Plants and butterflies of a small urban preserve in the Central Valley of Costa Rica

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Abstract: Costa Rica’s most populated area, the Central Valley, has lost much of its natural habitat, and the little that remains has been altered to varying degrees. Yet few studies have been conducted to assess the need for conservation in this area. We present preliminary inventories of plants, butterflies, and day-flying moths of the Reserva Ecológica Leonelo Oviedo (RELO), a small Premontane Moist Forest preserve within the University of Costa Rica campus, located in the urbanized part of the Valley. Butterflies are one of the best bio-indicators of a habitat’s health, because they are highly sensitive to environmental changes and are tightly linked to the local flora. A description of the RELO’s physical features and its history is also presented with illustrations. Approximately 432 species of ca. 334 genera in 113 families of plants were identified. However, only 57 % of them represent species native to the Premontane Moist Forest of the region; the rest are either exotic or species introduced mostly from lowland. More than 200 species of butterflies in six families, including Hesperiidae, have been recorded. Rev. Biol. Trop. 57 (Suppl. 1): 31-67. Epub 2009 November 30.

Key words: biodiversity, urban biological conservation, day-flying moths, Lepidoptera, premontane moist forest, Costa Rica.

Costa Rica’s Central Valley (Fig. 1), where the capital city of San José is located and over 40% of the country’s entire population reside (ICT 2007), may be roughly defined as an area delimited by Carrizal, Grecia to Turrúcares in the Northwest, Cerros de Escazú in the Southwest, Cerro de Ochomogo in the Southeast, and El Zurquí de Moravia in the Northeast. Along the edges of the Valley are several protected areas, such as the upper part of Cerro Carpintera, Cerros de Escazú, Braulio Carrillo National Park bordering El Zurquí, and Zona Protectora El Rodeo, but these are essentially located outside the Valley. The flat land of the Central Valley, the so-called ‘Meseta central’, has long been the coffee belt (León 1948). Further reduction of the natural habitats (Sánchez-Azofeifa et al. 2001, Vega & Valerio 2002, Bertsch 2006, Programa Estado de la Nación 2006) and uncontrolled introduction of exotic and other non-local ornamental plants (Chacón & Saborío-R 2006), especially in San José and other populated areas of the Central Valley, have adversely affected the biodiversity in these areas. Lack of substantial green space that preserves natural vegetation within these populated areas is another major contributing factor to this trend.

Efforts towards the inventory of Costa Rica’s biodiversity of plants, fungi, insects and some other invertebrates were pioneered by the National Museum at the end of the XIX century, by the University of Costa Rica since 1941, the National University (since 1973), and
recently by the Instituto Nacional de Biodiversidad (INBio). The latter uncovered approximately 2500 new species in the last 17 years of operation (INBio 2004, 2005, 2007), and the massive caterpillar rearing project led by D.H. Janzen & W. Hallwachs over nearly 30 years has produced a large and invaluable database on the Lepidoptera and their parasitoids of the Area de Conservación Guanacaste (Janzen & Hallwachs 2007a, b). These projects specifically target large protected areas. It is unfortunate that much less attention has been given to the unprotected areas and urban preserves, where rapid and extensive destruction, fragmentation and alterations of natural habitats are in progress at an ever accelerating pace. Clearly, an urgent need exists for preserving natural habitats and studying what may still survive in such areas. Nowhere is this need more acute than in the Central Valley (see Discussion), yet only a few such studies have been conducted thus far with regard to butterflies. Besides DeVries (1987, 1997), which covers the entire country, the list of butterflies found in the Premontane Wet- to Tropical Moist transition to Premontane Forest (Holdridge 1967, Bolaños et al. 1999) of Zona Protectora El Rodeo by Vega & Gloor (2001) may be the only relevant survey available, even though it again deals only with large protected areas. Fulton’s list (1966) of Central Valley butterflies is older, but the species obtained outside the Central Valley are included without distinguishing them from the former, depriving it of potential usefulness for the current purpose. With regard to plants, the floristic composition study in Zona Protectora El Rodeo done by Casoante M. & Estrada Ch. (2001) is probably relevant; although El Rodeo is strongly influenced by the dry Central Pacific climate.

It is in these contexts that we present here the results of our survey of the plants and butterflies in the Reserva Ecológica Leonelo Oviedo (RELO). This small urban preserve is located on the campus of the University of Costa Rica (UCR) in San Pedro, entirely surrounded by an urban environment (Fig. 2). Besides many small student projects related to class assignment and others conducted in the Preserve, only three previous studies on the RELO are known with regard to the butterflies and plants. G. Stiles (unpublished & pers. comm. 2005) mark-recaptured ithomine butterflies between 1975 and 1981; Di Stéfano et al. (1996) studied regeneration of the forest and included a list of tree species; and A.C. Guardia Orozco (1998) examined the number of species of butterflies to analyze the island effect, namely the relationship between the area size and the number of species in fragmented habitats. Additionally, an unpublished list of the papilionid, pierid, and nymphalid butterflies was compiled in 1996 by P. E. Hanson based on the collection of insects at the School of Biology, UCR.

Finally, a few words may be appropriate on the advantages of studying butterflies and plants. Invertebrates, particularly herbivorous insects, are good bio-indicators of habitat changes (Andrade-C 1998), because they are usually abundant, allowing quantitative and statistical analyses; easily manipulated without altering their behavior; and tightly linked to the local flora (Pearson 1994). Within the insects, butterflies (including moths) have been used
as an ecological indicator of habitat conditions in ecological assessment (e.g., Holloway & Hebert 1979, Daily & Ehrlich 1995, Brown 1997, New et al. 1995, Solis & Pogue 1999). The advantages of butterflies are a) their relatively well-known taxonomy and biology, b) relative ease of observation, and c) their attractiveness to the public in general (Andrade-C 1998). Furthermore, they are highly sensitive to changes in the habitat and climate conditions such as temperature, humidity, and light intensity (Kremen 1994, Sparrow et al. 1994, Brown 1997).

We present preliminary lists of plants and day-flying macrolepidoptera of the RELO and UCR campus for the first time as part of the foundation for biological and ecological studies in urban ecosystems (Pickett et al. 2001). Physical description and illustrations of the Preserve and its history, and some photos of butterflies and plants are included. Current conditions of the RELO and its conservation need and importance are discussed.

MATERIALS AND METHODS

Identification of plants (Pteridophyta, Spermatophyta: Gymnospermae, Angiospermae: Liliopsida, Magnoliopsida) was conducted mostly during August and September, 2007, using live materials and observations through binoculars, in and outside the RELO on campus, but not beyond the Loop line Road (Fig. 5). Most of the plants were reviewed and identified by the third author (C.O.M.); some were collected and pressed for identification at a later time. Nearly all of the recently planted tree saplings were not included in the list, because it is unknown whether these trees will survive.

Butterflies (Hesperioidea and Papilionoidea) and Macrolepidopteran day-flying moths, including Pyraloidea, were collected between September 1997 and September 2007. A few observations were made on campus outside of the RELO. The butterflies were mostly collected by the first and second authors, using insect nets, but others were either collected using banana-plantain bait traps (Austin & Riley 1995, Shuey 1997) or were reared from their immature stages using plastic bags by the first author. The collecting was done more or less randomly throughout the years, i.e., the effort and methods were not evenly distributed but opportunistic. Thus the missing dates of collecting in Table 2 do not indicate their absence. Most of the adult specimens were pinned and preserved in the entomological collection of Museo de Zoología (MZ-UCR), Escuela de Biología, UCR. Data from the students’ entomological collections and the butterfly list compiled by P. E. Hanson (1996) were combined with our own data. A list of Ithomiinae (collected between 1979 and 1980) provided by G. Stiles (unpublished) was added in the list. Nomenclature for butterflies follows Wahlberg et al. (2005), Lamas (2004), and Mielke (2005). The Herbarium of the University of Costa Rica (USJ) and Smith et al. (2004) were consulted for identification of plants. For scientific names of plants, Missouri Botanical Garden (2007) was consulted. Host plants of reared butterflies are given in Table 1 and also found in Beccaloni et al. (2008).

Study site: Reserva Ecológica Leonelo Oviedo (RELO) (ca. 1160 m above sea level; 09°56’15’’N, 84°03’00’’W), commonly known as ‘bosquecito’ (‘small woods’), is located on the campus of UCR, in San Pedro de Montes de Oca, San José province, Costa Rica (Figs. 1-5). It is located approximately in the center of the loop-line road and contiguous northwestward from the School of Biology building.

The University campus is located in a large urbanized area of Montes de Oca, one of the 12 metropolitan counties of San José (Bertsch 2006), and the surrounding areas are therefore highly disturbed (Figs. 1, 2). The RELO is a 37-year old secondary growth forest, formerly a coffee plantation (Fig. 4) (J. Di Stéfano, pers. comm. 2007), covering an area of approximately 1.5 ha. (ca. 100 x 150 m) and more or less bordered by the Negritos creek several meters wide, one running through the north and the
Fig. 2. Satellite image of San Pedro area in 2007, showing UCR campus and vicinity. The Leonelo Oviedo Ecological Preserve (RELO), is pointed by the arrow. (Source: DigitalGlobe® 2007, modified).

Fig. 3. Aerial photo of the University of Costa Rica main campus and vicinity in 1972. Arrow pointing at the Leonelo Oviedo Ecological Preserve (RELO). Note the coffee plantations in the west and southwest. (Source: Tropical Science Center, San Pedro, Costa Rica, modified).
other on the west side (Fig. 6). The ecological life zone is Premontane Moist Forest after Holdridge (1967) & Bolaños et al. (1999), though this designation is not concurrent with current habitat conditions. The biotic condition is moist subtropical with 5 or 6 dry months annually according to Herrera S. & Gómez P. (1993). The RELO usually becomes relatively dry during the last half of the dry season (between early February and late April), with fallen dry leaves covering the forest floor (Figs. 12, 13), and is wet to fairly moist during the rest of the year (Figs. 7-11, 13). The differences in the green density are quite notable between the dry and wet seasons (K. Nishida, personal observation 1998-2007). The average climatic data of the UCR campus between years 2001 and 2004 are as follows: minimum and maximum temperatures are 16°C and 25°C, respectively;
average monthly rainfall in the dry season (December to April) was 23.1 mm; in the wet season (May to November) it was 235.6 mm (data from Centro de Investigaciones Geofísicas, UCR).

Some of the recent activities at the RELO are:

- Planting of Miconia calvescens (Melastomataceae) in the west (Fig. 10) and east sides by Proyecto Miconia in late 2002 to mid-2003.
- Installation of flagstones and pebbles along the trails in early 2006.
- Construction of a look-out area on the south bank of the Negritos River in early 2006.
- Officially associated with the Environmental Education Program by Comisión de Colecciones in the middle of 2006.
- Installation of a signpost at the main entrance (Fig. 7) at the end of 2006.
- Reforestation of west and northwest sectors with nearly 200 specimens of young trees. These trees were donated by Professor E. García and part of the planting was conducted by students of the Escuela Monterrey, in early to middle 2007.
Fig. 7. Northeast side showing the main entrance of RELO and signpost (view from outside, August 18, 2007). Fig. 8. North side showing the Leonelo Oviedo Ecological Preserve (RELO) sign (view from outside, June 18, 2005). Fig. 9. South side showing Negritos Creek (view from outside on bridge to General Education building, August 18, 2007). Fig. 10. West side showing large *Erythrina poeppigiana* trees and arrow pointing at planted *Miconia calvescens* (September 12, 2007). Fig. 11. Southwest side showing open thicket composed mostly of *Ipomoea* in front (along Negritos Creek) and *Guañua angustifolia* bamboo thicket (arrow) (September 5, 2007). Fig. 12. Forest floor of late dry season (April 22, 2006). Fig. 13. Forest floor of early rainy season (May 18, 2005).
• Initiation of topographical mapping in collaboration with the School of Topography, UCR, in March 2007.
• Conclusion of the Total Tree Inventory in the middle of 2007.

Leonelo Oviedo was a professor of the School of Biology at the UCR in the 1960s and 1970s. During that time he worked on establishing the Ecological Preserve, and he contributed more towards its development than anyone else. The Preserve was later named in his honor by Dr. Luis A. Fournier (José Francisco Di Stéfano 2005, pers. comm.), also a professor of the School of Biology.

Vertebrates: Some vertebrates recognized in the RELO are as follows. At least two individuals of the two-toed sloth, *Choloepus hoffmanni*, have lived more than 10 years and have reproduced—about five individuals were observed at one point. The most abundant mammals are the bats that use the Preserve as refuge and feeding site and serve for plant pollination (J. M. Mora, pers. comm.). The Variegated Squirrel, *Sciurus variegatoides*, has frequently been observed. An agouti, *Dasyprocta punctata*, was seen twice between 2000 and 2004 (K. Nishida & I. Nakamura, pers. obs.). One of the commonly seen birds is the Blue-crowned Motmot, *Momotus momota*. The Lineated Woodpecker, *Dryocopus lineatus*, and Grey-necked Wood-rail, *Aramides cajanea*, are new comers to the Preserve since 2002, though approximately 40% of what existed on campus ca. 20 years ago is no longer observed (G. Barrantes, pers. comm. 2007, in manuscript). A few reptiles and amphibians that stand out are: a coral snake, *Micrurus nigrocinctus* (Girard); a boa, *Boa constrictor* L.; a Plain wormsnake, *Geophis hoffmanni* (Peters); an Olive lizard eater, *Mastigodryas melanomolus* (Cope); a glass frog, *Hyalinobatrachium fleischmanni* (Boettger); a tree frog, *Smilisca sordida* (Peters); a lizard, *Norops intermedius*; and the toad *Ollotis coccifer* (Federico Bolaños, pers. comm. 2005).

