SHORT COMMUNICATION

Lycaenid caterpillars (Lepidoptera, Lycaenidae) eating flowers of Dalea pennellii var. chilensis (Fabaceae) in the northern Chilean Andes

Héctor A. Vargas

ABSTRACT. Lycaenid caterpillars (Lepidoptera, Lycaenidae) eating flowers of Dalea pennellii var. chilensis (Fabaceae) in the northern Chilean Andes. The shrub Dalea pennellii var. chilensis (Fabaceae) is reported for the first time as a host plant for three Neotropical Polyommatini (Lepidoptera, Lycaenidae, Polyommatinae): Hemiarugas ramon (Dognin, 1887), Leptotes trigemmatus (Butler, 1881) and Nabokovia faga (Dognin, 1895), based on two collections performed in the western slopes of the northern Chilean Andes in two consecutive summers. The relative abundance was always above 90% for N. faga while it was always less than 5% for H. ramon and L. trigemmatus. Furthermore, N. faga was not found on inflorescences of other native Fabaceae examined in the study site. This pattern suggests a close relationship between N. faga and D. pennellii var. chilensis, at least at a local scale.

KEYWORDS. Andean butterflies; Aridity; Fabales; florivory; inflorescence.

Despite their generally ephemeral life, flowers are important resources for many phytophagous insects (Held & Potter 2004; Wardhaugh et al. 2012; Tsuji & Sota 2013). The feeding damage on any structure of developing floral buds or mature flowers before seed coat formation is known as florivory (McCoy & Irwin 2006). In some cases the plant fitness can be seriously decreased by damage in flower structures (Straus et al. 2004). Some traits of the plants and the florivores involved in each particular system, such as their life histories and their spatial and temporal patterns of activity, are extremely important in determining the demographic consequences of the florivory for the plant (McCall & Irwin 2006; Alves-Silva et al. 2013).

Flower-feeding larvae have been reported for many families of Lepidoptera (Morais et al. 2009; Chung et al. 2011), including Lycaenidae (Chew & Robbins 1984; Fiedler 1996), with many records for representatives of the Neotropical fauna (Robbins & Aiello 1982). For instance, Lycaenidae was mentioned as the third most important lepidopteran family in number of flower-feeding species in an area of the Brazilian cerrado near Brasilia (Morais et al. 2009). This specialized feeding behaviour is apparently widespread among the larvae of Neotropical Eumaeini (Badenes-Pérez et al. 2010; Kaminski & Freitas 2010; Kaminski et al. 2010, 2012, 2013; Silva et al. 2011; Bächold et al. 2013; Robbins & Glassberg 2013; Vargas & Duarte 2014) and Polyommatini (Benyamini 1995; Duarte et al. 2001; Vargas & Parra 2009). Higher concentrations of proteins and amino acids and lower levels of alkaloids have been mentioned as possible causes underlying the specialization of lycaenid larvae to feed on rapidly differentiating plant tissue, as flowers or developing fruits (Chew & Robbins 1984).

The western slopes of the northern Chilean Andes, at about 3,000 m elevation, are characterized by a tropical xeric biome (Luebert & Pliscoff 2006), with a highly seasonal vegetation cover that generally reaches the higher levels about March-April after the summer rains, which provide the necessary water input to prompt vegetative growth (Muñoz & Bonacic 2006; Luebert & Pliscoff 2006; Vargas & Benítez 2013).

The prostrate shrub Dalea pennellii var. chilensis (Fabaceae) (Figs. 1–3) is one of the representatives of the native flora of these arid landscapes (Muñoz & Bonacic 2006). Despite the beautiful aspect of this plant during flowering, no studies dealing with its phenology are available in the literature. Preliminary field observations performed by the author indicate that flowering mostly occurs following the start of the leaf development, which begins shortly after the summer rains in the study site. Similarly, no previous studies dealing with insects associated with this shrub were found in the literature; however, Benyamini (1995) mentioned that flowers of another species of the genus, Dalea cylindrica var. sulfurea, were eaten by larvae of Nabokovia faga (Dognin, 1895), based on sampling performed in Putre, at about 3,500 m elevation in the Parinacota Province, northern Chilean Andes.

In general, the biology of the northern Chilean butterflies has been little studied, and their host plant relationships are not adequately known (Benyamini 1995). The objective of this study is to communicate the first observations on lepidopteran larvae feeding on inflorescences of D. pennellii var. chilensis,
the plants were at the peak of flowering. Procedures were repeated in March 2014 in the same site to verify adult emergence. The same collecting and rearing procedures were followed, including differentiation in host use pattern between different populations (Bowers & Richardson 2013; Dolek et al. 2013; Vargas 2013). Thus a detailed documentation of host plant relationships at the local scale is crucial to understand the local biology of butterflies.

Twenty one individuals were found in the 100 inflorescences of *D. pennellii var. chilensis* examined in the 2014 sampling, 10 of which were eggs and 11 were larvae. Differently from the previous year, only two species were represented in the sample (Table I): *N. faga* (n = 62 individuals), while *Hemiargus ramon* (Dognin, 1887) and *Leptotes trigemmatus* (Butler, 1881) were represented by three individuals each. No eggs or larvae of Lycaenidae were found in the survey of the other flowering Fabaceae.

