

SCIENTIFIC NOTE

New Host-Plant Records for the Defoliator *Ormiscodes amphimone* (Fabricius) (Lepidoptera: Saturniidae)

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ABSTRACT - *Ormiscodes amphimone* (Fabricius) is a phytophagous moth species known to severely defoliate woody species in Chile and Argentina. Here we document new records of *O. amphimone*-host associations emphasizing the role of *Nothofagus pumilio* as its primary host in our study area. This new record for Argentina is highly significant given the economic importance of *N. pumilio* as a timber resource and the potential of *O. amphimone* to generate extensive outbreaks.

KEY WORDS: Defoliation, Hemileucinae, herbivory, insect outbreak, *Nothofagus pumilio*, Patagonia

Ormiscodes species in Chile and Argentina are large phytophagous moths (up to 95 mm wingspan) that feed on a wide variety of plant hosts (Angulo *et al* 2004). Due to their gregarious behavior during the larval stage and their potential to reach outbreak levels frequently, *Ormiscodes amphimone* (Fabricius), *O. nigrosignata* Philippi, and *O. cinammomea* Feisthabel, are considered detrimental to tree growth and timber production (Bauerle *et al* 1997).

Ormiscodes amphimone (syn. *Ormiscodes marginata* Philippi and *O. vulpina* Philippi), one of the most widespread *Ormiscodes* species in Chile and Argentina (Lemaire 2002, Angulo *et al* 2004), is known to cause severe defoliation of native tree species causing economic losses by killing saplings and reducing timber production, and by decreasing tourism in outbreak areas (Bauerle *et al* 1997, Baldini & Alvarado 2008). In Chile, where most studies and literature reviews on the biology of *Ormiscodes* species have been conducted, there are records documenting a significant number of taxonomically diverse hosts for *O. amphimone* (Table 1). On the contrary, in Argentina, the biology and economic impacts of *Ormiscodes* species are not well documented (Gentili & Gentili 1988, Giganti *et al* 1994, Paritsis *et al* 2009). Here, we present new records of host species for *O. amphimone* documented in northwestern Patagonia, Argentina, with emphasis on *Nothofagus pumilio*, which was recently recorded as a host in Chile (Baldini & Alvarado 2008).

Nothofagus pumilio is the most widely distributed species of *Nothofagus* (the predominant native tree genus in Patagonian forests) in South America, extending from 35°35'S in central Chile to 55°30'S at Cabo de Hornos

National Park (Veblen *et al* 1996, García & Ormazabal 2008). Due to the quality of its wood and the great extent of the resource, *N. pumilio* is the most important native species for timber production in southern Chile and Argentina (Martínez Pastur *et al* 2000, Peri *et al* 2002, Gea-Izquierdo *et al* 2004).

Given its broad distribution and that it commonly forms monospecific stands, *N. pumilio* has a surprisingly low number of defoliator species known to reach epidemic levels and cause defoliation. To our knowledge, only four insects are reported to cause severe and extensive defoliation on *N. pumilio* stands: an unidentified Geometridae-Larentiinae species (Bauerle *et al* 1997), an unidentified *Ormiscodes* species (A Holz, T Kizberger, M Mermoz, & S Queiro pers. com.), *Ormiscodes amphimone* [recently reported in Chile by Baldini & Alvarado (2008)], and *Ormiscodes cinammomea* (Veblen *et al* 1996; citing Gentili & Gentili 1988). However, the record of the latter species (i.e. *O. cinammomea*) as an outbreak species on *N. pumilio* is uncertain. Larvae of *O. amphimone* and *O. cinammomea* are morphologically similar (Bauerle *et al* 1997, Lemaire 2002); thus, these species may be difficult to differentiate during their larval (the most conspicuous) stage. In addition, records of *O. cinammomea* as the species responsible for generating severe defoliation on *N. pumilio* are primarily based on anecdotal observations and apparently not on the identification of adult specimens (Gara *et al* 1980, Gentili & Gentili 1988, Veblen *et al* 1996). Finally, multiple publications (including reviews) on *Ormiscodes* spp. biology do not include *N. pumilio* as a host for *O. cinammomea* (Lemaire 2002, Dapoto *et al* 2003, Baldini &

Table 1 Documented host species for *O. amphimone* in Chile and Argentina (Bourquin 1945, Bauerle et al 1997, Klein Koch & Waterhouse 2000, Lemaire 2002, Dapoto et al 2003, Angulo et al 2004, Baldini & Alvarado 2008).

