Thematic Collection

Thematic Collection: Alvars in Canada

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This is the first Thematic Collection of *The Canadian Field–Naturalist*, an initiative of the Ottawa Field-Naturalists' Club (OFNC) Publications Committee. Thematic Collections are editor-selected compilations of previously published contributions to both *The Canadian Field-Naturalist* (CFN) and to the OFNC's regional publication, *Trail & Landscape* (T&L), on a central theme with links to each article. The articles concern alvar landscapes, species that occur on alvars, and the conservation of alvar habitats. We estimate that the titles assembled here from those two publications represent 50% of the important papers published on Canadian alvars.

Alvars are very unusual natural habitats that to some extent are relicts of early postglacial times. They contain rare, restricted, endemic, and endangered species in most groups of organisms, are important for human recreation, and also contain important native crop germplasm. Biodiversity is high and up to 400 native plant species may occur on particular alvar landscapes. Up to 150 species of plants can occur on a 2 ha site.

Traditionally alvars have been defined as more or less naturally treeless (open) areas on thin soil over essentially flat limestone or marble rock (Figures 1–3). Ever-changing alvar plant communities are a consequence of some combination (depending on geography) of annual and/or periodic drought, fire, flooding, grazing, extreme temperatures, scouring, and ice uplift. They occur within generally forested, cool temperate regions. Although the term was initially confined to open rock pavement and meadow areas in Canada, it has most recently been applied to some semi-forested landscapes, including both "open alvar" and "alvar woodland". A final aspect of the definition includes the idea that alvars are self-sustaining but dynamic – what is open alvar today may be alvar woodland 200 years from now, and *vice versa*.

The "limestone barrens" of northwestern Newfoundland could be called alvars, but they have always been given the former name by local people. The Cedar Glades of the eastern US are strictly open areas and are older landscapes that also typically are drier, hotter, and

Figure 1. Alvar opening on the Carden Plain, City of Kawartha, Ontario (9 June 2009). The pink colour in the lower part of this photo is Prairie Smoke (*Geum triflorum* Pursh). Photo: D. F. Brunton.

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FIGURE 2. Alvar pavement, Great LaCloche Island, Manitoulin, Ontario (8 August 2011). Photo: D. F. Brunton.

FIGURE 3. Alvar meadow with yellow Balsam Ragwort (*Packera paupercula* (L.) A. & D. Love) and red Indian Paintbrush (*Castilleja coccinea* (L.) Spreng.) on the Carden Plain, City of Kawartha, Ontario (9 June 2009). Photo: D. F. Brunton.

experience less harsh winter conditions. In the Midwest, limestone prairies are similar to alvars in some respects but usually have a distinctive prairie composition. The term alvar has been used extensively in the sense of the preceding paragraph in the Great Lakes region of North America, the Baltic region of Northern Europe, and western Ireland. In Canada, alvars occur in northwestern Newfoundland, southwestern Quebec, southern Ontario, the Interlake region of Manitoba, and on the southwest side of Great Slave Lake in Northwest Territories (Figure 4).

The study and understanding of Canadian alvars began about 50 years ago. An Austrian-born and European trained scientist (mostly an arctic lichenologist),

