

SPECIES FACT SHEET

Common Name: Green sideband (Pacific sideband)

Scientific Name: *Monadenia fidelis flava* (Hemphill, 1892)

(Synonym: *Monadenia fidelis beryllica* [Chace & Chace, 1935])

Phylum: Mollusca

Class: Gastropoda

Order: Stylommatophora

Family: Bradybaenidae

Conservation Status

Global Status (2005): G4G5T1T2 (last reviewed 24 Mar 2005)

Rounded Global Status: T1 – Critically imperiled

Reasons: Rare Oregon endemic (ORBIC, March 2005)

National Status (US): N1N2 (24 Mar 2005)

State Status (Oregon): S1S2

(NatureServe 2014)

IUCN Red List: NE – Not evaluated

Taxonomic Note

This subspecies was previously known as *Monadenia fidelis beryllica* Chace & Chace, 1935, but the earlier name of *M. f. flava* Hemphill, 1892, has been resurrected as the valid name for the subspecies of *M. fidelis* that occurs along the coast and for some distance inland in Curry County, OR (Roth 2011, pers. comm.). Coan and Roth (1987) note that “the only extant type specimen [for *M. f. flava*]... is from within the range of *M. f. beryllica*, and is the earliest available name for that subspecies.” According to Frest and Johannes (2000), this species can also be found under the name *Aglaja fidelis* var. *flavus* Hemphill, 1892.

Another taxonomic entity, *Monadenia fidelis baxteriana* Talmadge, 1954, has been described from the immediate vicinity of Sisters Rocks, north of Ophir, in Curry County, OR., but it has a dark brown base, and is smaller (<30 mm) (Talmadge 1954). Talmadge, who originally named the subspecies, decided in a later review (Talmadge 1961) that it was in fact synonymous with *M. f. beryllica* (now *flava*). Coan & Roth (1987) agree with this synonymy; however, Frest and Johannes (2000) believe this taxon should stand on its own as a valid subspecies given differences in anatomy and shell morphology. This subspecies is not included in Burke (2013).

Technical Description

Shells of this subspecies are large and similar to typical *M. f. fidelis* and its variations (Burke 2013). Shell diameter is up to 40 mm with 5 ½ to 6 whorls (Frest and Johannes 2000). The base is dark green and very distinctive for this

subspecies. The spire is similar to that of *M. f. fidelis* but with a green tint. The umbilicus is narrower than *M. f. fidelis* and is contained about 18 times in the diameter of the shell; about half of it is covered by the columellar lip margin (Burke 2013, Frest and Johannes 2000). Shells are often lighter in color above and in dead shells the basal greenish periostracum commonly fades to yellow (Frest and Johannes 2000).

Similar species within this species' range

Frest and Johannes (2000) note that the form of *M. fidelis* commonly found in Douglas County “is sometimes slightly greenish for the last quarter to half whorl; but is large and far less distinctly green below” as seen in *M. f. flava*. The one known specimen of *M. f. flava* from Douglas County should be reexamined to ensure it is a valid specimen of *flava* and not this other form.

Life History

The green sideband is a rare Oregon endemic terrestrial snail. While the biology of this subspecies is not well understood, the parent species is known to be mainly crepuscular (active at dawn and dusk) during the moist spring and fall seasons. During the summer, snails aestivate deep in talus accumulations adjacent to streams or springs, which serve as refuge sites from desiccation. In moister seasons, daily refugia can include down wood, rock, or accumulations of litter. *Monadenia* species are also known to aestivate under moss and lichen on maple trees (*Acer* spp.). Snails will climb trees in riparian corridors and shelter in deep forest floor litter (Roth 1993, cited in Frest & Johannes 2000).

The diet of the green sideband is not known, but other *Monadenia* species feed on a variety of fungi and plants. Most *Monadenia* have life spans of 10-15 years, are slow growing, and may not reach maturity for 8-10 years (Perez & Cordeiro 2008). In captivity, adults of *M. f. flava* reached adult size in 2.5 to 2.75 years and survived up to 8 years (Walton 1970, as *M. f. beryllica*).

Range, Distribution, and Abundance

Range: All known sites are within Curry County except for one collection from the Roseburg District BLM, in the Middle Fork Coquille River watershed in Douglas County (Worthing 2015, pers. comm.; see map in Attachments). The type locality is from Port Orford, Curry County, OR. (Note that the type locality for *M. f. beryllica* is in a patch of trees and brush near the mouth of the Pistol River, Curry County, Oregon [Chace and Chace 1935].) Other areas with reported locations for this subspecies include Port Orford and between the Sixes and Winchuck Rivers, mostly in sites near the coast or west side of southern Oregon Coast Range. This is the dominant *Monadenia* on the west side of the Coast Range from the Pistol River to the Winchuck River (Frest & Johannes 2000). It does not appear in California where *Monadenia fidelis*

pronotis and *Monadenia fidelis smithiana* replace this taxon (Frest & Johannes 2000).