Even in the midst of human “development” and habitat changes, several new and rarely collected insects have been discovered and described from inside and outside the RELO on the campus of UCR. For example, three new species of weevils with unusual biology (Prena & Nishida 2005; C. Lyal & K. Nishida, in preparation; J. Prena, pers. comm. 2003), four new parasitoid wasps with new biological data (Hanson & Nishida 2002, 2004, Fortier & Nishida 2004, Shaw & Nishida 2005), possibly a new species of katydid (P. Naskrecki, pers. comm. 2005), and two new records of rare-in-collections moth species—*Venadicodia caneti* Epstein & Corrales (K. Nishida & M. Epstein, in preparation) and *Filinota brunniceps* (Felder & Rogenhofer) (D. Adamski & K. Nishida, in manuscript). At least one new species of skipper butterfly, *Quasimellana*, was collected at the RELO (L. R. Murillo, pers. comm. 2006). Some of these species are currently only known from the campus of UCR, i.e. are not known from anywhere else in Costa Rica. It is also noteworthy to mention the discovery of a rare Ascomycetes fungus that has only been found once in another part of the world (J. Carranza & J. Di Stefano, pers. comm. 2007).

ANALYSIS

Plants (Figs. 14-24, Table 1)

Table 1 shows the list of vascular plants resulting from the present inventory. There were some technical difficulties in identification of sterile plants of Araceae and Asteraceae, and Pteridophyta. The following summarizes Table 1: There were eight families of Pteridophyta with 14 species in approximately 14 genera; seven Gymnospermae with 10 species in eight genera; 26 Monocotyledoneae with 121 species in 84 genera; and 72 Dicotyledoneae with 286 species in 228 genera. Thus, the total species number was 432 in approximately 334 genera within 113 families. We recorded ca. 205 species in the RELO (excluding nursery garden). Of these 205 species, 64 species (ca. 31%) were present exclusively in the RELO.
Fig. 14. Chamaedorea costaricana, flowers (December 14, 2002).
Fig. 15. Costus pulverulentus, inflorescence and flower (August 18, 2007).
Fig. 16. Pseudorhizanthemum cuspidatum, flowers (Sept. 5, 2007).
Fig. 17. Senna papillosa, flowers (April 13, 2004).
Fig. 18. Rivina humilis, flowers and fruits (December 18, 2002).
Fig. 19. Aristolochia grandiflora, flower (April 28, 2004).
Fig. 20. Inga vera, flowers (white) and new flushing leaves (reddish) (April 13, 2004).
Fig. 21. Hamelia patens, flowers and fruits (April 13, 2004).
Fig. 22. Passiflora biflora, flower (March 23, 2004).
Fig. 23. Cecropia obtusifolia, leaves and spikes (June 9, 2004).
Fig. 24. Acnistus arborescens, flowers (April 13, 2004).
### TABLE 1

List of plants found on the University of Costa Rica main campus

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Location</th>
<th>Status</th>
<th>&lt;Common local name&gt;, comments, (butterfly species)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PTERIDOPHYTA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyatheaceae</td>
<td>Cyathea sp.</td>
<td>ng</td>
<td>non.</td>
<td>&lt;helecho&gt;, cultivated tree fern from lowland</td>
</tr>
<tr>
<td>Davalliaceae</td>
<td>Nephrolepis cf. <em>bissetrata</em> (Sw.) Schott</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;helecho&gt;, epiphytic fern</td>
</tr>
<tr>
<td>Davalliaceae</td>
<td>Nephrolepis cf. <em>rivularis</em> (Vahl) Mett. ex Krug</td>
<td>ng</td>
<td>nat.</td>
<td>&lt;helecho&gt;, terrestrial or epiphytic fern</td>
</tr>
<tr>
<td>Dennstaedtiaceae</td>
<td>Dennstaedtia sp.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;helecho&gt;, uncommon terrestrial fern</td>
</tr>
<tr>
<td>Lomariopsidaceae</td>
<td>Elaphoglossum sp.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;helecho&gt;, epiphytic fern</td>
</tr>
<tr>
<td>Lomariopsidaceae</td>
<td>Nephrolepis cf. <em>rivularis</em> (vahl) Mett. ex Krug</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;helecho&gt;, terrestrial or epiphytic fern</td>
</tr>
<tr>
<td>Dennstaedtiaceae</td>
<td>Dennstaedtia sp.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;helecho&gt;, uncommon terrestrial fern</td>
</tr>
<tr>
<td>Pteridaceae</td>
<td>Pityrogramma calomelanos (L.) Link</td>
<td>ng</td>
<td>nat.</td>
<td>&lt;helecho&gt;, terrestrial fern</td>
</tr>
<tr>
<td></td>
<td>approx. 5 undetermined species</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;helecho&gt;, herbaceous species</td>
</tr>
<tr>
<td><strong>SPERMATOPHYTA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gymnospermae</td>
<td>Araucariaceae <em>Araucaria cunninghamii</em> Aiton ex D. Don</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;araucaria&gt;, Australian tree species</td>
</tr>
<tr>
<td>Gymnospermae</td>
<td>Araucariaceae <em>Araucaria excelsa</em> (Lamb.) R. Br.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;araucaria&gt;, tree species from Norfolk Islands, Australia</td>
</tr>
<tr>
<td>Gymnospermae</td>
<td>Cupressaceae <em>Chamaecyparis</em> sp.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;ciprés&gt;, tree species of unknown origin</td>
</tr>
<tr>
<td>Gymnospermae</td>
<td>Cupressaceae <em>Cupressus lusitanica</em> Mill.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;ciprés&gt;, Mexican tree species</td>
</tr>
<tr>
<td>Gymnospermae</td>
<td>Cyclicadaceae <em>Cycas revoluta</em> Thunb.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;cica&gt;, Southeast Asian ornamental shrub</td>
</tr>
<tr>
<td>Gymnospermae</td>
<td>Pinaceae <em>Pinus caribaea</em> Morelet</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;pino&gt;, Northern Central American tree</td>
</tr>
<tr>
<td>Gymnospermae</td>
<td>Pinaceae <em>Pinus oocarpa</em> Schiede ex Schldl.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;pino&gt;, Northern Central American tree</td>
</tr>
<tr>
<td>Gymnospermae</td>
<td>Podocarpaceae <em>Podocarpus macrophyllus</em> (Thunb.) Sweet</td>
<td>ca</td>
<td>exo.</td>
<td>East Asian ornamental tree</td>
</tr>
<tr>
<td>Gymnospermae</td>
<td>Taxodiaceae <em>Taxodium mucronatum</em> Ten.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;ahuehuete&gt;, Mexican ornamental tree</td>
</tr>
<tr>
<td>Angiospermae</td>
<td>Zamiaceae <em>Zamia neurophyllidia</em> D.W. Stev.</td>
<td>ng</td>
<td>non.</td>
<td>&lt;zamia&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Angiospermae</td>
<td>Agavaceae <em>Agave americana</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;agave&gt;, large Mexican ornamental herb</td>
</tr>
<tr>
<td>Angiospermae</td>
<td>Agavaceae <em>Agave attenuata</em> Salm-Dyck</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;agave&gt;, large Mexican ornamental herb</td>
</tr>
<tr>
<td>Angiospermae</td>
<td>Agavaceae <em>Furcraea cubaya</em> Trel.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;cubaya&gt;, introduced from highland</td>
</tr>
<tr>
<td>Angiospermae</td>
<td>Agavaceae <em>Yucca guatemalensis</em> hort. ex Baker</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;itabo&gt;, Northern Central American giant herb</td>
</tr>
<tr>
<td>Amaryllidaceae</td>
<td>Crinum x powellii* hort. ex Baker</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;lirio de mayo&gt;, African ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Alocasia sp.</td>
<td>ng</td>
<td>exo.</td>
<td>cultivated ornamental herb, probably Asian</td>
</tr>
<tr>
<td>Araceae</td>
<td>Anthurium andreanum* Linden</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;anturio&gt;, South American ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Anthurium salvinii* Hemsl.</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;tabacón&gt;, large ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Anthurium sp. 1</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;anturio&gt;, ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Anthurium sp. 2</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;anturio&gt;, ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Anthurium sp. 3</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;anturio&gt;, ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Anthurium sp. 4</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;anturio&gt;, ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Philodendron bipinnatifidum Schott ex Endl.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;filampa&gt;, tropical Asian crop and ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Dieffenbachia oerstedi Schott</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;loteria, sainillio&gt;, ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Dieffenbachia sp. 1</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;loteria&gt;, ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Dieffenbachia sp. 2</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;loteria&gt;, ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Epipremnum aureum* (Linden &amp; André) G.S. Bunting</td>
<td>ng</td>
<td>exo.</td>
<td>ornamental climber from Solomon Islands, Southeast Asia</td>
</tr>
<tr>
<td>Araceae</td>
<td>Monstera adansonii* Schott</td>
<td>LO*, ng</td>
<td>nat.</td>
<td>common climber</td>
</tr>
<tr>
<td>Araceae</td>
<td>Monstera deliciosa* Liebm.</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td>&lt;piñanona&gt;, robust, terrestrial or epiphytic herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Philodendron bipinnatifidum Schott ex Endl.</td>
<td>ca</td>
<td>exo.</td>
<td>South American climber</td>
</tr>
<tr>
<td>Araceae</td>
<td>Philodendron sp. 1</td>
<td>LO</td>
<td>nat.</td>
<td>climber</td>
</tr>
<tr>
<td>Araceae</td>
<td>Philodendron sp. 1 ng ng</td>
<td>ng</td>
<td>nat.</td>
<td>climber</td>
</tr>
<tr>
<td>Araceae</td>
<td>Philodendron sp. 2 ng ng</td>
<td>ng</td>
<td>nat.</td>
<td>climber</td>
</tr>
<tr>
<td>Araceae</td>
<td>Philodendron sp. 3 ng ng</td>
<td>ng</td>
<td>nat.</td>
<td>climber</td>
</tr>
<tr>
<td>Araceae</td>
<td>Philodendron sp. 4 ng ng</td>
<td>ng</td>
<td>nat.</td>
<td>climber</td>
</tr>
<tr>
<td>Araceae</td>
<td>Spathiphyllum sp. 1 ng ng</td>
<td>ng</td>
<td>nat.</td>
<td>terrestrial ornamental herb</td>
</tr>
<tr>
<td>Araceae</td>
<td>Syngonium sp. 1, LO, ng ng</td>
<td>ng</td>
<td>nat.</td>
<td>herbaceous climber</td>
</tr>
</tbody>
</table>
### Table 1 (Continued)