Native host species	Family	Non-native host species	Family
<i>Cryptocarya alba</i>	Lauraceae	<i>Juglans regia</i>	Juglandaceae
<i>Drimys winteri</i>	Winteraceae	<i>Pinus radiata</i>	Pinaceae
<i>Lithraea caustica</i>	Anacardiaceae	<i>Populus</i> sp.	Salicaceae
<i>Luma apiculata</i>	Myrtaceae	<i>Prunus armeniaca</i>	Rosaceae
<i>Muehlenbeckia hastulata</i>	Polygonaceae	<i>Rosa</i> sp.	Rosaceae
<i>Nothofagus alpina</i> ¹	Nothofagaceae	<i>Salix babylonica</i> ²	Salicaceae
<i>N. dombeyi</i>	Nothofagaceae	<i>Salix humboldtiana</i>	Salicaceae
<i>N. obliqua</i>	Nothofagaceae	<i>Schinus molle</i>	Anacardiaceae
<i>N. pumilio</i>	Nothofagaceae	<i>Simmondsia chinensis</i>	Simmondsiaceae
<i>Peumus boldus</i>	Monimiaceae		

¹Synonyms: *Nothofagus procera*, *Nothofagus nervosa*.

²Only documented for the subspecies *Ormiscodes amphimone lauta*.

Alvarado 2008). Therefore, the role of *O. cinammomea* as an outbreak defoliator of *N. pumilio* is not certain.

On November 2003 we surveyed the vegetation at Paso Puyehue (40°43'S, 71°55'W; 1150 m.a.s.l.; mean annual precipitation circa 3000 mm) in the Nahuel Huapi National Park, searching for *Ormiscodes* egg clusters and larvae. We found circa 20 unhatched *O. amphimone* egg clusters on *N. pumilio* twigs and in subsequent surveys (on December 2003 and January 2004) we also observed multiple groups of *O. amphimone* larvae feeding on *N. pumilio* leaves.

We collected egg clusters, 1st and 2nd instar larvae, and we reared these in the laboratory with *N. pumilio* foliage until adults emerged. The adults were identified as *O. amphimone* (most likely *O. a. amphimone*, the typical subspecies) based on descriptions and figures by Lemaire (2002) and by comparison with specimens from collections of the Museo Nacional de Historia Natural in Santiago, Chile, where voucher specimens were deposited. We also found *O. amphimone* egg clusters and larvae feeding on *N. pumilio* on subsequent springs and summers (i.e., 2004, 2005, 2006 and 2007) at the same location. Eggs and larvae were also found on *Berberis buxifolia*, *Escallonia virgata*, *Nothofagus antarctica*, and *Ribes magellanicum*, but less frequently than on *N. pumilio* (Table 2). In addition to these observations at Paso Puyehue, we also documented the presence of *O. amphimone* egg clusters on a less mesic site (i.e.; Paso Cordoba, 40°36'S, 71°08'W; 1150 m.a.s.l.; mean annual precipitation circa 1000 mm) on *N. pumilio* twigs. However, at this xeric site the density of egg clusters was circa one order of magnitude lower than at Paso Puyehue. Larvae hatched from these eggs were also reared until adults emerged.

Although *O. amphimone* is known to feed on a variety of hosts, including *N. pumilio* in Chile (Baldini & Alvarado 2008), our record of *N. pumilio* as a frequent host in our study area is important given the relatively recent and severe *Ormiscodes* outbreaks on *N. pumilio* along its latitudinal gradient (Lago Rivadavia, 42°36'S, 71°41'W in 2003 and

2008; Cerro Castillo area, 46°06'S, 72°08'W in 2007, Los Glaciares N.P. 49°20'S, 72°55'W in 1999, 2001, 2003, and 2005). Although all these large and severe defoliations have been attributed to *Ormiscodes* larvae, the particular species could not be determined. Considering the new evidence provided here and the small number of species documented to severely defoliate *N. pumilio*, it is likely that all these recent defoliations were generated by *O. amphimone* larvae. This interpretation is supported by the observation that the only two *Ormiscodes* species with geographic ranges reaching south of c. 43°S along the Andes are *O. amphimone* and *O. cognata* (Lemaire 2002), and the latter species is not known to experience outbreak events.