Distribution: This is a southwestern Oregon endemic, limited to the western slope of the Coast Range and the immediate adjacent coast itself (Frest and Johannes 2000). The taxon was originally known from 12 sites in Curry County, OR (Roth 1993, cited in Frest & Johannes 2000). This subspecies appears to be well-distributed throughout Curry County in Oregon, despite the fact that *Monadenia* subspecies have not been consistently recognized or recorded during federal surveys for other listed species.

OR/WA BLM and FS Region 6 Units where Suspected or Documented: Both the Forest Service and BLM have listed the green sideband as a Sensitive Species in Oregon. It has been documented on the Rogue River Siskiyou National Forest, Coos Bay BLM District, and Roseburg BLM District.

Abundance: Population densities at known sites have not been conducted for this subspecies, however known collections have ranged from one to 16 individuals at a single site.

Habitat Associations

The green sideband is generally found in stands with deciduous trees (including alder) and brush in wet, relatively undisturbed forest, at low elevations; also in low coastal scrub (Frest and Johannes 2000). Habits include seasonal climbing of trees in riparian areas and shelter in deep forest floor litter (Roth 1993). A single site from Roseburg BLM was in a proposed thinning unit in a mixed conifer/hardwood stand. There were heavy accumulations of residual down wood and the oldest live Douglas fir trees were approximately 80 years of age. This site was not in a riparian community (Duncan 2005).

Threats

Logging, grazing, road construction, and mining are all threats to this species (Frest and Johannes 2000, *see review in Foltz Jordan and Black 2012*). Removal or reduction of forest canopy and increased sun exposure from logging or other habitat altering activities can result in drying of important subterranean refugia sites, reduction in fungi food sources and loss of aestivating individuals. Since many members of this genus are arboreal, at least during portions of the year, tree falling may result in direct mortality to individuals in the trees. Big-leaf maples or other species with heavy accumulations of mosses are heavily used for microhabitat sites, especially by juveniles. Concentrated use of riparian areas by livestock may also degrade available loose soil and litter habitat components used for foraging and breeding (Duncan 2005).

Conservation Considerations

Inventory and monitoring: Known sites on public lands should be monitored routinely to understand population size and trends and to determine which factors affect these trends. Additional surveys could be conducted to locate new populations in areas identified as potential habitat.

Management: Maintain areas of undisturbed forest, preferably around important habitat features such as moist rock talus, large down woody debris, and riparian areas. Connectivity between sites may be important for localized dispersal. Minimize management activities at known sites to avoid soil compaction and destruction of habitat.

Other pertinent information

Monadenia fidelis flava populations from Curry County are morphologically distinct from other subspecies of *M. fidelis*, but it should be noted that *Monadenia fidelis* from other areas can be found with similar shell shapes and colors. Pale yellow or green forms have been found throughout the Pacific Northwest and can be interspersed with normally colored individuals. For example, pale green specimens have been found in the Cispus watershed in Washington and a greenish shell was found on Lopez Island within a population of *M. f. fidelis* (Burke 2013). However, all of these shells are much lighter in color than *M. f. flava*, and are shaped more like typical *M. f. fidelis*.

The single specimen (an empty shell) of *M. f. flava* from Douglas County, which falls within the range of the closely related *M. f. celeuthia*, is a somewhat significant range extension. More surveys and specimen collection in Douglas County is warranted to help differentiate *M. f. celeuthia* and *M. f. flava* in this area of overlap.

Several subspecies of *Monadenia fidelis* (including many recognized and named subspecies, and others which have not been officially described in the literature) may form a large species complex in Oregon and Washington. Although most of these taxa are assumed to be at least geographically segregated, the range of variation in many of the morphologic characters used to distinguish between them overlap. In addition, there is evidence that subspecies or geographically separated populations can interbreed if brought into contact, and thus produce offspring with many intermediate characters. The taxonomic relationships among these subspecies of *M. fidelis* are actively being revised, based in part on new molecular information (e.g., see Cordero and Lindberg 2002). These taxa have not been recognized or recorded consistently during federal surveys for other listed species or may have been identified only to the species level. The extent of the range for each type has not been determined due to the uneven survey effort and to identification and recording difficulties (Duncan 2005).

