Seasonality of Predaceous Plant Bugs (Heteroptera: Miridae) and Phytophagous Thrips (Thysanoptera: Thripidae) as Influenced by Host Plant Phenology of Native Azaleas (Ericales: Ericaceae)

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ABSTRACT Seasonal synchrony of phytophagous insects, especially *Heterothrips azaleae* Hood, and the predaceous mirids *Dicyphus rhododendri* Dolling and *Rhinocapsus vanduzeei* Uhler, was determined on five species of native deciduous azaleas (*Rhododendron* spp.) during 1990–1993. Florida, Alabama, Piedmont, and Flame azaleas supported populations of *H. azaleae;* Plumleaf azalea did not. Peak adult and larval activity of this species of thrips varied with sequence of flowering during April and May. While *R. vanduzeei* was present on all azalea species, except Plumleaf, *D. rhododendri* was found to be abundant only on Florida azalea and occurred more rarely on Alabama azalea. *Dicyphus rhododendri* nymphs emerged in late March or early April, 2–3 wk before *R. vanduzeei* nymphs emerged from overwintering eggs, which were inserted into the woody plant tissue. Adult *D. rhododendri* became scarce after mid-May. *Rhinocapsus vanduzeei* adults were present until the last week of June. Although both species are known to be pollen feeders, scavengers, or both, they were observed to be active effective predators of thrips and other small insects in the field and in laboratory tests. Additional thrips species collected were Terebrantia: *Frankliniella tritici* (Fitch), *Anaphothrips obscurus* (Muller), *Chaetanaphothrips orchidii* (Moulton), *Thrips nigropilosus* Uzel, and Tubulifera: *Leptothrips mali* (Fitch). Seasonal occurrence of additional phytophagous Hymenoptera, Lepidoptera, and Homoptera are given.

KEY WORDS mirids, azaleas, predation

THIS ARTICLE EXAMINES the relationships among two predaceous mirids, selected prey, and five deciduous azalea host species that differ in timing of leaf flush and bloom. Azaleas, *Rhododendron* spp., are among the most widely-used landscape plants. These include both evergreen, deciduous plants, and literally thousands of named cultivars (Galle 1987). We sought to evaluate the interactions of phytophagous species and their potential predators on indigenous azaleas in Georgia because of a resurgence of interest in native North American deciduous azaleas as landscape plants, increasing commercial availability of these plants, and an absence of available information.

North American species of deciduous azaleas occupy two distinct geographic regions; (1) the Atlantic coast from southern Quebec to central Florida and west to Vermont, eastern Ohio, southeastern Oklahoma, and eastern Texas; and (2) on the Pacific coast from southern Oregon to southern California (Galle 1987). While >42 insect and mite species are at least occasional pests on cultivated evergreen azaleas (Johnson & Lyon 1988), few insect pests are reported to occur on native deciduous species. For example, *Stephanitis pyrioides* Scott, the azalea lace bug, is a widely-distributed pest of evergreen azaleas (e.g., Braman et al. 1992 and the references therein), but was found to be of little significance on the deciduous types (Braman & Pendley 1992). However, preliminary observations of fauna inhabiting well established deciduous azaleas in naturalized settings suggested a consistent colonization of these plants by potential pest and beneficial insect species. Here we focus on two potential predators, *Dicyphus rhododendri* Dolling and *Rhinocapsus vanduzeei* Uhler, the azalea plant bug, as we report their seasonal occurrence in relation to early season prey, *Heterothrips azaleae* Hood, and variable host plant phenologies.

Materials and Methods

Study Site and Host Plant Species. The native wildflower area of Callaway Gardens, Pine Mountain, GA, served as the study site for determining

Table 1. Characteristics of *Rhododendron* spp. sampled at Pine Mountain, GA, 1990–1993

Species	Azalea common names	Time of blooming	Flower color	Hardiness zone
R. austrinum	Florida	Mar/April	golden yellow	6
R. canescens	Piedmont	Mar/April	white–pink	9–6a
R. calendulaceum	Flame	April/May	yellow orange–deep red	8b–5a
R. albamense	Alabama	May	white	6b–9a
R. prunifolium	Plumleaf	July/Aug.	orange–deep red	9a–6a

seasonal activity of *D. rhododendri*, *R. vanduzeei*, *H. azaleae*, and other pest species. Large, mature plantings of deciduous azaleas provided an ideal opportunity to compare the fauna on different species. Five *Rhododendron* species were selected based on timing of flowering and abundance of mature plants within the facility (Table 1).

