Frank Mathewon began to collect and record the numbers of lady beetle species in crop fields, primarily in the Red River valley south of Winnipeg.

In 1988, C7 was found at four locations within 65 km of Winnipeg (Matheson 1989) and, in 1989, it was found throughout the agricultural areas of Manitoba and Saskatchewan (Turnock *et al.* 1990). Staff of the Agriculture Canada Research Station continued to record the relative abundance of lady beetle species in crop fields in conjunction with sampling for various insect pests. Sampling of Lake Manitoba beaches was begun because, on 4 November 1978, R. Bilodeau and I had observed thousands of living lady beetles on the shores of Lake Manitoba at Lily Bay. A collection was made and the relative abundance of lady beetles was determined (Turnock and Turnock 1979). I had heard of similar aggregations on the lake beaches in Manitoba and other occurrences had been reported in North America. So I contacted Russ Mead at the Field Station, enlisted his help, and began this continuing program.

Lady beetles wash ashore on the Delta beach whenever a northerly wind follows a warm, windy day. The beetles float easily when they fall into the lake, and dead beetles are almost never found on the beach. Fish predation is probably rare because fisheries biologists say that none of our lake fish are surface feeders, particularly in the autumn. In addition, the aposematic colours of lady beetles (red, orange, or yellow/black) act as warnings of bad taste to birds and no evidence of bird predation to these beetles on the

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beach has been observed.

When washed ashore, the beetles immediately walk away from the water, apparently attracted by the silhouette of vegetation on the shore. On a sandy beach, the beetles are attracted by any object, such as beach debris, driftwood, stones, or shrubs, that protrude from the sand. The number of lady beetles often reaches 1,500 to 2,000 per metre width from water to beach ridge. Major concentrations usually occur in the autumn, when the lady beetles are moving about in search of overwintering sites, but may occur in the spring, when they leave these sites.

The beetles normally accumulate overnight and remain on the beach until it is warm enough for flight. The critical temperature for flight varies among the species, so sampling must be done in the morning. Therefore, Russ Mead checks the beach early, and phones me whenever the beetles are abundant. The shaded, north-facing beach at Delta delays the warming of the beetles and extends the sampling period, usually to about noon. Each sample consists of all the beetles found in a transect, 0.5 m wide, extending from the edge of the water to the edge of the beach ridge. The beetles are then identified to species, counted, and released. In addition, sweep-net sampling of various crops is done by Agriculture Canada crews under the direction of Ian Wise and the lady beetles are examined as described above. The relative abundance of lady beetle species has been very similar annually in the field and beach collections, so these results have been combined in analyzing trends.

Since the first collection of C7 in 1988, its relative abundance has risen to 62% in 1992, declined to 4% in 1994, and has since varied from 20-35%. The rise and fall in the abundance of C7 resembles that which commonly occurs when species successfully invade a new area. However, the low numbers of C7 in 1994 may also have been caused by relatively low temperatures during that summer. *Hippodamia tredecimpunctata* (H13), a species which is much more active than C7 at temperatures below 15°C, was very abundant (circa 95% of the collections), in 1994 and 1995, when summer temperatures were low. We have no baseline data on the relative abundance of lady beetle species prior to the invasion of C7 except the collection of 1978, when *Hippodamia convergens* (Hcon) was the

most abundant species (96%, Turnock and Turnock 1979). Therefore, it is difficult to distinguish the impact of C7 on native species from normal variations in their abundance. We can, however, be reasonably sure that C7 has not affected the abundance of H13. Among the other two most common species in southern Manitoba, C7 has probably had an adverse effect on *Hippodamia convergens* and *Coccinella transversoguttata*.

Lady beetle species can usually be identified by the pattern of spots and other marks on the wing covers, on the pattern of the thorax, and on their general shape and size. Size and particularly the wing patterns are quite variable in some species (see *Calvia 14-guttata* and *Adalia bipunctata* in Fig. 1). The figures show the thorax and wing patterns of thirteen species that can be found in southern Manitoba. If a specimen does not fit these patterns you may be able to identify it by comparison to

specimens in the collection at the Field Station. In addition to these species, we have collected *Hippodamia sinuata*, *H. quinquesignata*, *Anatis mali*, *Anisostrieta bitriangularis*, and *Psyllobora vigintimaculata* in southern Manitoba. Diagrams of the many species found in western Canada and Alaska can be found in Belicek (1976) or Gorden (1985).