*List of plants found on the University of Costa Rica main campus*

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Location</th>
<th>Status</th>
<th>&lt;Common local name&gt;, comments (butterfly species)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Araceae</td>
<td><em>Xanthosoma undipes</em> (K. Koch &amp; C.D. Bouché)</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;tíquisque&gt;, uncommon robust herb</td>
</tr>
<tr>
<td>Araceae</td>
<td><em>Xanthosoma violaceum</em> Schott</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;tíquisque&gt;, occasional herb in open places</td>
</tr>
<tr>
<td>Araceae</td>
<td><em>Xanthosoma wendlandii</em> (Schott) Schott</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;comida de culebra&gt;, occasional herb in open places</td>
</tr>
<tr>
<td>Arecaceae</td>
<td><em>Bactris gasipaes</em> Kunth</td>
<td>ca</td>
<td>non.</td>
<td>&lt;pejibaye&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Arecaceae</td>
<td><em>Caryota arenis</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;palma cola de pez&gt;, Southeast Asian palm</td>
</tr>
<tr>
<td>Arecaceae</td>
<td><em>Chamaedorea costaricana</em> Oert.</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>&lt;pacaya&gt;, understory palm, probably needs control in LO, (Fig. 14) (&lt;Synale cynaxa&gt;)</td>
</tr>
<tr>
<td>Arecaceae</td>
<td><em>Dypsis lutescens</em> (H. Wendl.) Beentje &amp; J. Dransf.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;areca&gt;, Madagascan ornamental palm</td>
</tr>
<tr>
<td>Arecaceae</td>
<td><em>Elaeis guineensis</em> Jacq.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;palma aceitera&gt;, tropical African oil palm</td>
</tr>
<tr>
<td>Arecaceae</td>
<td><em>Elaeis guineensis</em> Jacq.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;licuara&gt;, ornamental palm from Southeast Asian islands</td>
</tr>
<tr>
<td>Arecaceae</td>
<td><em>Licuala grandis</em> H. Wendl. ex Linden</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>&lt;palma de Manila&gt;, Philippine ornamental palm</td>
</tr>
<tr>
<td>Asparagaceae</td>
<td><em>Asparagus</em> sp.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;esparrago&gt;, ornamental herb from the Old World</td>
</tr>
<tr>
<td>Asteliaceae</td>
<td><em>Cordyline fruticosa</em> (L.) A. Chev.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;caña de India&gt;, Asian ornamental shrub</td>
</tr>
<tr>
<td>Bromeliaceae</td>
<td><em>Ananas</em> sp.</td>
<td>ng</td>
<td>nat.</td>
<td>&lt;bromelia&gt;, ornamental herb</td>
</tr>
<tr>
<td>Bromeliaceae</td>
<td><em>Roystonea regia</em> (Kunth) O.F. Cook</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;palma real&gt;, Caribbean large palm</td>
</tr>
<tr>
<td>Bromeliaceae</td>
<td><em>Syagrus romanzoffiana</em> (Cham.) Glassman</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;chirivá&gt;, South American palm</td>
</tr>
<tr>
<td>Bromeliaceae</td>
<td><em>Veitchia merrellii</em> (Becc.) H.E. Moore</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;palma de Manila&gt;, Philippine ornamental palm</td>
</tr>
<tr>
<td>Cannaceae</td>
<td><em>Canna</em> sp.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;platanilla&gt;, ornamental hybrids from lowland</td>
</tr>
<tr>
<td>Costaceae</td>
<td><em>Costus</em> cf. montanae Maas</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;caña agria&gt;, occasional ornamental herb</td>
</tr>
<tr>
<td>Costaceae</td>
<td><em>Costus spicatus</em> C. Presl.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;pluma de Venus&gt;, Northern Central American ornamental herb</td>
</tr>
<tr>
<td>Costaceae</td>
<td><em>Costus speciosus</em> (J. König) Sm.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;caña agria&gt;, occasional ornamental herb</td>
</tr>
<tr>
<td>Costaceae</td>
<td><em>Dracaena marginata</em></td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;caña de India&gt;, African ornamental shrub</td>
</tr>
<tr>
<td>Cyclanthaceae</td>
<td><em>Aspidium</em> sp.</td>
<td>ng</td>
<td>non.</td>
<td>introduced herb from lowland</td>
</tr>
<tr>
<td>Cyperaceae</td>
<td><em>Cyperus involucratus</em> Rothb.</td>
<td>ca, LO, ng</td>
<td>exo.</td>
<td>common African naturalized ornamental herb</td>
</tr>
<tr>
<td>Cyperaceae</td>
<td><em>Cyperus tenuis</em> Sw.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>small herb in open places</td>
</tr>
<tr>
<td>Cyperaceae</td>
<td><em>Rynchospora nervosa</em> (Vahl) Boeck.</td>
<td>ca</td>
<td>nat.</td>
<td>small herb in open places</td>
</tr>
<tr>
<td>Dracaenaceae</td>
<td><em>Dracaena deremensis</em> Engl.</td>
<td>ca, LO, ng</td>
<td>exo.</td>
<td>&lt;caña de India&gt;, African ornamental shrub</td>
</tr>
<tr>
<td>Dracaenaceae</td>
<td><em>Dracaena fragrans</em> (L.) Ker Gawl.</td>
<td>ca, LO, ng</td>
<td>exo.</td>
<td>&lt;caña de India&gt;, tropical African ornamental shrub</td>
</tr>
<tr>
<td>Dracaenaceae</td>
<td><em>Dracaena marginata</em> Lam.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;marginata&gt;, African ornamental shrub</td>
</tr>
<tr>
<td>Dracaenaceae</td>
<td><em>Dracaena sp.</em></td>
<td>ng</td>
<td>exo.</td>
<td>cultivated ornamental shrub</td>
</tr>
<tr>
<td>Family</td>
<td>Species</td>
<td>Location</td>
<td>Status</td>
<td>&lt;Common local name&gt;, comments, (butterfly species)</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------</td>
<td>--------</td>
<td>-------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dracaenaceae</td>
<td>Sansevieria trifasciata Prain</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;lengua de suerga&gt;, African ornamental herb</td>
</tr>
<tr>
<td></td>
<td>Heliconia latispatha Benth.</td>
<td>LO</td>
<td>non.</td>
<td>&lt;heliconia&gt;, introduced large herb from lowland</td>
</tr>
<tr>
<td>Heliconiaceae</td>
<td>Heliconia metallica Planch. &amp; Linden ex Hook.</td>
<td>LO</td>
<td>non.</td>
<td>&lt;heliconia&gt;, cultivated ornamental herb</td>
</tr>
<tr>
<td></td>
<td>Heliconia cf. pogonantha Cufod.</td>
<td>ng</td>
<td>non.</td>
<td>&lt;heliconia&gt;, introduced from lowland</td>
</tr>
<tr>
<td></td>
<td>Heliconia psittacorum L.f.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;avecilla&gt;, ornamental herb from Northern South America</td>
</tr>
<tr>
<td></td>
<td>Heliconia tortuosa Griggs</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;heliconia&gt;, large ornamental herb</td>
</tr>
<tr>
<td>Hypoxidaceae</td>
<td>Hyposis sp.</td>
<td>ca</td>
<td>nat.</td>
<td>small weed in open places</td>
</tr>
<tr>
<td></td>
<td>Molineria capitulata (Lour.) Herb.</td>
<td>ca, LO, ng</td>
<td>exo.</td>
<td>&lt;coquillo&gt;, introduced herb from Southeast Asia</td>
</tr>
<tr>
<td>Iridaceae</td>
<td>Crocosmia x crocosmiiflora (Lemoine) N.E. Br.</td>
<td>LO</td>
<td>exo.</td>
<td>&lt;chispa&gt;, introduced herb from highland, of African origin</td>
</tr>
<tr>
<td></td>
<td>Neomarica sp.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;lirio caminante&gt;, South American ornamental herb</td>
</tr>
<tr>
<td>Iridaceae</td>
<td>Sisyrinchium microanthum Cav.</td>
<td>ca</td>
<td>nat.</td>
<td>small herb in wet and open places</td>
</tr>
<tr>
<td>Iridaceae</td>
<td>Tigrilla pavonia (L.) DC.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;lirio&gt;, Mexican ornamental herb</td>
</tr>
<tr>
<td>Liliaceae</td>
<td>Chlorophytum comosum (Thunb.) Jacques</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;mala madre&gt;, South African ornamental herb</td>
</tr>
<tr>
<td>Liliaceae</td>
<td>Hemerocallis fulva (L.)</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;lirio&gt;, Asian ornamental herb</td>
</tr>
<tr>
<td>Liliaceae</td>
<td>Hemerocallis lillo-asphodelus L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;lirio amarillo&gt;, Asian ornamental herb</td>
</tr>
<tr>
<td>Liliaceae</td>
<td>Tuliaphaga violacea Harv.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;ajillo&gt;, South African ornamental herb</td>
</tr>
<tr>
<td>Marantaceae</td>
<td>Calathea croatifera S. Watson</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;platanilla&gt;, occasional large ornamental herb</td>
</tr>
<tr>
<td>Marantaceae</td>
<td>Ctenanthe cf. oppenheiniana (E. Morren) K. Schum.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>South American ornamental herb</td>
</tr>
<tr>
<td>Marantaceae</td>
<td>Ctenanthe sp. 1</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;platanilla&gt;, South American ornamental herb</td>
</tr>
<tr>
<td>Marantaceae</td>
<td>Ctenanthe sp. 2</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;platanilla&gt;, South American ornamental herb</td>
</tr>
<tr>
<td>Marantaceae</td>
<td>Ctenanthe sp. 3</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;platanilla&gt;, South American ornamental herb</td>
</tr>
<tr>
<td>Marantaceae</td>
<td>Ctenanthe sp. 4</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;platanilla&gt;, South American ornamental herb</td>
</tr>
<tr>
<td>Marantaceae</td>
<td>Stromantho stromanthoides (J.F. Macbr.) L. Andersson</td>
<td>ca</td>
<td>exo.</td>
<td>South American ornamental herb</td>
</tr>
<tr>
<td>Marantaceae</td>
<td>Stromantho sp.?</td>
<td>ca, ng</td>
<td>exo.</td>
<td>cultivated ornamental herb, probably South American</td>
</tr>
<tr>
<td>Musaceae</td>
<td>Musa coccinea Andrews</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;bananito&gt;, Asian ornamental large herb</td>
</tr>
<tr>
<td>Musaceae</td>
<td>Musa sp.</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;guineo, banano&gt;, tropical Old World cultivated hybrids</td>
</tr>
<tr>
<td>Orchidaceae</td>
<td>Campylocentrum micranthum (Lindl.) Rolfe</td>
<td>ca</td>
<td>nat.</td>
<td>epiphytic herb</td>
</tr>
<tr>
<td>Orchidaceae</td>
<td>Epidendrum barbeyanum Kraenzl.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>epiphytic herb</td>
</tr>
<tr>
<td>Orchidaceae</td>
<td>Govenia cf. liliaresse (Lex.) Lindl.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>terrestrial herb in open protected places</td>
</tr>
<tr>
<td>Orchidaceae</td>
<td>Habernaria monorhiza (Sw.) Reich.f.</td>
<td>ca</td>
<td>nat.</td>
<td>terrestrial herb in open protected places</td>
</tr>
<tr>
<td>Orchidaceae</td>
<td>Prosthechea livida (Lindl.) W.E. Higgins</td>
<td>ca</td>
<td>nat.</td>
<td>epiphytic herb</td>
</tr>
<tr>
<td>Orchidaceae</td>
<td>Scaphyglottis micrantha (Lindl.) Ames &amp; Correll</td>
<td>ca, LO</td>
<td>nat.</td>
<td>epiphytic herb on trees and palms</td>
</tr>
<tr>
<td>Pandanaceae</td>
<td>Pandanus sp.</td>
<td>ca</td>
<td>exo.</td>
<td>Old World large ornamental herb</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Arundo donax L.</td>
<td>ca</td>
<td>exo.</td>
<td>Mediterranean ornamental cane</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Bambusa textilis McClure</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;bambú&gt;, Chinese ornamental bamboo</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Bambusa vulgaris Schrad. ex J.C. Wendl.</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;bambú amarillo&gt;, tropical Asian bamboo, (Perichares deceptus; P. lotus; Manataria maculata, captive, Murillo &amp; Nishida 2003)</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Chasquea pittieri Hack.</td>
<td>ca</td>
<td>non.</td>
<td>&lt;bambú&gt;, introduced from highland</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Coix lacryma-jobi L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;lágrimases de San Pedro&gt;, naturalized tropical Asian grass</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Cynodon sp.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;grama&gt;, common African grass</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Digitaria sp.</td>
<td>ca</td>
<td>nat.</td>
<td>common grass in open places</td>
</tr>
<tr>
<td>Family</td>
<td>Species</td>
<td>Location</td>
<td>Status</td>
<td>&lt;Common local name&gt;, comments, (butterfly species)</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>---------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Guadua angustifolia Kunth</td>
<td>LO</td>
<td>non.</td>
<td>&lt;bambú&gt;, bamboo probably cultivated from lowland, (Manataria maculata, captive, Murillo &amp; Nishida 2003; Oeoeschistus tauropolis, Pediadiodes dejecta; P. manis)</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Lasiaci sp.</td>
<td>LO</td>
<td>nat.</td>
<td>pseudo-bambusoid grass</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Opismsenus burmannii (Retz.) P. Beauv.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;zucate de rátón&gt;, common grass</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Pennisetum purpureum Schumach.</td>
<td>LO</td>
<td>exo.</td>
<td>&lt;pasto de elefante&gt;, African grass</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Phyllostachys aurea Carrière ex Rivière &amp; C. Rivière</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;bambú&gt;, Chinese ornamental bamboo</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Poaceae Lasiaca sp.</td>
<td>LO</td>
<td>nat.</td>
<td>pseudo-bambusoid grass</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Oplismenus burmannii (Retz.) P. Beauv.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;zucate de rátón&gt;, common grass</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Pennisetum purpureum Schumach.</td>
<td>LO</td>
<td>exo.</td>
<td>&lt;pasto de elefante&gt;, African grass</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Phyllostachys aurea Carrière ex Rivière &amp; C. Rivière</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;bambú&gt;, Chinese ornamental bamboo</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Pseudosasa japonica Makino ex Nakai</td>
<td>ca</td>
<td>exo.</td>
<td>Japanese ornamental bamboo</td>
</tr>
<tr>
<td>Smilacaceae</td>
<td>Smilax mollis Humb. &amp; Bonpl. ex Wild.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;zarzaparrilla&gt;, occasional climber</td>
</tr>
<tr>
<td>Smilacaceae</td>
<td>Ravenala madagascariensis Sonn.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;palma del viajero&gt;, Madagascar ornamental herb</td>
</tr>
<tr>
<td>Zingiberaceae</td>
<td>Alpinia purpurata (Vieill.) K. Schum.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;antorcha&gt;, Southeast Asian large ornamental herb</td>
</tr>
<tr>
<td>Zingiberaceae</td>
<td>Etlingera elatior (Jack) R.M. Sm.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;bastón de emperador&gt;, Malaysian large ornamental herb</td>
</tr>
<tr>
<td>Zingiberaceae</td>
<td>Hedychium coccineum Buch. Ham. ex Sm.</td>
<td>ca, LO, ng</td>
<td>exo.</td>
<td>East Asian ornamental herb</td>
</tr>
<tr>
<td>Zingiberaceae</td>
<td>Hedychium coronarium J. König</td>
<td>LO</td>
<td>exo.</td>
<td>&lt;heliotropo blanco&gt;, East Asian naturalized herb</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Blechum pyramidatum (Lam.) Urb.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;sormia&gt;, small herb in open places</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Graptophyllum pictum (L.) Griff.</td>
<td>ca</td>
<td>exo.</td>
<td>ornamental shrub from Southeast Asian islands</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Hygrophiha costata Nees</td>
<td>LO</td>
<td>nat.</td>
<td>common herb on river bank</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Hypoestes phyllostachy Baker</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;sarampión&gt;, naturalized tropical African herb</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Justicia aurea Schidtl.</td>
<td>LO</td>
<td>nat.</td>
<td>secondary growth shrub</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Megaskepasma erythrochlamys Lindau</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;pavón rojo&gt;, South American naturalized shrub</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Odontonema tubiforine (Bertol.) Kuntze</td>
<td>ca*, LO</td>
<td>nat.</td>
<td>&lt;espiga de fuego&gt;, common shrub at edges of river</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Pachystachys lutea Nees</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;camarón&gt;, South American ornamental shrub</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Pseuderanthemum cuspidatum (Nees) Radlk.</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>invasive annual herb in open places, Fig. 16, (Bolla oiclus imbras, Siproeta epaphus)</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Sanchezia parvibracteata Sprague &amp; Hutch.</td>
<td>ca</td>
<td>exo.</td>
<td>Northern South American ornamental</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Thunbergia erecta (Benth.) T. Anderson</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;teléfono&gt;, African ornamental shrub</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Achyranthes aspera L.</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>invasive annual herb in open places, Fig. 16, (Bolla oiclus imbras, Siproeta epaphus)</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Alternanthera amoena Back. &amp; Sloot.</td>
<td>ca, ng</td>
<td>nat.</td>
<td>annual herb in open places</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Alternanthera sp.</td>
<td>LO</td>
<td>exo.</td>
<td>ornamental herb of uncertain origin</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Iresine diffusa Humb. &amp; Bonpl. ex Wild.</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>young secondary growth herb</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Anacardium excelsum (Kunth) Skeels</td>
<td>ca, LO</td>
<td>nat.</td>
<td>common herb in open places</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Astronium graveolens Jacq.</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;espavel&gt;, introduced tree from lowland</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Mangifera indica L.</td>
<td>ca, LO</td>
<td>non.</td>
<td>young cultivated trees from lowland</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Mauria heterophylla Kunth</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;mango&gt;, Southeast Asian naturalized tree</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Schinus molle L.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;lantisco&gt;, tree species</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Spinacia purpurea L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;pirul&gt;, South American ornamental tree</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Anacardiaceae Tapirira mexicana Marchand</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;jocote&gt;, cultivated from lowland</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Annonaceae Annona cherimola Mill.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;cucurio de monte&gt;, tree species</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Annonaceae Cananga odorata (Lam.) Hook.f. &amp; Thomson</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;ilán-ilán&gt;, Southeast Asian tree</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Annonaceae Geuateria sp.</td>
<td>LO</td>
<td>non.</td>
<td>introduced from lowland</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Annonaceae Rollinia sp.</td>
<td>LO</td>
<td>non.</td>
<td>introduced from lowland</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Apiaceae Cyclospermum leptophyllum (Pers.) Sprague</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;cualantrillo&gt;, common herb in open places</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Apiaceae Eryngium carlinea F. Delaroche</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;achicoria&gt;, common herb in sunny places</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>Apiaceae Eryngium foetidum L.</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;culantro de coyote&gt;, occasional herb</td>
</tr>
</tbody>
</table>