Mirid Population Sampling. During 1990, direct visual observations of insect occurrence on 12 plants of each species within the garden were made on 12 and 23 April, 8 and 22 May, 12 and 26 June, 15 August, and 7 September. The same 12 plants of each species were monitored during 1991, except that insects were dislodged from the foliage by sharply beating six 30 cm sections of foliage over an enamel pan. Insects were collected, placed in vials containing 70% ethanol and returned to the laboratory for identification. During 1992 and 1993 beat samples were obtained on Florida and Alabama azalea, but were not collected on Plumleaf, Piedmont, or Flame azaleas. Additional potential pest species observed during the sampling period were also collected, counted, and identified.

Occurrence of overwintered mirid eggs was determined by collecting six terminals from each of the five azalea species on 6 March 1991 before the appearance of flowers or leaves. One terminal was selected at random from each of six individual plants representing each azalea species. Terminals were transferred to the laboratory and examined under the microscope for the presence of eggs inserted into the stems. The number of eggs was compared among plant species using a least significant difference test following an analysis of variance at $P = 0.05$. Terminals containing eggs were placed in tap water at room temperature (≈25°C) in an acrylic cage to await emergence of nymphs for species confirmation.

Thrips Population Sampling. Four sets of three inflorescences of each species were collected and placed in plastic bags on ice in a cooler, returned to the Georgia Station, and placed on Berlese funnels for five days to extract their inhabitants (thrips and first-instar mirids). During 1991, 1992, and 1993 samples were taken approximately once per week during the blooming phase for each species. Samples were continued during flower senescence until corolla, pistil, and stamens were no longer present and only seed pods remained.

Observations of Predation. Visual observations of predation by mirids were recorded in the field. In addition, mirids were offered prey in petri dishes in the laboratory. Nymphs were collected from landscape plants, placed in 32-ml plastic cups in a cooler and returned to the laboratory. Consumption during 24 h of adult *H. azaleae* by ($n = 20$) fifth-instar mirids was determined in the laboratory. Mirids were held for 12 h with only water. They were then provided individually with 10 adult thrips on a closed flower bud in a petri dish with a friction fitting lid. Number of thrips that were dead, alive, or missing was recorded after 24 h. Dishes containing thrips with no mirids served as controls. Azalea plant bugs are common on evergreen azaleas (personal observation) and were, therefore, offered a key pest species, azalea lace bug in consumption tests. *Rhinocapsus vanduzeei* fifth instar nymphs ($n = 20$) were exposed to 20 fifth-instar azalea lace bug nymphs during a 24-h period. Student's *t*-test was used to compare consumption of thrips by the two mirid species and consumption of lace bugs versus thrips by *R. vanduzeei*.

Results

Mirid Population Sampling. Mirid eggs were observed on all azalea species except Plumleaf, but were most abundant on Florida azalea (Table 2). Eggs were located most often at the base of flower buds rather than in leaf scars. Only *R. vanduzeei* emerged from eggs present in terminals collected on 6 March, 1991. In the landscape at the study site, however, both species were abundant. First-instar nymphs of both species were found in flowers rather than on foliage and

Table 2. Overwintered eggs of *R. vanduzeei* in deciduous azaleas, *Rhododendron* spp.

Species	Mean + SEM no. eggs per terminal		
	Flower bud base	Leaf scars	Total
R. austrinum	6.0 ± 2.6a	0.2 ± 0.1ns	6.2 ± 2.7a
R. canescens	0.2 ± 0.2b	0	0.3 ± 0.2b
R. calendulaceum	0.8 ± 0.3b	0.4 ± 0.3	1.2 ± 0.3b
R. albamense	0.8 ± 0.5b	0	0.8 ± 0.5b
R. prunifolium	0b	0	0b

Means within a column followed by the same letter are not significantly different ($P > 0.05$, Fisher's protected least significant difference test). NS, nonsignificant.