References

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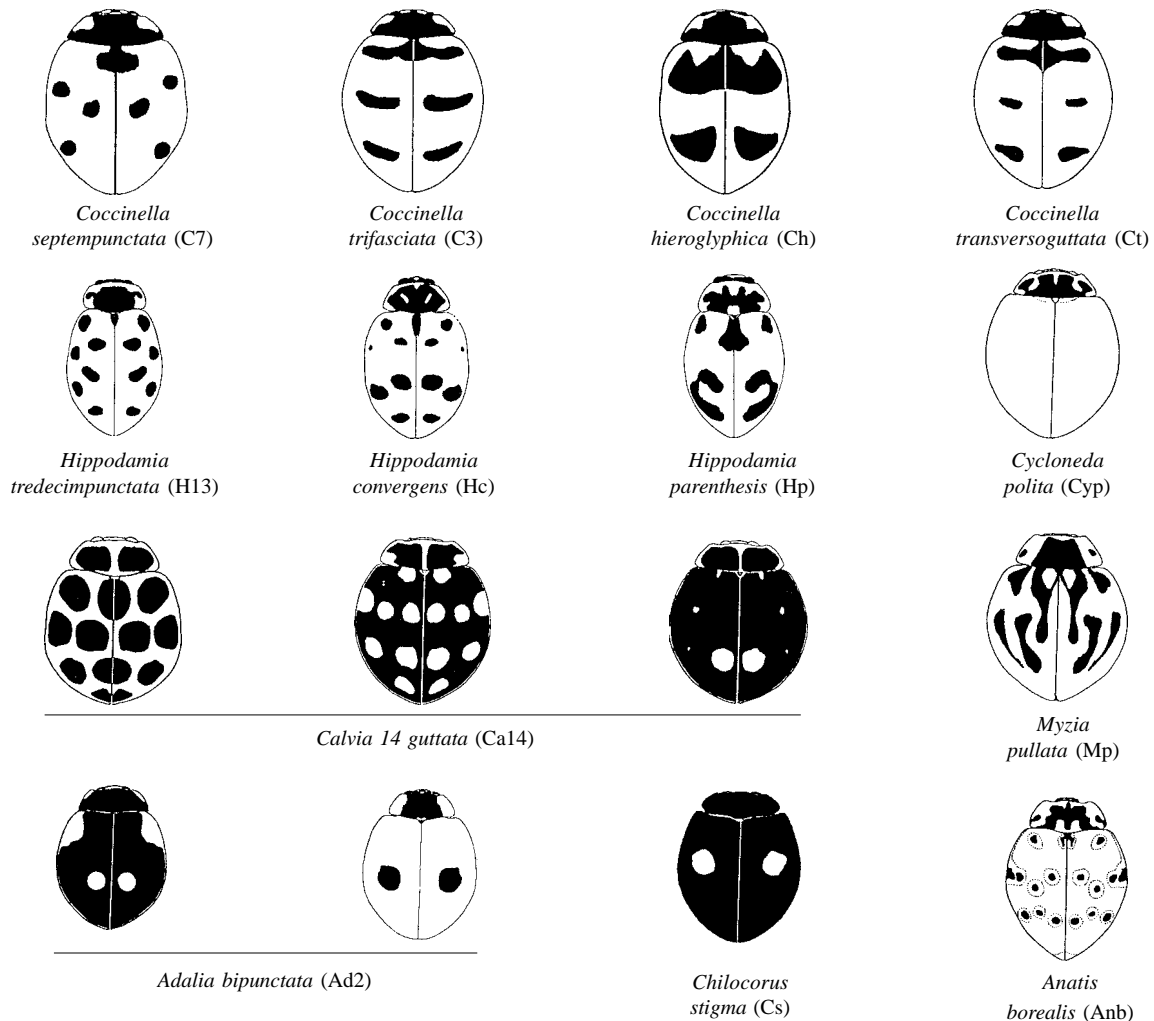


Figure 1. Diagrams of the major lady beetle species found on the beach at the University Field Station (Delta Marsh). All are drawn to the same scale.

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