**TABLE 1 (Continued)**

List of plants found on the University of Costa Rica main campus
<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Location</th>
<th>Status</th>
<th>Comments, (butterfly species)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apiaceae</td>
<td>Hydrocotyle bowlesioides Mathias &amp; Constance</td>
<td>ca</td>
<td>nat.</td>
<td>small herb in open places</td>
</tr>
<tr>
<td>Apiaceae</td>
<td>Hydrocotyle umbellata L.</td>
<td>ca, ng</td>
<td>nat.</td>
<td>&lt;comalillo&gt;, herb in wet and open places</td>
</tr>
<tr>
<td>Apocynaceae</td>
<td>Allamanda cathartica L.</td>
<td>ca, ng</td>
<td>non.</td>
<td>&lt;bejuco de San José&gt;, cultivated from lowland</td>
</tr>
<tr>
<td>Apocynaceae</td>
<td>Nerium oleander L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;adelia&gt;, South European ornamental shrub</td>
</tr>
<tr>
<td>Apocynaceae</td>
<td>Stemmalenia litoralis (Kunth) L. Allorge</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;huesos de caballito&gt;, tree species</td>
</tr>
<tr>
<td>Apocynaceae</td>
<td>Thevetia peruviana (Pers.) K. Schum.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;chirca&gt;, South American ornamental tree</td>
</tr>
<tr>
<td>Araliaceae</td>
<td>Dizygotheca elegansissima (Veitch ex Mast.) R. Vig. &amp; Guillaumin</td>
<td>ca</td>
<td>exo.</td>
<td>Southeast Pacific ornamental tree</td>
</tr>
<tr>
<td>Araliaceae</td>
<td>Hedera helix L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;hiedra&gt;, European ornamental climber</td>
</tr>
<tr>
<td>Araliaceae</td>
<td>Oreopanax xalapensis (Kunth) Decene. &amp; Planchn.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;cacho de venado&gt;, native tree to the study area</td>
</tr>
<tr>
<td>Araliaceae</td>
<td>Polyscias fruticosa (L.) Harms</td>
<td>ca</td>
<td>exo.</td>
<td>Southeast Pacific ornamental shrub</td>
</tr>
<tr>
<td>Araliaceae</td>
<td>Polyscias gulfosyled (W. Bull) L.H. Bailey</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;remiendo de pobre&gt;, Polynesian ornamental shrub</td>
</tr>
<tr>
<td>Araliaceae</td>
<td>Schefflera sp. 1</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;chefflera&gt;, ornamental shrub, origin unknown</td>
</tr>
<tr>
<td>Araliaceae</td>
<td>Schefflera sp. 2</td>
<td>ng</td>
<td>exo.</td>
<td>ornamental shrub, origin unknown</td>
</tr>
<tr>
<td>Araliaceae</td>
<td>Tetrapanax papyrifer (Hook.) K. Koch</td>
<td>ca, LO</td>
<td>exo.</td>
<td>Chinese treelit species</td>
</tr>
<tr>
<td>Aristolochiaceae</td>
<td>Aristolochia grandiflora Sw.</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>&lt;aristolodia&gt;, climber with large flowers, Fig. 19</td>
</tr>
<tr>
<td>Aristolochiaceae</td>
<td>Aristolochia ringens Vahl</td>
<td>ca</td>
<td>exo.</td>
<td>Brazilian cultivated climber</td>
</tr>
<tr>
<td>Asclepiadaceae</td>
<td>Asclepias curassavica L.</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;viborana&gt;, small shrub in open places</td>
</tr>
<tr>
<td>Asclepiadaceae</td>
<td>Gonolobus cf. edulis Hemsl.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;cuayote&gt;, herbaceous climber</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Acmella oppositifolia (Lam.) R.K. Jansen</td>
<td>ca</td>
<td>nat.</td>
<td>small weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Baccharis pedunculata (Mill.) Cabrera</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;manzana de pobre&gt;, secondary growth shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Bidens pilosa L.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;mireseco&gt;, common weed</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Bidens reptans (L.) G. Don</td>
<td>LO</td>
<td>nat.</td>
<td>occasional secondary growth climber</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Chaptalia nutans (L.) Pol.</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;dinica&gt;, small weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Chromolaena sp.</td>
<td>LO</td>
<td>nat.</td>
<td>secondary growth shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Conyza apurensis Kunth</td>
<td>ca</td>
<td>nat.</td>
<td>weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Conyza canadensis (L.) Cronquist</td>
<td>ca</td>
<td>nat.</td>
<td>weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Crassocephalum crepidioides (Benth.) S. Moore</td>
<td>ca, LO, ng</td>
<td>exo.</td>
<td>newly introduced invasive African weed</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Crotinia morifolia (Mill.) R.M. King &amp; H. Rob.</td>
<td>LO</td>
<td>nat.</td>
<td>secondary growth shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Dahlia cf. imperialis Roed ex Orties</td>
<td>LO</td>
<td>nat.</td>
<td>secondary growth shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Delilía biflora (L.) Kuntze</td>
<td>LO, ng</td>
<td>nat.</td>
<td>&lt;lentejas&gt;, weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Emilia fosbergii Nicolson</td>
<td>ca, ng</td>
<td>nat.</td>
<td>&lt;clavelillo&gt;, small weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Helianthus annuus L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;girasol&gt;, North American ornamental</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Jaegeria hirta (Lag.) Less.</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;mielcilla&gt;, common small herb</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Koanophyllum sp.</td>
<td>LO</td>
<td>nat.</td>
<td>secondary growth shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Lasianthea fruticosa (L.) K.M. Becker</td>
<td>LO</td>
<td>nat.</td>
<td>secondary growth shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Melampodium costaricense Stuessy</td>
<td>ca, LO</td>
<td>nat.</td>
<td>weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Melampodium perfoliatum (Cav.) Kunth</td>
<td>ca, LO</td>
<td>nat.</td>
<td>weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Melanthera nivea (L.) Small</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;boton blanco&gt;, weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Mikania micrantha Kunth</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;guaco&gt;, herbaceous climber</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Montanoa atriplicifolia (Pers.) Sch. Bip.</td>
<td>LO</td>
<td>nat.</td>
<td>secondary growth herb</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Montanoa hibiscifolia Benth.</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>&lt;tora&gt;, common secondary growth shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Podachaenium eminens (Lag.) Baill.</td>
<td>LO</td>
<td>nat.</td>
<td>secondary growth shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Pseudopelephantopus spicatus (Juss.) Vahl</td>
<td>ca, ng</td>
<td>nat.</td>
<td>weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Pseudelephantopus chenopodoides (Kunth) Cabrera</td>
<td>ca</td>
<td>non.</td>
<td>&lt;dalia trepadora&gt;, cultivated climber from highland</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Sonchus oleraceus L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;lechuguilla&gt;, Eurasian weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Symedrella nodiflora (L.) Gaertn.</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td>&lt;espinillo&gt;, small weed in open places</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Verbesina turbacensis Kunth</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td>&lt;tuete&gt;, secondary growth small shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Vernonia patens Kunth</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;tora&gt;, common secondary growth shrub</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Vernonia trifasciula Kunth</td>
<td>ca, LO</td>
<td>nat.</td>
<td>secondary growth small tree</td>
</tr>
<tr>
<td>Family</td>
<td>Species</td>
<td>Location</td>
<td>Status</td>
<td>&lt;Common local name&gt;, comments, (butterfly species)</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Youngia japonica (L.) DC.</td>
<td>ca</td>
<td>exo.</td>
<td>common Southeast Asian herb in open places</td>
</tr>
<tr>
<td>Balsaminaceae</td>
<td>Impatiens walleriana Hook. f.</td>
<td>ca, LO*, ng exo.</td>
<td>&lt;china&gt;, tropical African invasive weed</td>
<td></td>
</tr>
<tr>
<td>Basellaceae</td>
<td>Anredera cordifolia (Ten.) Steenis</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;moquillo&gt;, subtropical South American herbaceous climber</td>
</tr>
<tr>
<td>Begoniaceae</td>
<td>Begonia sp.</td>
<td>ng</td>
<td>exo.</td>
<td>&lt;begonia&gt;, cultivated ornamental herb</td>
</tr>
<tr>
<td>Berberidaceae</td>
<td>Cnidoscolus aconitifolius</td>
<td>ca, ng</td>
<td>exo.</td>
<td>East Asian ornamental shrub</td>
</tr>
<tr>
<td>Bignoniaceae</td>
<td>Anredera cordifolia (Ten.) Steenis</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;primavera&gt;, Mexican ornamental tree</td>
</tr>
<tr>
<td>Bignoniaceae</td>
<td>Parmentiera aculeata (Kunth)</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;jacaranda&gt;, South American tree</td>
</tr>
<tr>
<td>Bignoniaceae</td>
<td>Pyrostegia venusta (Ker Gawl.)</td>
<td>ca</td>
<td>non.</td>
<td>introduced from lowland</td>
</tr>
<tr>
<td>Bignoniaceae</td>
<td>Spathodea campanulata P. Beav.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;triquitrape&gt;, South American ornamental climber</td>
</tr>
<tr>
<td>Bignoniaceae</td>
<td>Tabebuia cf. impetiginosa (Mart. ex DC.)</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;llama del bosque&gt;, African tree</td>
</tr>
<tr>
<td>Cactaceae</td>
<td>Acanthocereus pentagonus (L.) Britton &amp; Rose</td>
<td>ca, ng</td>
<td>non.</td>
<td>&lt;roble de sabana&gt;, frequently planted ornamental tree from lowland</td>
</tr>
<tr>
<td>Cactaceae</td>
<td>Hylocereus costaricensis (F.A.C. Weber) Britton</td>
<td>ca</td>
<td>non.</td>
<td>&lt;vainillo&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Carya phyllophaeae</td>
<td>Drymarius cordata (L.) Willd. ex Schultz</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>uncommon herbaceous climber</td>
</tr>
<tr>
<td>Casuarinaceae</td>
<td>Casuarina equisetifolia J.R. Forst.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;pino de Australia&gt;, Australian tree</td>
</tr>
<tr>
<td>Cecropiaceae</td>
<td>Cecropia obtusifolia Bertol.</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>&lt;guarumo&gt;, secondary growth pioneer tree, Fig. 23, (Historis odius)</td>
</tr>
<tr>
<td>Clusiaceae</td>
<td>Calophyllum brasilense Cambess.</td>
<td>LO</td>
<td>non.</td>
<td>&lt;cedro maria&gt;, cultivated from lowland</td>
</tr>
<tr>
<td>Clusiaceae</td>
<td>Garcinia cf. dulcis ( Roxb.) Kurz</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;mangostán amarillo&gt;, Southeast Asian tree</td>
</tr>
<tr>
<td>Clusiaceae</td>
<td>Garcinia intermedia (Pittier) Hammel</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;jorco&gt;, tree species</td>
</tr>
<tr>
<td>Combretaceae</td>
<td>Terminalia amazonia (J.F. Gmelin) Exell</td>
<td>LO</td>
<td>non.</td>
<td>cultivated from lowland</td>
</tr>
<tr>
<td>Convolvulaceae</td>
<td>Ipomoea alba L.</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;churrutaste&gt;, herbaceous climber</td>
</tr>
<tr>
<td>Convolvulaceae</td>
<td>Ipomoea nilotica O'Donnell</td>
<td>LO*</td>
<td>nat.</td>
<td>&lt;churrutaste&gt;, herbaceous climber</td>
</tr>
<tr>
<td>Convolvulaceae</td>
<td>Ipomoea tuberosa L.</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;churrutaste&gt;, herbaceous climber</td>
</tr>
<tr>
<td>Cucurbitaceae</td>
<td>Cucurbita sp.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;ayote&gt;, creeping crop species</td>
</tr>
<tr>
<td>Cucurbitaceae</td>
<td>Cucurbita sp.</td>
<td>ca, ng</td>
<td>nat.</td>
<td>&lt;chachito&gt;, herbaceous climber</td>
</tr>
<tr>
<td>Cucurbitaceae</td>
<td>Cucurbita ollanchae Hook. &amp; Arn.</td>
<td>ca</td>
<td>non.</td>
<td>&lt;chayote&gt;, cultivated climber, (from highland?)</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Acalypha hispida Burm. f.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;rabo de gato&gt;, Southeast Asian ornamental shrub</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Acalypha leptopoda Müll. Arg.</td>
<td>LO</td>
<td>nat.</td>