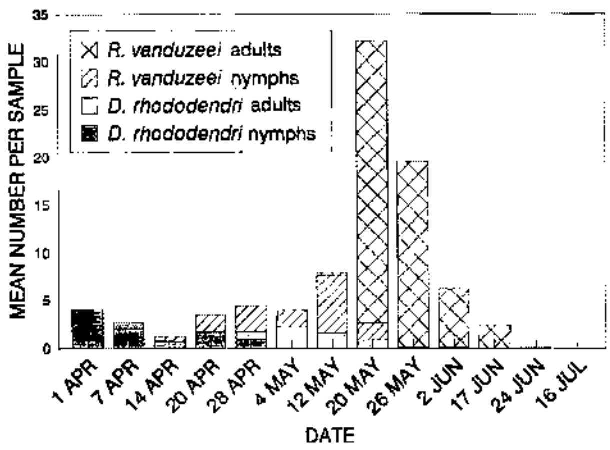

Fig. 1. Relative abundance of the mirids *Dicyphus rhododendri* and *Rhinocapsus vanduzeei* on deciduous azaleas, *Rhododendron* spp., during 1993.

are translucent to deep yellow in color. Later instars were active on foliage in addition to flowers and were a vibrant red.

Rhinocapsus vanduzeei nymphs and adults were present on all azalea species except Plumleaf (Fig. 1, Table 3). *D. rhododendri* was found only on Florida and Alabama azaleas. Emergence of *D. rhododendri* preceded that of *R. vanduzeei* by ≈2–3 wk each year. *D. rhododendri* nymphs were first recorded in late March or early April and had completed development by mid- to late April. Adults were rarely present after mid-May. Nymphs of *R. vanduzeei* emerged from overwintered eggs in early to mid-April each year. Peak adult abundance occurred in mid-May. Adults were present in low numbers until late June. Slight variation in timing of occurrence of mirids was apparent depending on host plant species (Fig 1; Table 3) and generally followed the sequence of flowering (Table 1).

Thrips Population Sampling. Florida, Alabama, Piedmont, and Flame azaleas supported populations of *H. azaleae;* Plumleaf did not. Peak adult and larval activity of this thrips varied with sequence of flowering during April and May (Fig. 2; Table 3), but in general coincided with activity of *D. rhododendri* and *R. vanduzeei*. Adult *H. azaleae* became active on flowers, especially Florida azalea, in early April. Peak larval abundance occurred from mid-April to mid-May depending on host plant species. Alabama azaleas, which bloom later in the spring, were apparently colonized later during the period of adult activity. As mentioned previously, no *H. azaleae* were recovered from Plumleaf azaleas, which do not bloom until July or August, and sporadically in September. However, large numbers of larvae (mean = 34.0 per sample) of this species were collected during September, 1992, in late blooming Sweet azalea flowers, *Rhododendron arborescens* (Pursh) Torrey. This suggests the occurrence of more than one generation per year of *H. azaleae*.

Frankliniella tritici (Fitch) was more common on Alabama azalea than *H. azaleae* during 1992 and 1993 (Fig. 2; Table 3). This species was also present in Plumleaf azalea flowers collected during September, 1992 and 1993 (unpublished data). Additional thrips species collected in very low numbers included Terebrantia: *Anaphothrips obscurus* (Muller), *Chaetanaphothrips orchidii* (Moulton), *Thrips nigripilosos* Uzel, and Tubulifera: *Leptothrips mali* (Fitch).

Activity of Additional Potential Pest Species. Phytophagous insects consistently observed in abundance during 1990–1993 included the leafhopper *Erythroneura (Eratoneura) claroides* Hepner. Stippling damage similar to that caused by azalea lace bug is symptomatic of infestation by *E. claroides* which was found reproducing on all azalea species except *R. prunifolium* (Plumleaf). An undescribed species of gelechiid in the genus *Coleotechnites* tunneled in the growing tips of all species of azaleas examined. Flagging and dieback were typical results of infestation by this species. A second undetermined gelechiid infested the flowers of all species, but was most common on Flame azaleas. During 1991, a survey of seven *R. calendulaceum* plants bearing (2,394 flowers) revealed that 47.6 ± 0.6% (mean ± SEM) flowers were infested with larvae. Infested buds either failed to open or were partially consumed with the remainder of the inflorescence covered in unsightly frass.