Version 2

Prepared by Candace Fallon (Xerces Society), March 2015

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Final Edits by Rob Huff, FS/BLM ISSSSP, May 2015

Version 1

Prepared by: Theresa Stone (USFS/UMP)

Date completed: December 2009

Edited by: Rob Huff (ISSSSP)

Date: May 2010

ATTACHMENTS:

- (1) References
- (2) List of pertinent or knowledgeable contacts
- (3) Map of known records in Oregon
- (4) Photographs of this subspecies
- (5) Gastropoda Survey Protocol, including specifics for this subspecies

1: References

Burke, T. 2013. Land Snails and Slugs of the Pacific Northwest. Oregon State University Press, Corvallis OR. 344 pp.

Chace, E.P. and E.M. Chace. 1935. A new variety of *Monadenia fidelis* from Curry County, Oregon. Nautilus 49(2): 48.

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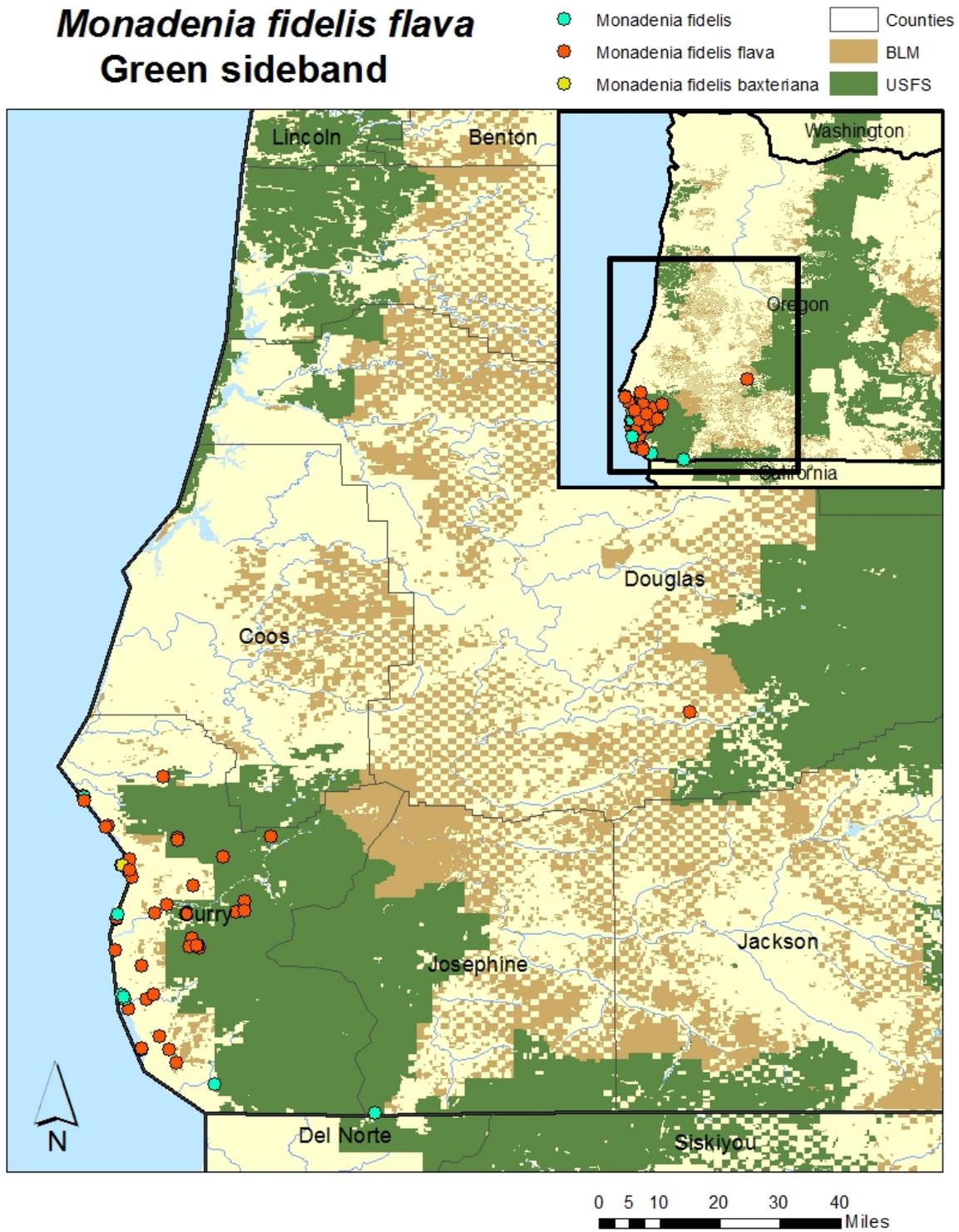
Worthing, A. 2015. Roseburg District BLM. Personal communication with Candace Fallon, the Xerces Society for Invertebrate Conservation.