<td>secondary growth shrub</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Acalypha wilkesiana Müll. Arg.</td>
<td>ca</td>
<td>exo.</td>
<td>South Pacific ornamental shrub</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Chamaesyce hirta (L.) Mills.</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;golondrina&gt;, small herb in open places</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Cordia antarctica (Mill.) L.M. Johnst.</td>
<td>ca, ng</td>
<td>nat.</td>
<td>&lt;chisiquis&gt;, occasional tree species</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Croton draco Cham. &amp; Schltdl.</td>
<td>ca, LO*</td>
<td>nat.</td>
<td>&lt;croto&gt;, Southeast Asian ornamental shrub</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Croton nivius Jacq.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;copalchi&gt;, occasional shrub or tree</td>
</tr>
<tr>
<td>Family</td>
<td>Species</td>
<td>Location</td>
<td>Status</td>
<td>&lt;Common local name&gt;, comments, (butterfly species)</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------</td>
<td>-----------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Euphorbia lancerfolia Schtldl.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;ixbut&gt;, Northern Central American medicinal herb</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Euphorbia pulcherrima Willd.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>&lt;pastora&gt;, Mexican ornamental shrub</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Phyllanthus niruri L.</td>
<td>ca*, ng</td>
<td>nat.</td>
<td>&lt;tamarindillo&gt;, common weed in open places</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Ricinus communis L.</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;higuerrilla&gt;, African naturalized shrub</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Sapium glandulosum (L.) Morong</td>
<td>ca*, LO*</td>
<td>nat.</td>
<td>&lt;yos&gt;, fast growing pioneer tree</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Bauhinia purpurea L.</td>
<td></td>
<td>exo.</td>
<td>&lt;orquídea de palo&gt;, Southeast Asian ornamental tree</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Caesalpinia exostemma DC.</td>
<td>ca</td>
<td>non.</td>
<td>introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Delonix regia (Bojer) Raf.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;malinche&gt;, African tree</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Hymenaea courbaril L.</td>
<td></td>
<td>non.</td>
<td>&lt;guapinol&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Senna didymobotrya (Fresen.) H.S. Irwin &amp; Barneby</td>
<td>ca, LO</td>
<td>exo.</td>
<td>African small ornamental tree</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Senna papillosa</td>
<td></td>
<td>non.</td>
<td>introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Senna didymobotrya (Fresen.) H.S. Irwin &amp; Barneby (Britton &amp; Rose)</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;guaba&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Senna spectabilis (Britton &amp; Rose) H.S. Irwin &amp; Barneby</td>
<td>ca</td>
<td>non.</td>
<td>&lt;guaba machete&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Inga punctata Wild.</td>
<td>ca, LO*</td>
<td>non.</td>
<td>&lt;guaba&gt;, occasional tree, Fig. 20,</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Inga spectabilis (Vahl) Willd.</td>
<td>ca</td>
<td>non.</td>
<td>&lt;guarado&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Inga vera Willd.</td>
<td>ca</td>
<td>non.</td>
<td>&lt;guaymín&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Inga sp.</td>
<td>LO</td>
<td>non.</td>
<td>&lt;guayabina&gt;, cultivated, origin unknown</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Leucaena leucocephala (Lam.) de Wit</td>
<td>LO</td>
<td>non.</td>
<td>&lt;ipil-ipil&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Lysiloma divaricatum (Jacq.) J.F. Macbr.</td>
<td>ca</td>
<td>non.</td>
<td>introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Sapium saman (Jacq.) Merr.</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;cenizarro&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Zygia longifolia (Humb. &amp; Bonpl. ex Willd.)</td>
<td></td>
<td>non.</td>
<td>introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Caes.</td>
<td>Zygia longifolia (Humb. &amp; Bonpl. ex Willd.)</td>
<td></td>
<td>non.</td>
<td>&lt;sotacaballo&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Pap.</td>
<td>Arachis pintoi Krapov. &amp; W.C. Gregory</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;manicillo&gt;, Brazilian ornamental herb</td>
</tr>
<tr>
<td>Fabaceae/Pap.</td>
<td>Cajanus cajan (L.) Millsp.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;frijol de palo&gt;, African or Asian bean shrub</td>
</tr>
<tr>
<td>Fabaceae/Pap.</td>
<td>Dalbergia retusa Hemsl.</td>
<td>LO</td>
<td>non.</td>
<td>&lt;cocomole&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Fabaceae/Pap.</td>
<td>Diaphysa americana (Mill.) M. Sousa</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td>&lt;guachipelin&gt;, native ornamental tree</td>
</tr>
<tr>
<td>Fabaceae/Pap.</td>
<td>Erythrina abysinica Lam. ex DC.</td>
<td>ca</td>
<td>exo.</td>
<td>African ornamental tree</td>
</tr>
<tr>
<td>Fabaceae/Pap.</td>
<td>Erythrina cristagalli L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;árbole de coral&gt;, South American ornamental tree</td>
</tr>
<tr>
<td>Fabaceae/Pap.</td>
<td>Erythrina poepiggiana (Walp.) O.F. Cook</td>
<td>ca, LO*, ng</td>
<td>exo.</td>
<td>&lt;poró gigante&gt;, invasive tree species from North America (Astrapias alardus)</td>
</tr>
<tr>
<td>Family</td>
<td>Species</td>
<td>Location</td>
<td>Status</td>
<td>Common local name&gt; comments, (butterfly species)</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------------------------</td>
<td>----------</td>
<td>---------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Lamiaceae</td>
<td><em>Stachys costaricensis</em> Briq.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>small herb in open places</td>
</tr>
<tr>
<td>Lauraceae</td>
<td><em>Cinnamomum triplinerve</em> (Ruiz &amp; Pav.) Kosterm.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;aguacatillo&gt;, tree species</td>
</tr>
<tr>
<td></td>
<td><em>Persea americana</em> Mill.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;aguacate&gt;, occasional tree species</td>
</tr>
<tr>
<td></td>
<td><em>Persea caerulea</em> (Ruiz &amp; Pav.) Mez.</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td>&lt;aguacatillo ascà&gt;, tree species</td>
</tr>
<tr>
<td>Loranthaceae</td>
<td><em>Struthanthus costaricensis</em> Standl.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;matapalo&gt;, parasitic sub-shrub</td>
</tr>
<tr>
<td></td>
<td><em>Struthanthus marginatus</em> (Desr.) Blume</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;matapalo&gt;, parasitic sub-shrub, (Hesperocaris crocea, captive)</td>
</tr>
<tr>
<td></td>
<td><em>Struthanthus orbicularis</em> (Kunth) Blume</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;matapalo&gt;, parasitic sub-shrub, (Hesperocaris crocea, Rhetus arcuus)</td>
</tr>
<tr>
<td>Lythraceae</td>
<td><em>Cuphea carthagenensis</em> (Jacq.) J.F. Macbr.</td>
<td>ca, ng</td>
<td>nat.</td>
<td>commonly cultivated ornamental sub-shrub</td>
</tr>
<tr>
<td></td>
<td><em>Lagerstroemia speciosa</em> (L.) Pers.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;orgullo de la India&gt;, East Asian ornamental tree</td>
</tr>
<tr>
<td>Malpighiaceae</td>
<td><em>Bunchosia macrophylla</em> Rose</td>
<td>ca, LO</td>
<td>nat.</td>
<td>cultivated ornamental tree</td>
</tr>
<tr>
<td></td>
<td><em>Malpighia glabra</em> L.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;acerola&gt;, shrub or tree species</td>
</tr>
<tr>
<td></td>
<td><em>Tetraperys schiedeana</em> Schltdl. &amp; Cham.</td>
<td>ca</td>
<td>nat.</td>
<td>woody climber</td>
</tr>
<tr>
<td>Malvaceae</td>
<td><em>Hibiscus rosa-sinensis</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;amapola&gt;, East Asian ornamental shrub</td>
</tr>
<tr>
<td></td>
<td><em>Malvaviscus penduliflorus</em> DC.</td>
<td>ca, LO, ng</td>
<td>exo.</td>
<td>&lt;malvavisco&gt;, Mexican ornamental shrub</td>
</tr>
<tr>
<td></td>
<td><em>Pavonia rosea</em> Schhldl.</td>
<td>LO</td>
<td>exo.</td>
<td>&lt;higüero&gt;, common roadside tree in San José city, (Catocyclotis adelina, Emesis mandana)</td>
</tr>
<tr>
<td></td>
<td><em>Sida rhombifolia</em> L.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>herb in open places</td>
</tr>
<tr>
<td></td>
<td><em>Conostegia salapensia</em> (Bonpl.) D. Don ex DC.</td>
<td>ca</td>
<td>nat.</td>
<td>uncommon secondary growth shrub</td>
</tr>
<tr>
<td></td>
<td><em>Miconia calvescens</em> Schr ank &amp; Mart. ex DC.</td>
<td>ca, LO</td>
<td>non.</td>
<td>shrub, introduced from lowland for study purpose</td>
</tr>
<tr>
<td></td>
<td><em>Cissampelos pareirea</em> L.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;cedro amargo&gt;, timber tree species</td>
</tr>
<tr>
<td>Meliaceae</td>
<td><em>Cedrela odorata</em> L.</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;cedro dulce&gt;, introduced from highland</td>
</tr>
<tr>
<td></td>
<td><em>Melia azedarach</em> L.</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;paraso&gt;, East Asian tree species</td>
</tr>
<tr>
<td></td>
<td><em>Swietenia macrophylla</em> King</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;caoba&gt;, introduced from lowland</td>
</tr>
<tr>
<td></td>
<td><em>Trichilia havanensis</em> Jacq.</td>
<td>ca*, LO*</td>
<td>nat.</td>
<td>&lt;urucu&gt;, common roadside tree in San José city, (Catocyclotis adelina, Emesis mandana)</td>
</tr>
<tr>
<td>Menispermaceae</td>
<td><em>Cissampelos pareirea</em> L.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>herbaceous climber</td>
</tr>
<tr>
<td>Moraceae</td>
<td><em>Arctocarpus heterophyllus</em> Lam.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;jaca&gt;, tropical Asian or Polynesian ornamental tree</td>
</tr>
<tr>
<td></td>
<td><em>Ficus benjamina</em> L.</td>
<td>ca*, ng</td>
<td>exo.</td>
<td>&lt;laurel de la India&gt;, common Asian ornamental tree</td>
</tr>
<tr>
<td></td>
<td><em>Ficus cf. citrifolia</em> Mill.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;higueroñ&gt;, locally rare tree</td>
</tr>
<tr>
<td></td>
<td><em>Ficus costaricana</em> (Liebm.) Miq.</td>
<td>ca*, LO</td>
<td>nat.</td>
<td>&lt;higueroñ&gt;, common tree species</td>
</tr>
<tr>
<td></td>
<td><em>Ficus elastica</em> Roxb.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;chilamate&gt;, East Asian tree</td>
</tr>
<tr>
<td></td>
<td><em>Ficus jimenezii</em> Standl.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;chilamate, higueroñ&gt;, tree species</td>
</tr>
<tr>
<td></td>
<td><em>Ficus pertusa</em> L.f.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;higueroñ&gt;, epiphytic tree</td>
</tr>
<tr>
<td></td>
<td><em>Ficus cf. velutina</em> Kunth</td>
<td>LO</td>
<td>non.</td>
<td>&lt;higueroñ&gt;, introduced from highland</td>
</tr>
<tr>
<td></td>
<td><em>Morus nigra</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;morera&gt;, East Asian ornamental</td>
</tr>
<tr>
<td></td>
<td><em>Ardisia revoluta</em> Kunth</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;tucuco&gt;, introduced from lowland</td>
</tr>
<tr>
<td></td>
<td><em>Callistemon lanceolatus</em> (J.E. Smith) Sweet</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;hisopo&gt;, Australian shrub</td>
</tr>
<tr>
<td></td>
<td><em>Eugenia sp.</em></td>
<td>LO</td>
<td>non.</td>
<td>cultivated tree, origin unknown</td>
</tr>
<tr>
<td></td>
<td><em>Eucalyptus sp.</em> 1</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;eucalipto&gt;, Australian tree species</td>
</tr>
<tr>
<td></td>
<td><em>Eucalyptus sp.</em> 2</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;eucalipto&gt;, Australian tree species</td>
</tr>
<tr>
<td></td>
<td><em>Eucalyptus sp.</em> 3</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;eucalipto&gt;, Australian tree species</td>
</tr>
<tr>
<td></td>
<td><em>Eugenia biflora</em> (L.) DC.</td>
<td>ca</td>
<td>non.</td>
<td>&lt;pitanga&gt;, South American shrub or tree</td>
</tr>
</tbody>
</table>