The sawfly *Arge abdominalis* (Leach) was common on Piedmont, Flame, and Alabama azaleas and occasionally occurred on Florida azaleas. It was not collected from Plumleaf azaleas during 1990–1993. Larvae that were returned to the laboratory and reared often were parasitized by *Tetrastichus trisulcatus* Provancher, a eulophid wasp known to parasitize many species of sawflies. Periods of activity and abundance of these phytophagous species overlapped primarily with that of *Rhinocapsus vanduzeei* (Fig. 3).

Observations of Predation. Adults and nymphs of both mirid species were observed feeding on a variety of small insects, including thrips on azaleas at Callaway Gardens. Insects most commonly noted as prey during direct visual observations included small dipterans, aphids, whiteflies, and leafhoppers. In addition to actively capturing live insects, *D. rhododendri* adults often took advantage of small insects trapped in sticky glandular exudates that are especially characteristic of Florida azalea.

Nymphs of both species were able to capture and consume *H. azaleae* adults in the laboratory (Fig. 4). Adult mirids, however, did not feed on thrips when exposed in a similar manner. Approximately equal numbers of thrips were killed and consumed on average by *D. rhododendri* and *R. vanduzeei:* 4.7 ± 0.6 versus 4.1 ± 0.6,

Table 3. Seasonal occurrence of thrips and mirids on deciduous azaleas in Georgia (1991 and 1992)