2: List of Pertinent or Knowledgeable Contacts

Taxonomic experts experienced with collecting and identifying this subspecies:

- Barry Roth
- Ed Johannes (Deixis Consultants)
- Tom Burke

3: Map of known *M. f. flava* records in Oregon



Known records of *Monadenia fidelis flava* and *M. f. baxteriana* in Oregon, relative to Forest Service and BLM land. Records identified as *M. fidelis* from Curry County are also included.

4: Photographs of this subspecies



Photos of *Monadenia fidelis flava*. Note the greenish hue of the shell. Photo on left by Joseph Furnish, photo on right by Nancy Duncan; both photos used with permission.

5: Gastropoda survey protocol, including specifics for this subspecies

Survey Protocol (adapted from Foltz 2009)

Taxonomic Group

Gastropoda

Species

Monadenia fidelis flava

Please refer to the following documents for detailed mollusk survey methodology:

1. General collection and monitoring methods for both aquatic and terrestrial mollusks (pages 64-71):

Frest, T.J. and E.J. Johannes. 1995. Interior Columbia Basin mollusk species of special concern. Final report: Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA. Contract #43-0E00-4-9112. 274 pp. plus appendices.

2. Pre-disturbance surveys for terrestrial mollusk species, the objective of which is to establish whether a specific mollusk is present in proposed project areas with a reasonable level of confidence, and to document known sites discovered during surveys:

Duncan, N., Burke, T., Dowlan, S. and P. Hohenlohe. 2003. Survey protocol for survey and manage terrestrial mollusk species from the

Northwest Forest Plan. Version 3.0. U.S. Department of Interior, Bureau of Land Management, Oregon/Washington and U.S. Department of Agriculture, Forest Service, Region 6, U.S. Fish and Wildlife Service. 70 pp. Available at

http://www.blm.gov/or/plans/surveyandmanage/files/11-mollusks_v3_enclosed2.pdf (last accessed 27 February 2015).

Species-specific survey details, including:

1. Identification features
2. Historic and current distribution
3. Federal Units where species is suspected or documented
4. Areas where surveys are recommended
5. Habitat where surveys should take place
6. General survey method and instructions (e.g. time of year)

Monadenia fidelis flava (Green sideband)

Monadenia is a genus of pulmonate, terrestrial snails in the family Bradybaenidae. In the Pacific Northwest, this genus is distinguished from similar taxa as follows (Burke 2013): snails of moderate to large size (20 to 40 mm wide) with a moderate to fairly high conic spire and small, open umbilicus. Most are multi-colored (shades of brown and yellow; sometimes white and rarely greenish) with a light band around the periphery, a dark band above it, and a narrower light band above the dark one. The aperture lip is narrowly reflected, at least basally, in fully adult shells. Immature shells are shouldered or angled at the periphery and have granulations on the embryonic whorls. Adult shells mostly have a rounded periphery and are sculptured with spiral striae and growth wrinkles.

Monadenia fidelis is the largest native land snail in the Pacific Northwest. Its shell measures 31 to 38 mm wide by 20 to 27 mm high with 6 ½ to 7 ½ whorls [with the exception of *M. fidelis minor*, which is smaller] (Burke 2013). The spire is moderately to fairly high, conic or a little convex. The last whorl descends rather abruptly to the aperture, which is widely oval, its lip narrowly flared and narrowly reflected basally. The shell is white inside, but the brown color of the base and the peripheral band shows through. The umbilicus is narrow, about one-tenth the shell width. The color pattern varies but is typically dark brown or chestnut basally with a light yellow band at the periphery, a dark brown to black band just above the periphery, and a narrow yellow area above the dark band followed by a blending of the yellow and brown colors on the spire. The resulting color depends on the dominance of those two individual colors. The yellow is often replaced by white, and there are usually radial streaks of brown on the spire behind growth stop lines (Burke 2013).

The *M. f. flava* subspecies is a green form, described as follows (Frest and Johannes 2000): Shell large, to 40 mm at 5 ½ - 6 whorls; umbilicus small, contained about 18 times in diameter, about half covered by reflected peristome lip; spire much as in *fidelis*; periostracum greenish basally, sometimes greenish nearly to suture on live specimens (fades to yellow commonly on dead shells); commonly lighter in color above (often yellowish). The green color of the periostracum, often quite striking and perhaps most noticeable on the base, is very distinctive. The common Douglas County, Oregon form sometimes is slightly greenish for the last quarter to half whorl; but this taxon is large and far less distinctly green below. The relationship of this taxon to *flava* has yet to be definitively established.