*TABLE 1 (Continued)*

List of plants found on the University of Costa Rica main campus


47
TABLE 1 (Continued)
List of plants found on the University of Costa Rica main campus

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Location</th>
<th>Status</th>
<th>&lt;Common local name&gt;, comments, (butterfly species)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Myrtaceae</strong></td>
<td><em>Myrcianthes fragrans</em> (Sw.) McVaugh</td>
<td>LO</td>
<td><strong>non.</strong></td>
<td>introduced from highland</td>
</tr>
<tr>
<td><strong>Myrtaceae</strong></td>
<td><em>Psidium guajava</em> L.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;guayabo&gt;, tree in open places</td>
</tr>
<tr>
<td><strong>Myrtaceae</strong></td>
<td><em>Syzygium jambos</em> (L.) Alston</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;manzana rosa&gt;, Southeast Asian invasive tree</td>
</tr>
<tr>
<td><strong>Nyctaginaceae</strong></td>
<td><em>Bougainvillea glabra</em> Choisy</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;veranera&gt;, South American ornamental shrub</td>
</tr>
<tr>
<td><strong>Nyctaginaceae</strong></td>
<td><em>Neea psychrioides</em> Donn. Sm.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>small tree with fruits eaten by many animal species</td>
</tr>
<tr>
<td><strong>Myrtaceae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oleaceae</strong></td>
<td><em>Fraxinus udelet</em> (Wenz.) Lingels.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;fresco&gt;, North American tree</td>
</tr>
<tr>
<td><strong>Oleaceae</strong></td>
<td><em>Ligustrum lucidum</em> Aiton</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;trueno&gt;, Mediterranean tree species</td>
</tr>
<tr>
<td><strong>Oleaceae</strong></td>
<td><em>Ligustrum vulgare</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;olivo de cerca&gt;, European shrub</td>
</tr>
<tr>
<td><strong>Onagraceae</strong></td>
<td><em>Oenothera rosea</em> Aiton</td>
<td>ca, ng</td>
<td>nat.</td>
<td>&lt;trébol&gt;, small herbs in open places</td>
</tr>
<tr>
<td><strong>Oxalidaceae</strong></td>
<td><em>Oxalis corniculata</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;trébol&gt;, small herbs in open places</td>
</tr>
<tr>
<td><strong>Passifloraceae</strong></td>
<td><em>Passiflora adenopoda</em> DC.</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td>&lt;calzancillo&gt;, herbaceous climber, Fig. 22, (Heliconius spp.)</td>
</tr>
<tr>
<td><strong>Passifloraceae</strong></td>
<td><em>Passiflora biflora</em> Lam.</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td></td>
</tr>
<tr>
<td><strong>Nyctaginaceae</strong></td>
<td><em>Bougainvillea glabra</em> Choisy</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;veranera&gt;, South American ornamental shrub</td>
</tr>
<tr>
<td><strong>Nyctaginaceae</strong></td>
<td><em>Neea psychrioides</em> Donn. Sm.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>small tree with fruits eaten by many animal species</td>
</tr>
<tr>
<td><strong>Nyctaginaceae</strong></td>
<td><em>Bougainvillea glabra</em> Choisy</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;veranera&gt;, South American ornamental shrub</td>
</tr>
<tr>
<td><strong>Nyctaginaceae</strong></td>
<td><em>Neea psychrioides</em> Donn. Sm.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>small tree with fruits eaten by many animal species</td>
</tr>
<tr>
<td><strong>Oleaceae</strong></td>
<td><em>Fraxinus udelet</em> (Wenz.) Lingels.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;fresco&gt;, North American tree</td>
</tr>
<tr>
<td><strong>Oleaceae</strong></td>
<td><em>Ligustrum lucidum</em> Aiton</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;trueno&gt;, Mediterranean tree species</td>
</tr>
<tr>
<td><strong>Oleaceae</strong></td>
<td><em>Ligustrum vulgare</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;olivo de cerca&gt;, European shrub</td>
</tr>
<tr>
<td><strong>Onagraceae</strong></td>
<td><em>Oenothera rosea</em> Aiton</td>
<td>ca, ng</td>
<td>nat.</td>
<td>&lt;trébol&gt;, small herbs in open places</td>
</tr>
<tr>
<td><strong>Oxalidaceae</strong></td>
<td><em>Oxalis corniculata</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;trébol&gt;, small herbs in open places</td>
</tr>
<tr>
<td><strong>Passifloraceae</strong></td>
<td><em>Passiflora adenopoda</em> DC.</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td>&lt;calzancillo&gt;, herbaceous climber, Fig. 22, (Heliconius spp.)</td>
</tr>
<tr>
<td><strong>Passifloraceae</strong></td>
<td><em>Passiflora biflora</em> Lam.</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td></td>
</tr>
<tr>
<td><strong>Nyctaginaceae</strong></td>
<td><em>Bougainvillea glabra</em> Choisy</td>
<td>ca, LO</td>
<td>exo.</td>
<td>&lt;veranera&gt;, South American ornamental shrub</td>
</tr>
<tr>
<td><strong>Nyctaginaceae</strong></td>
<td><em>Neea psychrioides</em> Donn. Sm.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>small tree with fruits eaten by many animal species</td>
</tr>
<tr>
<td><strong>Oleaceae</strong></td>
<td><em>Fraxinus udelet</em> (Wenz.) Lingels.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;fresco&gt;, North American tree</td>
</tr>
<tr>
<td><strong>Oleaceae</strong></td>
<td><em>Ligustrum lucidum</em> Aiton</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;trueno&gt;, Mediterranean tree species</td>
</tr>
<tr>
<td><strong>Oleaceae</strong></td>
<td><em>Ligustrum vulgare</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;olivo de cerca&gt;, European shrub</td>
</tr>
<tr>
<td><strong>Onagraceae</strong></td>
<td><em>Oenothera rosea</em> Aiton</td>
<td>ca, ng</td>
<td>nat.</td>
<td>&lt;trébol&gt;, small herbs in open places</td>
</tr>
<tr>
<td><strong>Oxalidaceae</strong></td>
<td><em>Oxalis corniculata</em> L.</td>
<td>ca</td>
<td>exo.</td>
<td>&lt;trébol&gt;, small herbs in open places</td>
</tr>
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<td><em>Passiflora adenopoda</em> DC.</td>
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<td>ca, LO, ng</td>
<td>nat.</td>
<td>&lt;calzancillo&gt;, herbaceous climber, Fig. 22, (Heliconius spp.)</td>
</tr>
<tr>
<td><strong>Passifloraceae</strong></td>
<td><em>Passiflora biflora</em> Lam.</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 1 (Continued)

**List of plants found on the University of Costa Rica main campus**

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Location</th>
<th>Status</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sapindaceae</td>
<td><em>Sapindus saponaria</em> L.</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;chumico, jaboncillo&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Sapindaceae</td>
<td><em>Thouinidium decandrum</em> (Humb. &amp; Bonpl.) Radlk.</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;sardino&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td><em>Manilkara chicle</em> (Pittier) Gilly</td>
<td>LO</td>
<td>non.</td>
<td>&lt;nispero&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td><em>Pouteria fossicola</em> Cronquist</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;zapote&gt;, tree species</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td><em>Pouteria reticulata</em> (Engl.) Eyma</td>
<td>LO</td>
<td>non.</td>
<td>&lt;zapotillo&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td><em>Sideroxylon capiri</em> (A. DC.) Pittier</td>
<td>LO</td>
<td>non.</td>
<td>&lt;tempisque&gt;, young trees introduced from lowland</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td><em>Sapindus saponaria</em> L.</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;chumico, jaboncillo&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td><em>Thouinidium decandrum</em> (Humb. &amp; Bonpl.) Radlk.</td>
<td>ca, LO</td>
<td>non.</td>
<td>&lt;sardino&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td><em>Manilkara chicle</em> (Pittier) Gilly</td>
<td>LO</td>
<td>non.</td>
<td>&lt;nispero&gt;, introduced from lowland</td>
</tr>
<tr>
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<td><em>Pouteria fossicola</em> Cronquist</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;zapote&gt;, tree species</td>
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<td>LO</td>
<td>non.</td>
<td>&lt;zapotillo&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td><em>Sideroxylon capiri</em> (A. DC.) Pittier</td>
<td>LO</td>
<td>non.</td>
<td>&lt;tempisque&gt;, young trees introduced from lowland</td>
</tr>
<tr>
<td>Scrophulariaceae</td>
<td><em>Castilleja arvensis</em> Schldl. &amp; Cham.</td>
<td>ca</td>
<td>nat.</td>
<td>uncommon secondary growth shrub</td>
</tr>
<tr>
<td>Scrophulariaceae</td>
<td><em>Mazus pumilus</em> (Burm. f.) Steenis</td>
<td>ca</td>
<td>exo.</td>
<td>Asian naturalized weed</td>
</tr>
<tr>
<td>Simaroubaceae</td>
<td><em>Picaninia antidesma</em> Sw.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;amargo&gt;, understory shrub</td>
</tr>
<tr>
<td>Simaroubaceae</td>
<td><em>Simarouba amara</em> AUBL.</td>
<td>LO</td>
<td>non.</td>
<td>&lt;aceituno&gt;, introduced from lowland</td>
</tr>
<tr>
<td>Solanaceae</td>
<td><em>Acmisodus arborecens</em> (L.) Schlld.</td>
<td>ca*, LO, ng</td>
<td>nat.</td>
<td>&lt;guatucamal&gt;, pioneer shrub or small tree, flowers visited by many butterflies, fruits eaten by many animal species, Fig. 24</td>
</tr>
<tr>
<td>Solanaceae</td>
<td><em>Browallia americana</em> L.</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;no me olvides&gt;, small herb in open places</td>
</tr>
<tr>
<td>Solanaceae</td>
<td><em>Brunfelsia calycina</em> Benth.</td>
<td>ca, ng</td>
<td>exo.</td>
<td>South American ornamental shrub</td>
</tr>
<tr>
<td>Solanaceae</td>
<td><em>Cestrum tomentosum</em> L. f.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;zorrillo&gt;, stinking pioneer shrub or tree</td>
</tr>
<tr>
<td>Solanaceae</td>
<td><em>Cestrum</em> sp.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;zorrillo&gt;, secondary growth shrub</td>
</tr>
<tr>
<td>Solanaceae</td>
<td><em>Solanum torvum</em> Sw.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;berenjena cimarrona&gt;, ruderal species</td>
</tr>
<tr>
<td>Solanaceae</td>
<td><em>Solanum umbellatum</em> Mill.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;zorrillo&gt;, stinking ruderal species (Dircenna klugii)</td>
</tr>
<tr>
<td>Solanaceae</td>
<td><em>Witheringia solanacea</em> L’Her.</td>
<td>LO, ng</td>
<td>nat.</td>
<td>&lt;tomatillo&gt;, secondary growth herb</td>
</tr>
<tr>
<td>Sterculiaceae</td>
<td><em>Byttneria aculeata</em> (Jacq.) Jacq.</td>
<td>LO</td>
<td>nat.</td>
<td>thorny herbaceous species</td>
</tr>
<tr>
<td>Sterculiaceae</td>
<td><em>Guazuma ulmifolia</em> Lam.</td>
<td>LO</td>
<td>non.</td>
<td>&lt;guatucamal&gt;, young cultivated trees from lowland dry forest</td>
</tr>
<tr>
<td>Tiliaceae</td>
<td><em>Heliocarpus cf. appendiculatus</em> Turcz.</td>
<td>ng</td>
<td>nat.</td>
<td>&lt;burio&gt;, pioneer tree species</td>
</tr>
<tr>
<td>Tiliaceae</td>
<td><em>Triunfetta semitriloba</em> Jacq.</td>
<td>LO</td>
<td>nat.</td>
<td>&lt;mozote&gt;, small medicinal shrub</td>
</tr>
<tr>
<td>Ulmaceae</td>
<td><em>Trema microanthra</em> (L.) Blume</td>
<td>ca</td>
<td>nat.</td>
<td>&lt;jucó&gt;, pioneer tree species</td>
</tr>
<tr>
<td>Urticaceae</td>
<td><em>Phenax rugosus</em> (Poir.) Wedd.</td>
<td>ca, ng</td>
<td>nat.</td>
<td>small shrub in open places</td>
</tr>
<tr>
<td>Urticaceae</td>
<td><em>Pilea cadieri</em> Gagnep. &amp; Guillamin</td>
<td>LO, ng</td>
<td>exo.</td>
<td>&lt;herba de aluminio&gt;, Southeast Asian ornamental shrub</td>
</tr>
<tr>
<td>Urticaceae</td>
<td><em>Pilea hyalina</em> Fenzl.</td>
<td>LO, ng</td>
<td>nat.</td>
<td>small fleshy herb</td>
</tr>
<tr>
<td>Urticaceae</td>
<td><em>Pilea microphylla</em> (L.) Liebm.</td>
<td>ca*, LO, ng</td>
<td>nat.</td>
<td>very common small herb in open places</td>
</tr>
<tr>
<td>Verbenaceae</td>
<td><em>Citharexylum donnell-smithii</em> Greenm.</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;dama&gt;, shrub or small tree</td>
</tr>
<tr>
<td>Verbenaceae</td>
<td><em>Clerodendrum paniculatum</em> L.</td>
<td>LO, ng</td>
<td>exo.</td>
<td>Southeast Asian ornamental shrub</td>
</tr>
<tr>
<td>Verbenaceae</td>
<td><em>Lantana camara</em> L.</td>
<td>ca, ng</td>
<td>nat.</td>
<td>&lt;cinco negritos&gt;, ruderal small shrub</td>
</tr>
<tr>
<td>Verbenaceae</td>
<td><em>Stachydrphenia</em> sp.</td>
<td>ca</td>
<td>non.</td>
<td>&lt;alacranecillo&gt;, cultivated from lowland to attract butterflies</td>
</tr>
<tr>
<td>Vitaceae</td>
<td><em>Cissus verticillata</em> (L.) Nicolson &amp; C.E. Jarvis</td>
<td>ca, LO</td>
<td>nat.</td>
<td>&lt;insta&gt;, herbaceous climber</td>
</tr>
<tr>
<td>Vochysiaceae</td>
<td><em>Vochysia guatemalensis</em> Donn. Sm.</td>
<td>LO</td>
<td>non.</td>
<td>&lt;palo de mayo&gt;, cultivated from lowland</td>
</tr>
<tr>
<td>Zygophyllaceae</td>
<td><em>Guaiacum sanctum</em> L.</td>
<td>ca, LO, ng</td>
<td>nat.</td>
<td>&lt;guayacan real&gt;, young cultivated trees from lowland dry forest</td>
</tr>
</tbody>
</table>