Date	Mean ± SEM no. per sample							
	H. azaleae adults	*H. azaleae* larvae	*F. tritici* adults	*F. tritici* larvae	*D. rhododendri* nymphs	*D. rhododendri* adults	*R. vanduzeei* nymphs	*R. vanduzeei* adults
1991	*R. austrinum* (Florida azalea)							
3 April	7.0 ± 3.3	10.2 ± 4.5	0	0	8.25 ± 1.4	0	0	0
9 April	0	12.2 ± 5.2	0	0	7.2 ± 1.4	0.7 ± 0.4	1.0 ± 0.3	0
17 April	0	0.5 ± 0.4	0	0	2.7 ± 1.4	0 ± 0	1.0 ± 0.3	0
25 April	0	0.3 ± 0.1	0	0	0	1.7 ± 0.8	1.2 ± 0.3	0
30 April	0	0	0	0	0	0.8 ± 0.2	1.2 ± 0.6	0.1 ± 0.1
6 May	0	0	0	0	0	0.7 ± 0.2	0.5 ± 0.2	0.2 ± 0.1
15 May	0	0	0	0	0	0.3 ± 0.2	0	0.4 ± 0.2
23 May	0	0	0	0	0	0.8 ± 0.1	0	0.4 ± 0.1
31 May	0	0	0	0	0	0	0	0.3 ± 0.2
6 June	0	0	0	0	0	0	0.1 ± 0.1	0
11 June	0	0	0	0	0	0	0	0
20 June	0	0	0	0	0	0	0	
1992								
17 March	0	0	0	0	0	0	0	0
24 March	0	0	0	0	0	0	0	0
31 March	0.9 ± 0.2	0	0	0	0	0	0	0
14 April	0.9 ± 0.2	58.0 ± 22.6	0	0	0	1.2 ± 0.3	0.9 ± 0.2	0
21 April	0.8 ± 0.3	50.0 ± 15.8	0	0	0.1 ± 0.1	4.0 ± 0.8	0.8 ± 0.3	0
27 April	0	19.0 ± 13.0	0.2 ± 0.1	0	0	0.6 ± 0.1	0.3 ± 0.1	0
4 May	0	0.7 ± 0.2	0.1 ± 0.1	0	0	1.0 ± 0.4	0.7 ± 0.2	0
11 May	0	0	0	0	0	0	0	0
20 May	0	0	0	0	0	0.4 ± 0.2	0.1 ± 0.1	0.8 ± 0.2
28 May	0	0	0	0	0	0.2 ± 0.1	0	0.9 ± 0.3
2 June	0	0	0	0	0	0.1 ± 0.1	0	0
17 June	0	0	0	0	0	0	0	1.0 ± 0.3
30 June	0	0	0	0	0	0	0	0
1991	*R. albamense* (Alabama azalea)							
3 April	0	0	0	0	1.3 ±	0	0	0
9 April	0	0	0	0	0.7 ±	0	0.1 ± 0.1	0
17 April	1.8 ±	1.5 ±	0	0	0.2 ±	0.4 ± 0.1	0.8 ± 0.1	0
25 April	0.3 ±	3.8 ±	0	0	0	0.8 ± 0.3	0.2 ± 0.1	0
30 April	0	7.8 ±	0	0	0	1.0 ± 0.5	1.8 ± 0.5	0
6 May	0	0.8 ±	2.0 ±	0	0	3.0 ± 0.1	0.4 ± 0.2	0.8 ± 0.3
15 May	0	0	0	0	0	0.2 ± 0.1	0	1.0 ± 0.8
23 May	0	0	0	0	0	0	0	1.3 ± 0.8
31 May	0	0	0	0	0	0	0	0
6 June	0	0	0	0	0	0	0.1 ± 0.1	0.2 ± 0.2
11 June	0	0	0	0	0	0	0	0.3 ± 0.1
20 June	0	0	0	0	0	0	0	0
1992								
17 March	0	0	0	0	0	0	0	0
24 March	0	0	0	0	0	0	0	0
31 March	0	0	0	0	0	0	0	0
14 April	0	0	0	0	0	0	0	0
21 April	0	0	0	0	0	0	0	0
27 April	0.1 ± 0.1	0	0	0	0	0	0	
4 May	0.1 ± 0.1	0	0.2 ± 0.1	0	0	0	0	0
11 May	0	0	0.2 ± 0.1	0	0	0	0	0
20 May	0	0	0.7 ± 0.4	2.0 ± 0.7	0	0	0	12.8 ± 3.3
28 May	0	0	0.3 ± 0.2	3.0 ± 3.0	0	0	0	5.7 ± 0.9
2 June	0	0	5.7 ± 2.0	7.3 ± 1.6	0	0	0	6.3 ± 2.0
17 June	0	0	1.0 ± 0.4	1.5 ± 0.4	0	0	0	0.1 ± 0.1
30 June	0	0	0	0	0	0	0	0
1991	*R. calendulaceum* (Flame azalea)							
3 April	6.2 ± 3.6	2.0 ± 2.0	0	0	0	0	0	0
9 April	0.3 ± 0.2	5.3 ± 3.0	0	0	0	0	0	0
17 April	0	0.3 ± 0.2	0	0	0	0	0	0
25 April	0	4.3 ± 2.4	0	0	0	0	0.4 ± 0.1	0
30 April	0	0	0.5 ± 0.2	0	0	0	0	0.3 ± 0.1
6 May	0	0	0	0	0	0	0.3 ± 0.1	0.2 ± 0.1
15 May	0	0	0	0	0	0	0	0
23 May	0	0	0	0	0	0	0	0
31 May	0	0	0	0	0	0	0	0.1 ± 0.1
6 June	0	0	0	0	0	0	0	0
11 June	0	0	0	0	0	0	0	0
20 June	0	0	0	0	0	0	0	0

