GENE FLOW PROJECT - 2006
CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL
UNIVERSIDAD DE COSTA RICA
BUNDESMINITERIUM FÜR WIRTSCHAFTLICHE ZUSAMMENARBEIT UND ENTWICKLUNG (GERMANY)

Wild form and landrace of common bean growing close at the experimental site of Quircot (December 2005) (photo: Rodolfo Araya).

TRIP REPORT – COSTA RICA, JANUARY 2006

Daniel G. Debouck[1] and Rodolfo Araya V.[2]
[1]Centro Internacional de Agricultura Tropical, and
[2]Universidad de Costa Rica, Estación Fabio Baudrit Moreno

Introduction and Objectives

This field exploration is part of a series of field studies (Araya et al. 2001; González et al. 2004a) aiming at: (i) identification of populations of wild beans in Costa Rica, (ii) location of places where traditional landraces of common bean are still grown in Costa Rica, above all in the Central Valley of that country, (iii) identification of weedy races possibly resulting from events of gene flow between such landraces and wild forms. Preliminary results seem to indicate that events of gene flow do occur in Central Costa Rica (González Torres et al. 2004b). These preliminary results need confirmation, along four directions: (i) intensity and direction of gene flow (through pollen flow), (ii) presence of gene flow wherever both biological forms are in sympatry and close contact, (iii) persistence of effects of gene flow through time, and (iv) participation of alien species in the gene flow events. Incidentally, if knowledge about the identity and distribution of wild species can be increased, this is an additional objective and net benefit to the biodiversity of that country.

In turn, these objectives are in line with the establishment of the knowledge basis for the safe introduction and management of transgenical beans on the one hand, and for the management of genetic resources on-farm and *in situ* on the other hand, specially if the work by farmers on the 'wild-weed-crop complexes' can be evidenced (Beebe et al. 1997). Transgenical common beans with herbicide resistance have been claimed (Agarao et al. 2002), although attempts to reproduce the transformation process have failed (Jacobsen, personal communication, 2004). This situation may mean that transgenical beans may be soon available on the market, and planted for commercial production; accordingly, biosafety procedures if found desirable have to be developed on sound biological background, among others (Rissler & Mellon 1996). One aspect is thus to map on a large scale populations of taxa genetically compatible with the crop; another is to spot the hybrid swarms resulting from gene flow events between the components of the crop gene pool. This may include landraces, wild and weedy forms of the crop (usually considered within the primary gene pool), and wild species partially or totally genetically compatible (Ellstrand et al. 1999; Gepts & Papa 2003).

We were also interested in monitoring the evolution of past gene flow events, and therefore visited again the sites of Aserrí and Quircot, in the provinces of San José and Cartago, respectively, where gene flow events were spotted as early as 1987 and 1998, respectively (Debouck et al. 1989; Araya et al. 2001). For the monitoring of gene flow events over time, we sampled materials at the same localities as in previous years; therefore the same collection numbers are used, but with indication of years. It would not make sense (duplicates in the genebank!) to give new collection numbers. If thought pertinent, we did the same for other populations of wild species in order to have a better appraisal of evolution of their demography over time.

During the field work in Quircot in 2004, we found a few plants with characteristics of artificial interspecific hybrids (i.e. showy flowers, pods with few or just one ovule evolving into a seed, shrivelled seeds, 'cripple' leaflets) (for further description, see Hucl & Scoles 1985; Smartt 1970). These materials were confirmed as hybrids between *P. vulgaris* and *P. dumosus* Macfad. (González-Torres et al. 2006). So, gene flow may involve another species, but it is not clear to us why it is with *P. dumosus* (an introduced species into Costa Rica, even if it can survive well as feral: Schmit & Debouck 1991), and not the sympatric *P. costaricensis* Freytag & Debouck. The collection of additional material for study in 2006 with help of the different markers established in previous works (González Torres et al. 2004b, 2006) was thus appropriate.