This list consists with plants recorded inside of loop-line road as indicated in figure 5. Common species with more than 10 plants observed between 2004 and 2007 are indicated with * after location. Location: plants found on the UCR campus outside of Reserva ecológica Leonelo Oviedo = ca; in Leonelo Oviedo = LO; in nursery garden in Leonelo Oviedo = ng. Status: native to Premontane Moist Forest of the region = nat.; non-native to the area, but found naturally in Costa Rica = non. (emphasized in grey); exotic = exo. (emphasized in grey), bold letters emphasizing non. and exo. found in the Leonelo Oviedo Ecological Preserve (RELO). Butterfly species hosted are indicated in bold parentheses in the comments column. The word Captive, indicates that the plant was given as food plant under captive conditions, resulted in successful adult emergence.
i.e. were absent in the nursery garden or on UCR campus. There were 117 species in the nursery garden and 33 species (ca. 28%) of these were found only on that site. On the rest of the campus indicated in figure 5, we recorded 317 species; 142 species (ca. 45%) of these were absent either from the nursery garden or the RELO.

Most of the plants on UCR campus (excluding the RELO), whether native or introduced, were planted as ornamentals. Consequently, only 57% (182 species) of the campus flora was composed of native Costa Rican species. In the RELO, 86% of flora (179 species) was native to Costa Rica; though not all these species were native to the studied site, i.e. were either manually planted or escaped from cultivation and arrived at the Preserve either before or after the preservation of the area as the RELO. Roughly one-third (59) of the 179 Costa Rican species naturally does not occur in the Preserve or in the Premontane Moist Forest habitat of the region. Most of these plants were composed of young cultivated trees, species that usually grow in secondary forests in lowland regions of Costa Rica. Regarding just the tree species of the Preserve, there were 36 native-to-region species, which is 17.6% of the RELO total flora. The 36 tree species account for approximately 30% of all native-to-region plants including shrubs and herbaceous species.

In the RELO, basically two floristic components were observed. One was composed of secondary growth herbs, shrubs, and trees, with a very few mature large vegetations which are survivors from the ancient forests of the region. Regarding the presence of the remnant large native trees, it appeared to be favored by the presence of the Negritos River, because most of these trees were found along the river banks. The other component was composed of various planted, introduced tree species from lowland and a smaller number from the highland of Costa Rica, as well as a few exotic tree species. Native-to-region tree species commonly occurring in the RELO were Stemmadenia litoralis (Apocynaceae), Cordia eriostigma (Boraginaceae), Cecropia obtusifolia (Cecropiaceae) (Fig. 23), Croton draco, Sapium glandulosum (Euphorbiaceae), Inga punctata, Lonchocarpus cf. oliganthus (Fabaceae), Licaria triandra, Persea caerulea (Lauraceae), Trichilia havanensis (Meliaceae), and Acenitus arborescens (Solanaeaceae) (Fig. 24). In contrast, Ficus cf. citrifolia (Moraceae) and Zanthoxylum rhoifolium (Rutaceae) were floristically considered rare in the Preserve. Other rare species in the RELO were: a terrestrial herb, Govenia cf. lilacea (Orchidaceae); a riparian herb, Hygrophila costata (Acanthaceae); an herbaceous climber, Torretia lappacea (Bignoniaceae); and two shrubs, Acalypha leptopoda (Euphorbiaceae) and Podachaenium eminens (Asteraceae). This last species once commonly occurred in urbanized areas of San José, though presently it is close to local extinction. Therefore, the Preserve may well be one of the last refuges for the species in this region. Currently, three individuals were recognized in the southwestern limit of the Preserve, indicating a possible recovery of a small population.

Most of the invasive plants found in the RELO consisted of introduced exotic ornamentals (e.g. Erythrina poeppigiana, Impatiens walleriana, Megaskpasma erythrochlamsys, Syzygium jambos), weeds (e.g. Cyperus involucratus, Pennisetum purpureum) and some crops and fruit trees (especially Coffea arabica, Mangifera indica, and Eriobotrya japonica) which escaped from cultivation. In Costa Rica, the fast-growing, large, northern South American Erythrina poeppigiana trees are commonly planted as fence trees on farm lands and as shadow trees in coffee plantations. This species has been reproducing itself very successfully in the RELO where we have seen hundreds of saplings and germinating seeds, especially in the rainy seasons of the last two years. Monitoring and controlling all exotics and species that are not native to the region is necessary, especially when they become invasive and affect native flora and fauna. This could apply also to some of the native species to establish healthy conditions of the Preserve for its regeneration. For example, approximately 10 years
ago thickets of *Ipomoea santillanii* were very abundant, covering most of the forest floor and hindering the growth of small trees, thus it was necessary to control (Di Stéfano 1996). At present it appears that a control of *Chamaedorea costaricana* is necessary since its thickets are covering the forest floor quite heavily in some parts of the Preserve. Another locally native species which is possibly invasive is *Pseuderanthemum cuspidatum* (Fig. 16).

Today the forest floor is more shaded than 10 years ago; hence, we must note that the flora and fauna of the Preserve changes as the forest grows. For example, the shrubs of *Psychotria marginata* (Rubiaceae) which grow in slightly open understory have slowly been weakening, wilting, and disappearing during the last few years. Also some drastic changes may occur as large trees fall and destroy the others, or small plants, especially occasional small herbs will suffer by the periodic trimming of the plants in open areas of the campus.

**Butterflies and day-flying moths**

(Figs. 25-38, Table 2)

Table 2 lists 203 species of butterflies and 20 species of day-flying moths thus far recorded in the RELO. The list also shows the year(s) in which the record is available in order to provide a measure of historical context and the up-to-datedness of the available records, as well as the times of the year in which the presence of each species’ adult has been confirmed. Our own study began in 1997, but for the sake of completeness we included the data available from several other sources as described in the materials and methods section. Unfortunately, however, dates of collecting were not always available in those cases. We have been able to confirm the presence of 13 species of Ithomiinae between 1997 and 2007, a far cry from the 29 species Stiles found in 1979 or 1980. Moreover, between 1975 and 1981, Stiles (pers. comm. 2005) observed 40 species of Ithomiinae, a number that approaches 80% of the total species known from Costa Rica. It should be noted, however, that these most likely include migrating species or strays rather than true residents (G. Stiles pers. comm., 2005), a caveat that applies equally to the rest of the Ithomiinae species we have found ourselves. DeVries (1987) also mentions that this many species might be found in San José for this reason. Of particular interest among the records is *Ithomia celemia*, a species known to be one of the rarest of Costa Rican Ithomiinae. The nearest current habitat of this species is Rodeo (Montero-Moreno 2003; I. Nakamura, unpublished record, 2007). It is not inconceivable that this species was more common in the Central Valley until its main habitats were lost.

We present in Fig. 39 a “collecting curve” of butterflies spanning the 10 year period of our study (note that it does not include day-flying moths). Atypical shape of the curve has several causes. First, we counted any visit to the RELO as a collecting day, regardless of the length of the time spent or the weather conditions. Second, when rearing of larvae or pupae ended with adults, the day of adult emergence was counted as a visit. Presence of a substantial number of species was first established through rearing, particularly in the early phase of our study, resulting in the slow rate of rise early in the curve. Third, our effort to inventory the Hesperiidae of the RELO did not begin in earnest until relatively late. In any event, the curve clearly indicates that our list is far from complete and that our effort needs to continue.

Generally speaking, the butterfly fauna of the RELO seems notable for the common occurrence of some species which are seldom encountered or at least much less common elsewhere. These include *Synale cynaxa* (Hesperiidae, Hesperiinae), the two *Hesperocharis* species (Pieridiae, Pierinae), and *Catocyclotis adelina* (Riodinidae, Riodininae) (Fig. 33). None of these species appear in Fulton’s list (1966) or in Vega & Gloer (2001). It is possible that the relatively common occurrence of these species in the RELO simply reflects availability of uncommon host plants and other favorable conditions. Alternatively, these species may represent a remnant of the former fauna of the Central Valley.
Fig. 25. *Xenophanes tryxus* perched on underside of *Impatiens* leaf (8:30 am, March 25, 2004). **Fig. 26.** *Anthoptus epictetus* on a dry leaf on ground basking (9:00 am, March 25, 2004). **Fig. 27.** *Cynea cynea* showing mating behavior (male on right rubbing female’s abdomen with its hind legs) on *Heliconia* leaf (1:00 pm, April 25, 2004). **Fig. 28.** *Leptotes cassius* on dry twig (9:30 am, March 25, 2004). **Fig. 29.** *Eurema xanthochlora* mature and empty pupae, a recently eclosed adult drying its wings on *Senna papillosa* (10:00 am, Sept. 17, 2003). **Fig. 30.** *Calycopis isobeon* or *C. origo* (female) feeding on bird dropping near ground level (4:00 pm, March 23, 2004). **Fig. 31.** *Euselasia mystica* resting on underside of *Eugenia* leaf (11:00 am, April 1st, 2004).
Fig. 32. *Mesosemia telegone* on underside of *Heliconia* leaf (10:00 am, March 17, 2007).

Fig. 33. *Catocyclotis adelina* (female) resting on underside of *Inga vera* leaf between ovipositions (10:00 am, July 6, 2000).

Fig. 34. *Ihomia patilla* perching on *Commelina* leaf (1:00 pm, August 25, 2003).

Fig. 35. *Castilia griseobasalis* on a dry twig in light gap (12:00 pm, March 27, 2004).

Fig. 36. *Oxeoschistus tauropolis* on a leaf near forest floor in light gap (11:00 am, April 1st, 2004).

Fig. 37. *Heliconius charithonia* on flowers of *Pentas lanceolata* in the nursery garden (11:00 am, April 22, 2006).

Fig. 38. *Heliconius erato* showing courtship behavior in light gap; female perched on leaf near ground and male in fluttery flight approaching the female (1:30 pm, December 14, 2002).
### TABLE 2

*List of butterflies and day-flying moths found in Reserva Ecológica Leonelo Oviedo (RELO)*

<table>
<thead>
<tr>
<th>Family: Subfamily / Species</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
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TABLE 2 (Continued)
List of butterflies and day-flying moths found in Reserva Ecológica Leonelo Oviedo (RELO)

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**TABLE 2 (Continued)**

*List of butterflies and day-flying moths found in Reserva Ecológica Leonelo Oviedo (RELO)*

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<td>Hamadryas februa (Hübner, [1823])&lt;sup&gt;1&lt;/sup&gt;</td>
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**Nymphalidae: Nymphalinae**

| Anartia fatima (Fabricius, 1793) | 96,97,00,03,04,07 | | | | | | | | | | | | |
| Anartia jatrophae (Linnaeus, 1763) | | | | | | | | | | | | | 96 |
| Anthanassa aridis (Hewitson, 1864)* | 96-98,01,04-06 | | | | | | | | | | | | |
| Anthanassa otanes fulviplaga (Butler, 1872) | 03,04,07 | | | | | | | | | | | | |
| Castilia grisobasalis (Röber, 1913) | 04,05 | | | | | | | | | | | | |
| Chlosyne janais (Drury, 1782) | 97-99,03-06 | | | | | | | | | | | | |
| Colobura dixie (Linnaeus, 1758) | 98,02,04,07 | | | | | | | | | | | | |
| Historis acheronta (Fabricius, 1775) | 99,04 | | | | | | | | | | | | |
| Historis odius (Fabricius, 1775) | 02 | | | | | | | | | | | | |
| Junonia evanida (Cramer, 1779) | 99 | | | | | | | | | | | | |
| Siproeta apalus (Latreille, [1813]) | 98,03,04,06 | | | | | | | | | | | | |
| Siproeta stelenes (Linnaeus, 1758) | 03 | | | | | | | | | | | | |
| Smyrna blomfieldia (Fabricius, 1781) | 98,04 | | | | | | | | | | | | |
| Tegosa anieta (Hewitson, 1864) | 04,06 | | | | | | | | | | | | |

**Nymphalidae: Heliconiinae**

| Actinote anteas (Doubleday, [1847]) | 03,04 | | | | | | | | | | | | |
| Allinote ozemene nor (Bates, 1864) | 05,07 | | | | | | | | | | | | |
| Dione juno (Cramer, 1779) | 01 | | | | | | | | | | | | |
| Dione moneca Hübner, [1825] | 04 | | | | | | | | | | | | |
| Dryadula phaetusa (Linnaeus, 1758) | 04 | | | | | | | | | | | | |
| Dryas iulia (Fabricius, 1775) | 96,98,01,03,04,07 | | | | | | | | | | | | |
| Eueides isabella (Stoll, 1781) | 96 | | | | | | | | | | | | |
| Eueides probula Doubleday, [1847] | 00 | | | | | | | | | | | | |
| Heliconius charitonia (Linnaeus, 1767) | 88,89,96,04 | | | | | | | | | | | | |
| Heliconius clisonymus (Linnaeus, 1767) | 96,97,01,04 | | | | | | | | | | | | |
| Heliconius erato (Linnaeus, 1758)* | 96,98,03,04,07 | | | | | | | | | | | | |
| Heliconius hecale (Fabricius, 1776) | 98,03,04 | | | | | | | | | | | | |
| Heliconius ismenius (Linnaeus, 1758) | 04 | | | | | | | | | | | | |
### Table 2 (Continued)