Table 3. Continued

Date	Mean ± SEM no. per sample *H. azaleae* adults	*H. azaleae* larvae	*F. tritici* adults	*F. tritici* larvae	*D. rhododendri* nymphs	*D. rhododendri* adults	*R. vanduzeei* nymphs	*R. vanduzeei* adults
1992								
17 March	0	0	0	0	—	—	—	—
24 March	0	0	0	0	—	—	—	—
31 March	0	0	0	0	—	—	—	—
14 April	0	0	0	0	—	—	—	—
21 April	0	0	0	0	—	—	—	—
27 April	0	4.5 ± 3.2	0	0	—	—	—	—
4 May	0	17.0 ± 4.0	0	0	—	—	—	—
11 May	0	0	0.1 ± 0.1	9.5 ± 2.2	—	—	—	—
20 May	0	0	0.2 ± 0.1	8.5 ± 5.4	—	—	—	—
28 May	0	0	0.3 ± 0.2	32.5 ± 3.0	—	—	—	—
2 June	0	0	0.2 ± 0.1	8.0 ± 3.3	—	—	—	—
17 June	0	0	0	0.5 ± 0.2	—	—	—	—
30 June	0	0	1.0 ± 0.8	5.3 ± 1.8	—	—	—	—
7 July	0	0	2.0 ± 1.0	4.5 ± 1.1	—	—	—	—
22 July	0	0	0	0	—	—	—	—
1991				*R. canescens* (Piedmont azalea)				
3 April	7.0 ± 4.0	10.0 ± 3.8	0	0	0	0	0	0
9 April	1.9 ± 0.8	0	0	0	0	0	0.1 ± 0.1	0
17 April	0	2.8 ± 2.4	0	0	0	0	1.25 ± 0.8	0
25 April	0	0.8 ± 0.7	0	0	0	0	0.1 ± 0.1	0
30 April	0	0.7 ± 0.6	1.0 ± 0.9	0.8 ± 0.7	0	0	0.5 ± 0.1	0
6 May	0	0	0	0	0	0	0.1 ± 0.1	0.1 ± 0.1
15 May	0	0	0	0	0	0	0	0.4 ± 0.1
23 May	0	0	0	0	0	0	0	0
31 May	0	0	0	0	0	0	0	0.1 ± 0.1
6 June	0	0	0	0	0	0	0	0
11 June	0	0	0	0	0	0	0	0
20 June	0	0	0	0	0	0	0	0

respectively (mean ± SEM, $t = 0.7$, df = 38, $P = 0.49$). *Rhinocapsus vanduzeei* fifth instars also successfully killed fifth-instar azalea lace bugs. More fifth-instar lace bugs were killed than adult thrips: 7.4 ± 0.6 versus 4.1 ± 0.6 (mean ± SEM, $t = 3.77$, df = 38, $P = 0.0006$) by *R. vanduzeei*. This difference may in part be the result of experimental limitation in ability to accurately categorize fate of prey items. While all lace bug nymphs were recovered and scored as dead or alive, missing thrips averaged 1.7 and 1.6 in petri dishes containing *D. rhododendri* or *R. vanduzeei*, respectively. Often, however, dead lace bugs were still turgid indicating that hemolymph had not been withdrawn from the insect. This suggests that under these confined conditions, the mirid killed more lace bugs than were actually consumed.

Discussion

Stannard (1968) records *H. azaleae* as "a thrips of the southeastern United States whose range barely extends into Illinois." Little published information is available regarding the biology or potential for injury to azalea flowers. We observed little cosmetic damage to floral parts, although early flower senescence appeared to be thrips induced and the effect of thrips on seed set was not quantified. One generation of thrips was produced on the spring blooming azaleas. The existence of a second generation was suggested by populations found on late blooming Sweet azalea.

H. azaleae may also serve as a source of early season prey for the two mirids observed during this study. Wheeler & Herring (1979) described the pollen feeding behavior of *R. vanduzeei* on azaleas in Pennsylvania. Feeding by nymphs and adults on stamens caused the filaments to atrophy, potentially affecting seed production. Later stage nymphs were observed to complete development on early blooming azaleas after all flowers had dropped from the plant suggesting that *R. vanduzeei* was not an obligatory flower feeder. An understanding of the relative contribution of phytophagy and the predaceous habit to development, survival, and reproductive capacity will be necessary to enhance the beneficial aspects of this insect's life history attributes in managed landscape settings.

Seasonal activity of *R. vanduzeei* in Pennsylvania was similar to that reported here in Georgia, although phenological events were observed to occur somewhat later. Eggs hatched in early- to mid-May, first adults were observed in early-June, and adults had largely disappeared by early- to mid-July. Egg hatch appeared to take place earlier on early blooming azalea varieties, a phenomenon also observed in the present study.