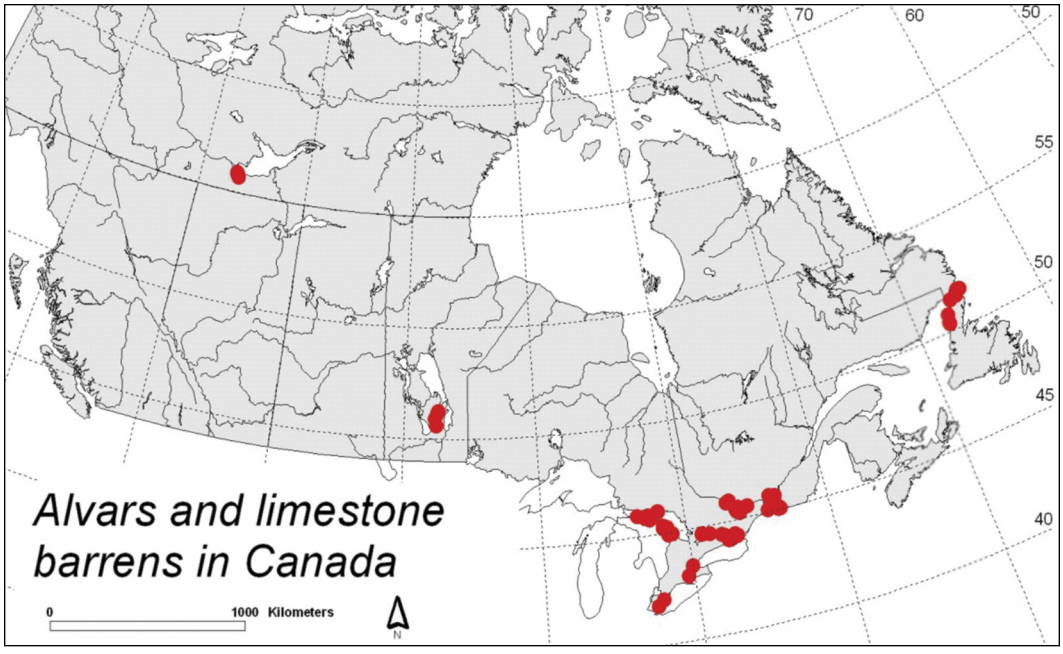

FIGURE 4. Distribution of alvar landscapes in Canada (reproduced with permission from Catling *et al.* 2014).

Roland Beschel was working at Queens University in Kingston in the 1960s. With experience in northern Europe he realized that there were alvars around Kingston. Beschel died suddenly in 1971, before being able to initiate any detailed studies. However, he did tell his students about the local alvars and he also wrote a few very general articles about the Ontario alvars. Beschel's information became the basis for further study; the first comprehensive review article about Ontario alvars was published in 1975 in the *Ontario Field Biologist*. Soon after that and until 1994 as the exceptional natural features of alvars became better known, many researchers and natural resource agencies completed life science inventories of alvars in Ontario. It became apparent that alvars existed throughout the Great Lakes region and that a universal approach to the description of alvar types and their communities was needed.

An international alvar initiative was established in 1994 to provide both a profile and a universal approach. It brought experts from all Great Lakes jurisdictions together to prepare an inventory report with recommendations. This had substantial impact. As a result of the initiative, many people became interested in alvar research and several important theses and other work resulted. As well as increasing awareness, the initiative led to increased protection of alvar habitat in Ontario, New York, and Michigan. One of the best examples of this was in Ontario. In 2003, the Ontario government established the 516 ha Burnt Lands Provincial Park in the City of Ottawa specifically to protect alvar habitat. Over the past decade and a half, the Nature Conservancy of Canada, cooperating with the Couchiching Conservancy and the Ontario Ministry of Natural Resources and Forestry, purchased a number of large alvar properties in Carden Township, City of Kawartha. In 2014 Ontario Parks amalgamated a number of these to form the core of Carden Alvar Provincial Park encompassing 1917 ha. This was a major step because of the size of this alvar landscape, but many smaller and some richer sites have also been protected in Ontario within provincial parks, conservation reserves, and through municipal zoning. Educational programs, agreements, and easements have been applied to many other alvar properties.

Another improvement over the past few decades has been our understanding of appropriate management of alvar landscapes. A good example is the Stone Road Alvar on Pelee Island and perhaps the nearby (also on Pelee Island) Brown's Road Alvar, and savannah sites (Red Cedar, Verbeek). Here succession of more open alvar conditions to thickets and cool season grasses is causing a decline in alvar species. Fire and mechanical thinning are being used to reduce the thickets, but some are left for birds including provincially significant Yellow Breasted Chat (*Icteria virens* L.) and care is taken not to disturb rare snakes. Restricted plants, including Whorled Milkweed (*Asclepias verticillata* L.), Blue Ash (*Fraxinus quadrangulata* Michx.), Nodding Onion (*Allium cernuum* Roth), Grey-headed Coneflower (*Ratibida pinnata* (Vent.) Barnh.), Downy Woodmint (*Blephilia ciliata* (L.) Benth.), Oval Ladies Tresses (*Spiranthes ovalis* Lindl.), and Narrow-leaved Paleseed (*Leucospora multifida* (Michaux) Nuttall), have been successfully promoted.

As a result of being very unusual habitats and containing rare, endangered, and endemic species, alvars

are of great interest to science, but unusual flora and fauna has also become a very popular recreation target. Thousands of people visit the Carden Alvar IBA (Important Bird Area) every year. Many come to see the endangered or threatened wildlife such as Loggerhead Shrikes (*Lanius ludovicianus* L.), Bobolink (*Dolichonyx oryzivorus* L.), or Blanding's Turtles (*Emys blandingii* Holbrook), but others just come to enjoy the open landscape with their astonishing carpets of wildflowers.

Alvars and alvar complexes vary within different geographic regions (Figure 4). Although many large Ontario alvar landscapes have been protected over the past few decades (e.g., Manitoulin Island, Bruce Peninsula, Carden Plain) as well as alvars in the Interlakes Region of Manitoba and the limestone barren alvars of northern Newfoundland, there are still some major gaps in the system of representative protected sites. These include globally significant alvar habitat on the Napanee Plain in Ontario and alvar remnants in western Quebec. Many groups of organisms on alvars and some alvar habitats remain poorly known. The fact that alvars are relicts makes them ideal for research aimed at a better understanding of ecology and evolution.

Collection of Papers

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