**List of butterflies and day-flying moths found in Reserva Ecológica Leonelo Oviedo (RELO)**

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<td><strong>Pyralidae</strong></td>
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<td><em>Mapeta xanthomelas</em> Walker, 1863</td>
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<td>Unidentified sp. (clear wing, black-metallic blue wasp-like)</td>
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<td><strong>Uranidae</strong></td>
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<td><em>Urania fulgens</em> (Walker, 1854)</td>
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<td><em>Atyria comoda</em> Prout, 1938</td>
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<td><em>Melanchroia chephise</em> (Stoll, 1782)</td>
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<td><em>Simena luctifera</em> Walker, 1856</td>
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<td><strong>Notodontidae: Dioptinae</strong></td>
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<td><em>Josia frigida</em> Druce, 1885</td>
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<td><em>Tithraustes mirma</em> (Druce, 1899)</td>
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<td><strong>Arctiidae</strong></td>
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<td><em>Achlya heber</em> (Cramer, 1780)</td>
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<td><em>Amycles adusta</em> (Felder, 1874)</td>
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<td><em>Ardoea morio</em> (Walker, 1854)</td>
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<td><em>Argyrotaeus notha</em> Schaus, 1911</td>
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<td><em>Cacostatia saphira</em> (Staudinger, 1875)</td>
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<td><em>Correbidia</em> sp.</td>
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<td><em>Cyanopepla arrogans</em> (Walker, 1854)</td>
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<td><em>Episeepsis lenaeus</em> (Cramer, 1780)</td>
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<td><em>Napata leucoteles</em> (Butler, 1876)</td>
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<td><em>Nyriidea xanthocera</em> (Walker, 1856)</td>
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<td><em>Phaenarete diana</em> Druce, 1886</td>
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<td><em>Syntomeida melanthus</em> (Cramer, 1779)</td>
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*Common* species seen throughout the year from 2004 to 2007 are indicated with * after species name. Species without voucher specimens in the entomological collection of Museo de Zoología, UCR are indicated with after species name. Each month is divided into three 10-day periods, left = early, middle = middle, right = late, and the cells for recorded periods are filled with gray color; E = egg laying observed, R = reared, M = mating, B = bait trap, / = data without specific dates (only month), bold letters in year = data with only the year available.
The following species were commonly seen in the RELO throughout the year: *Greta morgane*, *Ithomia heraldica*, *I. patilla* (Fig. 34) (Ithomiinae), *Oxeoschistus tauropolis* (Fig. 35), *Pedaliodes manis*, *Hermeuptychia hermes* (Satyrinae), and *Heliconius erato* (Fig. 38) (Heliconiinae). In almost every visit, at least one individual of these species was encountered along the trail. Other common species include *Astraptes*, *Staphylus*, *Urbanus*, *Callimormus*, *Cynea* (Fig. 27), *Papias*, *Poanes* (Fig. 26), and *Saliana* species in Hesperiidae; *Eurema* (Fig. 29) and *Phoebis* species in Pieridae; *Calycopis* (Fig. 30) in Lycaenidae; *Calephelis* and *Cato-cyclotis* (Fig. 33) in Riodinidae; *Pteronymia notilla* in Ithomiinae; *Anthanassa ardis*, *Castilia griseobasalis* (Fig. 36) in Nymphalinae; *Dryas iulia*, and *Heliconius charithonia* (Fig. 37) in Heliconiinae.

Some butterflies were observed on the following naturally occurring food sources: Some skippers (e.g. *Pompeius pompeius* (female) and *Astraptes alardus*) on bird dropping, *Sinale cynaxa* on flower nectar of *Impatiens wal-leriana*, *Phoebis*, some lycaenids (unidentified) and *Thisbe lycorias* on *Inga vera* (Fig. 20), *Calycopis isobeon / origo* (female) feeding on bird dropping (Fig. 30), *Catoclytis adelina* (male) on flowers of *Acnistus arborescens* (Fig. 24), several ithomiines on bird droppings or carrion (decomposing insects), overripe *Rivina humilis* fruits (Fig. 18), and accumulated water in *Heliconia* flowers, *Oxeoschistus tauropolis* on sticky secretion on flower-fruit peduncles of *Chamaedorea costaricana* (Fig. 14), *Pedaliodes manis* on flower nectar of the *Impatiens* and decomposing flower of *Monstera deliciosa* on ground, *Heliconius clysonymus* on flower nectar of *Hamelia patens* (Fig. 21). The following species were caught on the flowers of *Acnistus arborescens*: *Cynea* sp.; *Mucia zygia*; *Pompeius pompeius*; *Buzyges rolla*; *Ascia monuste*; *Hesperocharis costaricensis*; *H. crocea*; *Strymon cestri*; *Calycopis isobeon / origo*; *Ziegleria syllis*; and *Thisbe lycorias*. Those species caught in the plantain-banana traps, placed between 1 to 5 m above ground, are indicated in Table 2.

The well-known behavior of *Hamadryas februa*, perching head-down with the wings open or flying and producing clicking-sounds around the bare trunks of medium to large

Fig. 39. “Collecting curve” of butterflies spanning the 10 year period of our study. X-axis = number of collecting day; Y-axis = cumulative number of species.
trees, has been seen on campus and commented on by casual observers (also from J. Monge-Nájera, pers. comm.).

**Importance of the RELO**

As stated earlier, the original purpose of establishing the RELO was to protect the area and restore a representative Premontane Moist Forest of the region. However, the current condition of the Preserve may be described as a mosaic of native, non-native-to-region, and exotic plants. Thus, it does not represent a forest truly composed of locally native species and is more like a botanical garden. One of the critical facts that seem to defy the concept of the Ecological Preserve is ongoing planting of trees that are not native to the region. Furthermore, some of those young trees were not even taxonomically identified at the time of planting, clearly diverging from the original purpose and worsening the conditions of the Preserve.

Data from 1991 show that 98% of the Premontane Moist Forest habitat in Costa Rica is deforested, i.e. only 2% remains as Premontane Moist Forest; this remaining tiny portion is composed of 265 fragmented areas with each patch averaging 0.3 km² in size (Sánchez-Azofeifa et al. 2001). The percentage and patch sizes are the smallest among all other life zones according to Holdridge (1967) classification. Sánchez-Azofeifa et al. (2001) state that “Forests are almost completely eliminated from the Tropical Moist Forest and Premontane Moist Forest life zones, and the level of fragmentation of remaining forests may be more advanced than previously thought.” According to J. Lobo (pers. comm. 2007), the data compiled by the Fondo Nacional de Financiamiento Forestal (FONAFIFO 2005) indicate that merely ca. 4500 ha of the Premontane Moist Forest habitat in Costa Rica is still covered by forest, that is, ca. 0.003% of protected areas that include National Parks, Biological Reserves, and Wildlife Refuges, among others. This low percentage presumably resulted from the concentrated distribution of such life zone in the central part of Costa Rica, such as in the Valleys of Cartago, San Ramón, and especially in the Central Valley (Bolaños et al. 1999) where human “development” is prevalent. Therefore, reconditioning and preserving such forest habitat is even more important, including a small patch of green space in the Central Valley such as the RELO.

The small RELO preserve is under pressure from habitat fragmentation, air and water pollution, and invasion of non-native plants, requiring reconditioning to improve its ecosystem. On the other hand, it has been playing important roles for many organisms, and serving the needs of students and researchers. The RELO is likely to yield more new discoveries in addition to those we mentioned earlier, indicating its potential scientific value. It is probable that the ecological conditions of the RELO have been supported by other green areas surrounding the UCR campus and vice versa, especially the areas in Ciudad de la Investigación and Instalación Deportiva of the UCR, including “protected” areas along the rivers (Fig. 2). There are at least two important roles the Negritos Creek plays for the Preserve, namely 1) as a narrow biological corridor for living organisms (Di Stéfano et al. 1996) and 2) providing a fair amount of moisture for survival of organisms especially during the dry season.

While a larger connected protected area would be ideal (MacArthur & Wilson 2001, Laurence et al. 2006), fragmentation of natural habitat or green space seems inevitable in urban areas where social pressure dominates (Bertsch 2006); however, keeping or creating small preserves like the RELO may be the best current option that we can embrace. Two known projects are presently in progress in the city of San José. One is Proyecto Mariposas en San José, organized by Plan de Arborización Urbana (PLANARBU), Sección de Parques del Municipio, Municipalidad de San José (A. Solórzano, pers. comm. 2005). The other is Proyecto Plás conducted by Programa Bandera Azul Ecológica of Departamento de Educación Ambiental del Ministerio de Educación Pública and JICA (Japan International Cooperation Agency) in Costa Rica with Escuela República de Haití in San Sebastián de Paso Ancho.
(Proyecto Plás 2007). These two projects aim to re-create an environment suitable for butterflies and other organisms in the city of San José by planting trees that are locally native, as well as butterfly host plants and flowering plants that are also native. These projects and the existence of the RELO may hopefully slow down the process of species extinction to some extent, and help migratory species that fly through the Central Valley (Haber 1993).

In addition to conservation of biodiversity and habitat, it is clear that green natural space in a city environment is important for many other reasons, e.g., it reduces city noise, provides better water retention to reduce flood frequency, and supplies better air quality (clean moist air) (Sukopp & Werner 1991, Nowak et al. 1997, Pickett et al. 2001 and references therein, Rudd et al. 2002, Chiesura 2004, Ruiz-Jaen & Mitchell 2006). Ongoing habitat destruction and fragmentation, as well as air and water pollution in the Valley will undoubtedly have negative impacts even to the surrounding protected areas, e.g. El Zurqui region of Braulio Carrillo National Park and Zona Protectora El Rodeo.

In spite of the rapid and devastating deforestation of the Central Valley in the past, which most likely was associated with coffee plantations in early 19th century, we still have some plant species native to the region which can be used to restore and improve Premontane Moist Forest. We hope that this study will serve as a basis for further research in the RELO and its surrounding habitats, and for monitoring our environment.

ACKNOWLEDGMENTS

We thank José Fco. Di Stéfano G. for the permission to conduct this study in the RELO, providing literature and valuable information, and for reviewing the manuscript; Elizabeth Heffington for reviewing the draft; F. Gary Stiles for sharing the unpublished data on Ithomiinae and comments on the manuscript; Paul E. Hanson for sharing the butterfly list and revision of the manuscript; Vladimir Jiménez Salazar for providing aerial photo of San Pedro and comments on the geographical area of the Central Valley; Jorge Lobo and Patricia Ortiz for sharing unpublished data, on the forest covertures and the map of the RELO, respectively. Julián Monge-Nájera, José Manuel Mora, Gilbert Barrantes, Federico Bolaños, Julieta Carranza, Luis Ricardo Murillo and Cesar Sánchez kindly provided information on the organisms of the RELO and campus. Nakamura’s collecting activity was conducted under research permits issued by SINAC/MINAE through 2004-07, and for this he thanks Javier Guevara of MINAE and Mario Posla. For identification of Lycaenidae, Riodinidae, and Hesperiidae, the staff of the U.S. National Museum, the Smithsonian Institution, Washington, D.C., provided invaluable assistance, in particular, Robert Robbins, Donald Harvey, Jason Hall, and John Burns. George Austin and Andy Warren at the McGuire Center for Lepidoptera and Biodiversity, Gainesville, Florida, were particularly helpful in identifying some of the difficult Hesperiids. The climatic data were provided by Centro de Investigaciones Geofísicas, UCR. Adrián Solórzano and Municipalidad de San José provided information about PLANARBU. Day-flying arctiid moths and some of the skippers were identified by Bernardo Espinoza and Andrew D. Warren, respectively. Some Asteraceae and Cyperaceae were identified by Jorge Gómez-Laurito, and Phlebodium fern was identified by Alexander Rojas.

RESUMEN

Por ser el área más poblada del país, el Valle Central de Costa Rica perdió su hábitat natural; lo poco que queda ha sido alterado en grados variados. Sin embargo, se han realizado algunos estudios para evaluar la necesidad de conservación en esta área. Se presentan inventarios preliminares de plantas, mariposas y polillas diurnas de la Reserva Ecológica Leonel Oviedo (RELO); una pequeña reserva de bosque húmedo premontano en del campus de la Universidad de Costa Rica, ubicado en la parte urbanizada del valle. Las mariposas diurnas son uno de los mejores bio-indicadores de la salud del hábitat, porque son muy sensibles a los cambios del ambiente y están estrechamente ligadas a la flora local. Se presenta también una descripción de los caracteres físicos y la historia de la RELO, con ilus-
traciones. Se identificaron aproximadamente 432 especies de ca. 334 géneros en 113 familias de plantas. Sin embargo, solamente 57% de ellas son especies nativas del bosque húmedo premontano de la región; el resto son especies exóticas o introducidas en su mayoría desde tierras bajas. Se han registrado más de 200 especies de mariposas diurnas en seis familias, incluyendo Hesperidae.

**Palabras clave:** biodiversidad, conservación biológica urbana, polillas diurnas, Lepidoptera, bosque húmedo premontano, Costa Rica.

**REFERENCES**


INTERNET REFERENCES