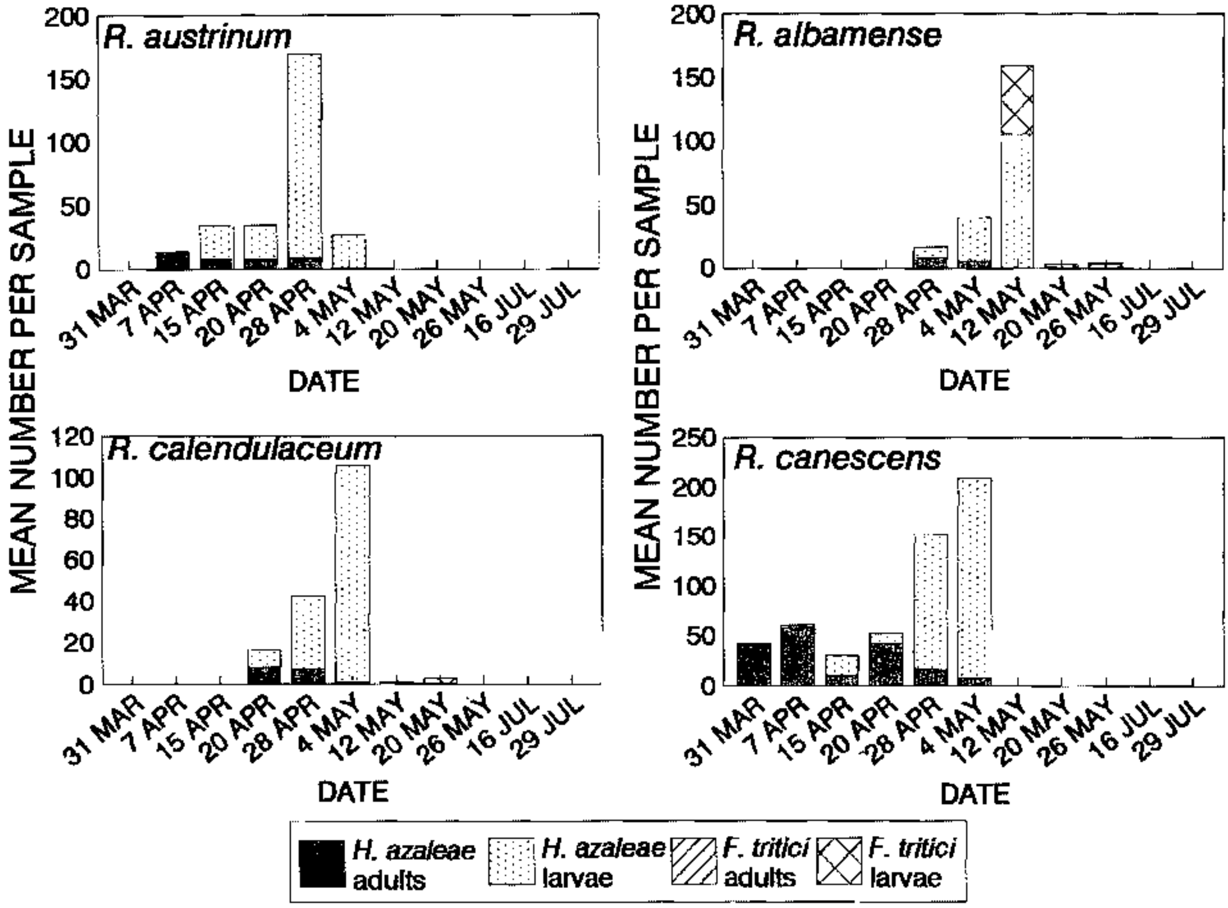

Fig. 2. Abundance of adult and larval thrips in deciduous azalea flowers during 1993.

Dicyphus rhododendri was initially reported in association with and feeding on the aphid *Masonaphis* sp., on *Rhododendron* spp. in England (Dolling 1972). Although described from England, the species originated in the Nearctic (Henry & Wheeler 1976). Scavenging habits are common in the family Miridae. Henry & Wheeler (1988) state that species of *Dicyphus* living on glandular-hairy plants will feed on tiny insects trapped on the sticky stems and leaves. We observed this scavenging habit in the landscape most often with *D. rhododendri* and occasionally with *R. vanduzeei*.

