SCIENTIFIC NOTE

A novel host association for *Monarthrum scutellare* (Coleoptera: Curculionidae: Scolytinae) in British Columbia

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Monarthrum scutellare (LeConte) is an ambrosia beetle that ranges from British Columbia to northern Baja California in Mexico (Bright and Stark 1973, Wood 1982, Wood and Bright 1992). It is recorded to breed in various species of Fagaceae including *Chrysolepis*, *Lithocarpus densiflora* (Hooker & Arnold) Rehder, *Quercus* spp., *Quercus agrifolia* Neé, *Q. garryana* Douglas and *Q. kellogi* Newberry (Farris 1965, Bright and Stark 1973, Bright 1976, Wood and Bright 1992) with single records from *Abies* and sequoia that Bright and Stark (1973) considered accidental or erroneous.

On 2 May 2005, a 38-cm length of "green" split alder firewood and associated Scolytinae (Coleoptera: Curculionidae) collected from a recently delivered commercial load of firewood were submitted to the Canadian Forest Service for identification after beetles were observed emerging from the wood. The half stem section was split off-centre, included all annual growth rings, and was 18.2 cm in diameter and 27 years of age. No bark was present on the piece of firewood, however, a single V-shaped parental gallery 22 mm in length was incised in the sapwood and five adult *Alniphagus aspericollis* (LeConte) (Curculionidae: Scolytinae) were associated with the sample. The gallery shape agrees with those described by Bright and Stark (1973) as typical for *A. aspericollis*. The presence of a parental gallery of *A. aspericollis* and the structure of the wood (absence of rays, ring porous wood) confirmed that the host attacked was *Alnus rubra* Bongard (Betulaceae).

Boring dust was being actively extruded from ambrosia beetle galleries along the split face of the wood; however, no entrance holes were observed on the outer face of the bole. The wood was held at room temperature for adult emergence and 52 female and 55 male *M. scutellare* emerged between 2 May and 17 May 2005. The sample was then split longitudinally and the distribution of galleries along the split face enumerated by growth ring and growth ring widths measured to the nearest 0.5 mm. All of the 22 *M. scutellare* galleries visible on the split face were in the widest growth rings (mean ± SD = 5.6 ± 0.99 mm) from the first nine years of growth. No galleries were apparent in the outermost 40.5 mm of the xylem comprising the last 18 years of growth.

A band saw was used to cut 1-2 cm thick cross-sections containing ambrosia beetle galleries and the galleries dissected. Bifurcations were evident in four of the five partial galleries dissected, with three having a single bifurcation and one bifurcating twice. The galleries dissected (longest arm) ranged from 12.5 to 52.8 mm in length and were heavily stained black, likely by the ambrosia fungus introduced by the female beetles (Farris 1965). Although larvae of *Monarthrum* species, including *M. scutellare* (Wood and Stark 1973), *M. mali* (Fitch) and *M. fasciatum* (Say) (Solomon 1995) characteristically develop in "cradles" excavated above and below the sidewalls of the parental galleries, no brood cradles were evident in the dissected galleries or on the radial faces of the split wood. While no evidence of brood production was found during gallery dissections, the heavy staining observed along the length of the dissected galleries indicates that the observed attack was not recent and the large

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numbers of adults recovered suggests that *M. scutellare* can attack and breed in red alder. At least one oak-feeding species of *Monarthrum*, *M. laterale* (Eichhoff), has been recorded from alder and *M. bidentatum* Wood, *M. hoegi* (Blandford) and *M. umbrinum* (Blandford) breed in *Alnus* spp. (Wood 1982, Wood and Bright 1993). Thus, while *M. scutellare* is usually associated with species of Fagaceae, it is possible that hosts in other families may also be utilized. Alternatively, the emergent adults could represent mature adults attempting to establish brood in the firewood piece. Because galleries associated with this collection were incomplete, the ability of *M. scutellare* to develop in *A. rubra* cannot be determined with certainty. The presence of brood production in choice and no-choice breeding trials of *M. scutellare* in cut stem sections of native Fagaceae (*Quercus garryana* Douglas ex Hooker) and *A. rubra* or the discovery of brood in naturally attacked red alder will be necessary to confirm breeding in non-traditional hosts. Although evidence of breeding of *M. scutellare* in red alder is currently circumstantial, such novel host associations have been demonstrated to occur in other ambrosia beetles. Nijholt (1981) reported attack in red alder by two species of ambrosia beetles, *Gnathotrichus retusus* LeConte and *Trypodendron lineatum* (Olivier), which normally utilize coniferous species as hosts (Bright 1976, Wood and Bright 1992). Kunholz *et al.* (2000) subsequently confirmed red alder as a breeding host for *G. retusus*, while Lindgren (1986) documented brood production by *T. lineatum* in bigleaf maple, *Acer macrophyllum* Pursh.

Voucher specimens of *A. aspericollis* and *M. scutellare* have been deposited in the reference collection at Canadian Forest Service, Pacific Forestry Centre, Victoria, British Columbia. L. Safranyik, T. Shore and A. Carroll, Natural Resources Canada, Canadian Forest Service reviewed an earlier version of this manuscript. Their helpful comments and those of two anonymous reviewers are gratefully acknowledged.

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