Soft body anatomy is not required for field identification of this subspecies (Duncan 2005), and Curry County specimens are distinct in their color and shell shape (Burke 2013). The eggs of this species are opaque white and about 5 mm in diameter (Evergreen State College 2008). Photographs of this subspecies from Curry County, OR, are provided in Burke (2013).

This subspecies occurs primarily in Curry County, southwest Oregon, with one record known from adjacent Douglas County. In Oregon, this subspecies is documented on the Rogue River Siskiyou National Forest, Coos Bay BLM District, and Roseburg BLM District.

A number of other *Monadenia fidelis* subspecies are also present in southwest Oregon, but do not appear to overlap with the *flava* subspecies in its range in Curry County. However, the single *M. f. flava* record from Douglas County does overlap the known range of *M. f. celeuthia*. In addition, the taxon from Sisters Rocks in Ophir, OR, if considered a distinct subspecies, would overlap with *M. f. flava* along the Curry County coast. Other greenish-hued individuals have been collected on Lopez Island and the Cispus River watershed in Washington; however these are not considered synonymous with *M. f. flava*.

Additional surveys for this rare subspecies are recommended in appropriate habitat throughout Douglas county. Such surveys will be valuable in identifying the location of new populations, the viability and stability of the known populations, and the actual range of this subspecies (Duncan 2005). They may also be helpful in documenting range overlaps and any potential intergradations between *Monadenia fidelis* subspecies in the region.

The habitat for this subspecies is described as relatively low elevations in comparatively uncut, partly shaded, somewhat rocky Douglas fir forest (Frest and Johannes [n.d.]). Most sites with this taxon are seasonally moist, but rather dry, exposed, and rocky in comparison with nearby sites. The taxon appears to favor shaded basalt talus and outcrops, not open talus (Frest and Johannes [n.d.]). The parent species, *Monadenia fidelis*, is found at elevations

from near sea-level up to 1220 m (3937 ft.) where it occurs in mesic forest habitats generally with rock substrates, although in some forested sites where no rock substrates occur, the species has been found associated with logs and other large woody debris (Evergreen State College 2008, Duncan 2005). Note that mollusks which inhabit rocky habitats also utilize the surrounding forest areas during moist, cool conditions (Jordan and Black 2014). In winter, this species has been found hibernating under moss (above ground) in the crotches of bigleaf maple trees as well as buried under leaf litter at their bases (Evergreen State College 2008). Downed wood may provide temporary refugia used during dispersal in the wet season, while rock substrates provide more stable refugia used for aestivation during summer and winter, and loose soil is considered necessary for egg laying (Jordan and Black 2014). Burke (2013) recommends searching for this species under loose hanging mosses and lichens on the trunks of bigleaf maples.

Hand collection is the appropriate survey method for this subspecies (Johannes 2009, *pers. comm.*). At the species level, this taxon appears to be active on the surface mainly in spring (Evergreen State College 2008). Surveys should consider the following (species-level) ecological and seasonal information, taken from the Conservation Assessment for *M. f. minor* (Foltz Jordan and Black 2015):

The species is mainly crepuscular (active only during dawn and dusk) during the moist spring and fall seasons. During the wet seasons, it may be found in the open, away from refugia, foraging for green vegetation and fruit, feces, old leaves, leaf mold, fungi, or microorganisms found on woody debris. Daily refugia used during moist seasons can be down wood, rock or accumulations of litter. The degree of habitat connectivity for dispersal depends on the density and arrangement of shaded downed wood and other cover objects which provide daily refugia during the wet season.

During the summer, snails are found deep in talus accumulations which are adjacent to springs or streams and which serve as refuge sites from desiccation and protection from predators while they are immobile. These deep rock refugia also provide the important, environmentally stable sites needed to survive wildfire events and cold winter conditions. The distribution of these stable rock refugia sites across the landscape may determine or at least help to explain the distribution of the species in areas with short fire-return intervals. Mollusks which inhabit talus habitats also utilize the surrounding forest areas during moist, cool conditions, ranging out from the refugia provided by the rocks to forage in the adjacent forest floor litter. Vegetation within the surrounding forest not only moderates the temperature and moisture conditions within the rock habitats, but provides food, loose soil and litter conditions necessary for egg laying.

Generally, the lower one-third of a talus slope contains the largest, most stable habitat elements. Because of the long-term stability in these areas and larger interstitial spaces between the rocks, microsite conditions are more favorable and provide dependable refugia sites. Other sites with rock-on-rock accumulations, such as are common at the base of rock outcrops, may provide similar crevices.

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