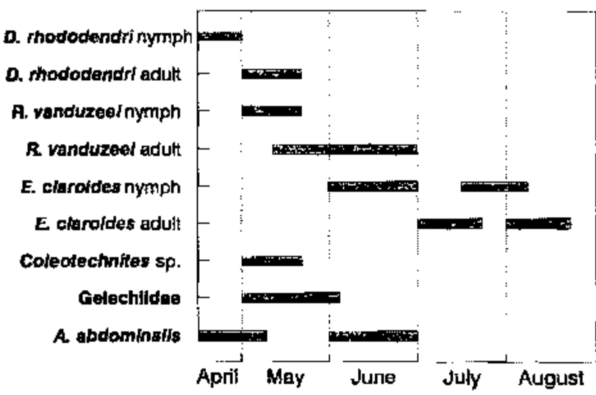

Fig. 3. Seasonal occurrence of phytophagous insects on *Rhododendron* spp. in relation to occurrence of two predaceous mirids as observed during 1990–1993.

Interest in heteropteran predators in agricultural systems often focuses on predaceous damsel bugs (Nabidae), big-eyed bugs (Lygaeidae), stink bugs (Pentatomidae), or minute pirate bugs (Anthocoridae). However, many plant bugs are important predators of arthropod pests (Henry & Wheeler 1988). Most species of *Phytocoris* Fallén and *Deraecoris* Kirshbaum are predatory on arthropods of woody plants. We have determined that two species of mirids with potential as predators can be abundant on landscape plants. Laboratory assessment of predation on two pest species confirmed observed predatory habits of *R. vanduzeei* and *D. rhododendri*. An evaluation of seasonal patterns of abundance indicated an overlap with the occurrence of potentially serious pest species on deciduous azaleas.

The predatory behavior of *R. vanduzeei* and *D. rhododendri* observed during our study, their relative abundance, and close synchrony with seasonal occurrence of potentially serious pests of deciduous azaleas suggest their potential importance as natural enemies on native *Rhododendron* spp. We have observed *R. vanduzeei* to

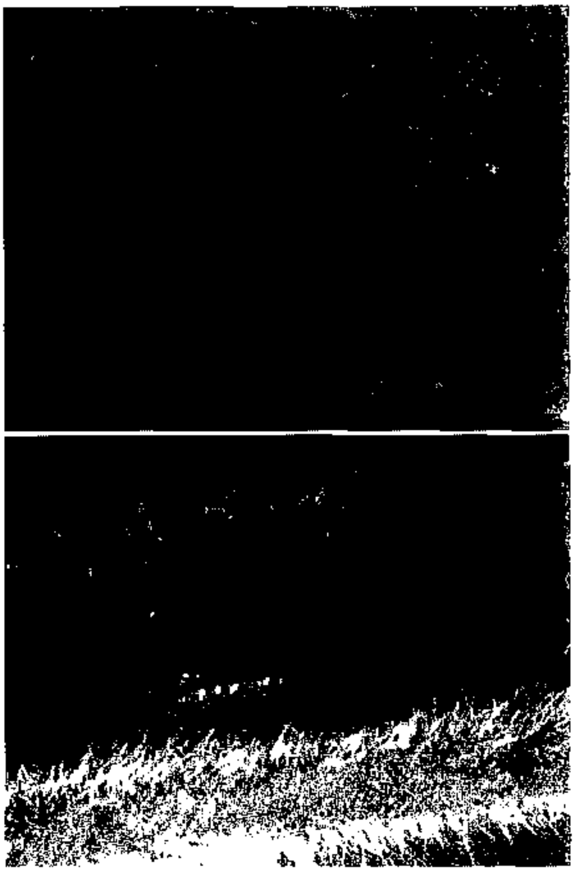

Fig. 4. Predation on *Heterothrips azaleae* adults by (A) *Rhinocapsus vanduzeei* and (B) *Dicyphus rhododendri*.

prey on whiteflies and lepidopteran eggs in addition to azalea lace bugs on evergreen azaleas. *Rhinocapsus vanduzeei* is also a common inhabitant of cultivated evergreen varieties where its habits as a general predator merit additional study.

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