The present record of *N. pumilio* as a host for *O. amphimone* in the eastern slopes of the Patagonian Andes constitutes an important contribution to the relatively understudied diversity of plant-insect interactions in the Patagonian forests of Argentina. The relevance of this association is reinforced by the ecological, biogeographical, and economical significance of *N. pumilio* and *O. amphimone* in this region. In this context, our record provides a foundation for future studies

Table 2 New records of plant host species for *Ormiscodes amphimone* in Argentina (field observations in Nahuel Huapi National Park). All but *Nothofagus pumilio* are also new records for the entire geographic range of *Ormiscodes amphimone*.

Species	Family	Status as host
<i>Nothofagus pumilio</i>	Nothofagaceae	Very frequent
<i>N. antarctica</i>	Nothofagaceae	Frequent
<i>Berberis buxifolia</i>	Berberidaceae	Infrequent
<i>Escallonia virgata</i>	Escalloniaceae	Infrequent
<i>Ribes magellanicum</i>	Grossulariaceae	Infrequent

focusing on ecological and biogeographical aspects of this interaction.

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References

- Angulo A O, Lemaire C, Olivares T S (2004) Catalogo crítico e ilustrado de las especies de la familia Saturniidae en Chile (Lepidoptera: Saturniidae). *Gayana* 68: 20-42.
- Baldini A, Alvarado A (2008) Manual de plagas y enfermedades del bosque nativo en Chile. Asistencia para la recuperación y revitalización de los bosques templados de Chile, con énfasis en los *Nothofagus* caducifolios. FAO/CONAF, Santiago de Chile, 240p.
- Bauerle P, Rutherford P, Lanfranco D (1997) Defoliadores de roble (*Nothofagus obliqua*), raulí (*N. alpina*), coigue (*N. dombevi*) y lenga (*N. pumilio*). *Bosque* 18: 97-107.
- Bourquin F (1945) Mariposas Argentinas: vida, desarrollo, costumbres y hechos curiosos de algunos lepidópteros Argentinos. Edición del Autor, Buenos Aires, 212p.
- Dapoto G, Giganti H, Gentili M (2003) Lepidópteros de los bosques nativos del Departamento Aluminé (Neuquén-Argentina): II Contribución. *Bosque* 24: 95-112.
- Gara R, Cerda L, Donoso M (1980) Manual de entomología forestal. Valdivia, Chile. Facultad de Ciencias Forestales, Universidad Austral de Chile, 61p.
- García N, Ormazabal C (2008) Árboles nativos de Chile. Enersis S.A. Santiago, Chile, 196p.
- Gea-Izquierdo G, Martínez Pastur G M, Cellini J M, Lencinas M V (2004) Forty years of silvicultural management in southern *Nothofagus pumilio* primary forests. *For Ecol Manage* 201: 335-347.
- Gentili M, Gentili P (1988) Lista comentada de los insectos asociados a las especies sudamericanas del género *Nothofagus*. *Monogr Acad Nac Ci Exactas, Fís Nat* 4: 85-106.
- Giganti H, Dapoto G, Gentili M (1994) Lepidópteros de los bosques nativos del Depto. Aluminé (Neuquén, Argentina). *Bosque* 15: 67-74.
- Klein Koch C, Waterhouse D F (2000) The distribution and importance of arthropods associated with agriculture and forestry in Chile. Australian Centre for International Agricultural Research Monograph no. 68.
- Lemaire C (2002) The Saturniidae of America. Hemileucinae (= Attacinae). Goecke & Evers, Keltern, 1388p.
- Martínez Pastur G, Cellini J, Peri P, Vukasovic R, Fernández C (2000) Timber production of *Nothofagus pumilio* forests by a shelterwood system in Tierra del Fuego (Argentina). *For Ecol Manage* 134: 153-162.
- Paritsis J, Veblen T T, Kitzberger T (2009) Assessing dendroecological methods to reconstruct defoliator outbreaks on *Nothofagus pumilio* in northwestern Patagonia, Argentina. *Can J For Res* 39: 1617-1629.
- Peri P, Martínez Pastur G, Vukasovic R, Diaz B, Lencinas M V, Cellini J M (2002) Propuesta de aplicación de raleos fuertes para reducir los volteos de viento en bosques de *Nothofagus pumilio* de Patagonia, Argentina. *Bosque* 23: 19-28.
- Veblen T T, Donoso C, Kitzberger T, Rebertus A J (1996) Ecology of Southern Chilean and Argentinean *Nothofagus* forests, p.293-353. In Veblen T T, Hill R S, Read J (eds) The ecology and biogeography of *Nothofagus* forests. Yale University Press, New Haven, 414p.

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