<table>
<thead>
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<th>Species</th>
<th>January 2013</th>
<th>March 2014</th>
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<tr>
<td></td>
<td>n</td>
<td>%</td>
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<tr>
<td><em>Hemiargus ramon</em> (Dognin, 1887)</td>
<td>3</td>
<td>4.41</td>
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<tr>
<td><em>Leptotes trigemmatus</em> (Butler, 1881)</td>
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<td>4.41</td>
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<tr>
<td><em>Nabokovia faga</em> (Dognin, 1895)</td>
<td>62</td>
<td>91.18</td>
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<td><strong>Total</strong></td>
<td>68</td>
<td>100</td>
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Twenty one individuals were found in the 100 inflorescences of *D. pennellii var. chilensis* examined in the January 2013 to determine possible additional host plant associations for the species collected on *D. pennellii var. chilensis*. All the inflorescences collected of *Adesmia spinosissima* (n = 30 plants), *Adesmia verrucosa* (n = 10), *Lupinus aereophilis* (n = 30) and *Senna birostris var. arequipensis* (n = 40) were carefully examined. Voucher specimens obtained in the rearing of the immature stages collected in the two sampling periods are deposited in the Colección Entomológica de la Universidad de Tarapacá (IDEA), Arica, Chile.

As a result of the sampling carried out in 2013, 68 individuals were counted in the 100 inflorescences of *D. pennellii var. chilensis* examined, 19 of which were eggs and 49 were larvae. Three species of the Neotropical Polyommatini were identified in the sample (Table I): *N. faga* was the most abundant (n = 62 individuals), while *Hemiargus ramon* (Dognin, 1887) and *Leptotes trigemmatus* (Butler, 1881) were represented by three individuals each. No eggs or larvae of Lycaenidae were found in the inflorescences of *Dalea pennellii var. chilensis* and its flower-feeding Lycaenidae in the western slopes of the northern Chilean Andes in January 2013 and March 2014.

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In January 2013, as part of a survey of Lepidoptera associated with native plants in northern Chile, eggs and larvae of Lycaenidae were found on inflorescences of *Dalea pennellii var. chilensis* in January 2013. *N. faga* (Butler, 1895) was the most abundant (n = 62 individuals), while *Hemiargus ramon* (Dognin, 1887) and *Leptotes trigemmatus* (Butler, 1881) were represented by three individuals each. No eggs or larvae of Lycaenidae were found in the survey of the other flowering Fabaceae.
northern Chilean Atacama Desert on inflorescences of the native Acacia macracantha and the exoticMedicago sativa (Benyamini 1995; Vargas & Parra 2009). These same two plants are also consumed by larvae of L. trigemnatus in the same habitats (Benyamini 1995; Vargas & Parra 2009). In addition, Prosopis tamarugo is an important host plant of L. trigemnatus in the Pampa del Tamarugal, another hyper-arid area of the Atacama Desert located at about 1,000 m elevation. Also, the exotic plants Aloysia looseri (Verbenaceae) and Plumbago capensis (Plumbaginaceae) have been reported as hosts for L. trigemnatus in central Chile (Benyamini 1995; Peña & Ugarte 1996).

This is the first report of the plant genus Dalea as a host for H. ramon and L. trigemnatus. Although the low abundance detected for both species in the assemblage suggests a weak relationship between these butterflies and D. pennellii var. chilensis, this new record is helpful to understand the presence of both butterflies in the study area, where their other native host plants are absent. Furthermore, these weak host plant relationships and the absence of other native hosts could be underlying factors of the low abundance generally observed for adults of both species in many sites of the northern Chilean Andes (unpubl. data), contrasting with other landscapes of northern Chile where other native host plants (e.g.: A. macracantha and P. tamarugo) are available for egg-laying and larval development, and adults of both species can be easily found at least during part of the year (Benyamini 1995).

Besides the previous host record of D. cylindrica var. sulfae for N. faga, Benyamini (1995) also indicated the Fabaceae Adesmia melanthes as a host plant for this species. Thus D. pennellii var. chilensis is the second host plant in the genus Dalea recorded for N. faga. The data presented here suggest a strong relationship between D. pennellii var. chilensis and N. faga, as this species was always the most abundant in the assemblage (Table I). This suggestion is also corroborated by the absence of eggs and larvae of N. faga on all other native Fabaceae examined in the study site at the same time that these were abundant in the inflorescences of D. pennellii var. chilensis.

Interestingly, the abundance of N. faga was more than three times greater in the 2013 sampling, when the inflorescences were mostly at bud stage, than in the 2014 sampling with the inflorescences at flowering peak (Table I). Unfortunately, the phenology of the northern Chilean Andes butterflies has been little investigated. However, as also mentioned for some other Neotropical lepidopterans (Bendicho-Lopez et al. 2003; Pessoss-Queiroz et al. 2008; Muniz et al. 2012), an important role of the host plant phenology was mentioned for the temporal variation of the host-specialist butterfly Teriocoliaezelia andina Forbes, 1928 (Pieridae, Coliadinae) in the same study site (Vargas 2012; Vargas & Benitez 2013). Thus the pattern here reported for N. faga, with a striking variation in the abundance between two successive summers, deserves further attention as the collections were performed at different flowering stages.

Nabokovia faga occurs in the Andes from southern Ecuador to northern Chile (Peña & Ugarte 1996; Bálint & Wojtusiak 2005). The fabacean genus Dalea is well represented through a great part of this range (Baldeón et al. 2006) which suggests the availability of many potential host plants for this butterfly. At a local scale, additional field and laboratory studies are required in order to characterize better the host plant range and the field biology of N. faga in the western slopes of the northern Chilean Andes.

ACKNOWLEDGEMENTS

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REFERENCES