Schedule and journeys

January 16: flight Cali – San José.
January 17: Cartago: Quircot, Poroses. Collections in open vegetations (# 3125, 3126, 3142, 3149), farmers' fields (# 3152, 3153, 3154, 3194, 3195), and field borders (# 3126). As indicated elsewhere (Araya et al. 2001; González Torres et al. 2004a), Quircot has been our major site for field observations since 1998. Plots are planted by farmers associated through a cooperative, in a modified slash-and-burn practice, with less fallow between plantings. Plots are planted with maize, beans (both grain and snap bean varieties of common bean, and *P. dumosus* Macfad. 'cuba'), and vegetables (cabbage, pea, squash, arracacha).
January 18: San José: Aserrí, Alajuelita. Collections in open vegetations (# 2111, 2112, 2116, 3131, 3146, 3176, 3177) and old fallows (# 2111, 2112).
January 19: San José: Santa Eduviges, Santa María de Dota. Collections in open vegetations (# 3168, 3170, 3172, 3173, 3182). The Santa María area was visited again in order to better evaluate the presence of wild common bean in that watershed, since only one plant was found in 2003.
January 20: San José: Vuelta de Jorco (# 3190), Palmichal (# 3191), Pabellón above Santa Ana (# 3192, 3193).
January 21: preparation of samples and report.
January 22: flight San José – Cali.

Results and Discussion
General
A list of materials found can be seen in Table 1.

Table 1 – List of populations and materials found, species, sites, watershed, and coordinates.

Collectors' Number	Date	Species	Province, district, closest site	Watershed	Longitude	Latitude	Altitude (masl)
3125	17/1	*xantho*	Cartago, San Nicolás, Quircot	Reventazón	83°56'W	9°54'N	1540
3126	17/1	*vulg* silv	Cartago, San Nicolás, Quircot	Reventazón	83°56'W	9°54'N	1540
3127	17/1	*costar*	Cartago, San Nicolás, Quircot	Reventazón	83°56'W	9°54'N	1540
3149	17/1	hybrid?	Cartago, San Nicolás, Quircot	Reventazón	83°56'W	9°54'N	1540
3165	17/1	*leptos*	Cartago, San Nicolás, Quircot	Reventazón	83°56'W	9°54'N	1540
?	17/1	*vulg* cult	Cartago, San Nicolás, Quircot	Reventazón	83°56'W	9°54'N	1540
3142	17/1	*costar*	Cartago, San Nicolás, 5km NNW Quircot	Reventazón	83°55'W	9°55'N	1850
2111	18/1	*vulg* silv	San José, Aserrí, Piedra de Aserrí	Virilla sur	84°07'W	9°52'N	1540
2112	18/1	*xantho*	San José, Aserrí, Piedra de Aserrí	Virilla sur	84°07'W	9°52'N	1540
2116	18/1	*costar*	San José, Aserrí, Piedra de Aserrí	Virilla sur	84°07'W	9°52'N	1540
3146	18/1	*leptos*	San José, Aserrí, Piedra de Aserrí	Virilla sur	84°07'W	9°52'N	1550
3131	18/1	*vulg* silv	San José, Desamparados, Jericó	Candelaria n	84°03'W	9°49'N	1540
3176	18/1	*xantho*	Sn José, 1.5km SW Llano Alajuelita	Virilla sur	84°07'W	9°52'N	1400
3177	18/1	*lun* silv	Sn José, 2.4km SW Llano Alajuelita	Virilla sur	84°07'W	9°52'N	1470
3172	19/1	*hygroph*	Sn José, Sn Isidro, Sta Eduviges	Savegre	83°45'W	9°30'N	1580
3173	19/1	*hygroph*	Sn José, Sn Isidro, Las Nubes	Savegre	83°46'W	9°28'N	1550
3168	19/1	*vulg* silv	Sn José, Sta. María Dota, 1km W Sta Mar	Pirrís	83°59'W	9°39'N	1860
3170	19/1	*tuerck*	San José, Sta María Dota, Los Angeles	Pirrís	83°58'W	9°38'N	1500
3182	19/1	*talaman*	Sn José, Sta. María Dota, 1km W Sta Mar	Pirrís	83°59'W	9°39'N	1500
3190	20/1	*vulg* silv	San José, San Gabriel, Vuelta de Jorco	Candelaria n	84°08'W	9°48'N	1480
3191	20/1	*lun* silv	San José, Sn Ignacio, 4km NE Palmichal	Candelaria n	84°11'W	9°52'N	1390
3192	20/1	*lun* silv	Sn José, Sta Ana, 1km N Pabellón	Virilla sur	84°12'W	9°55'N	1280
3193	20/1	*costar*	Sn José, Sta Ana, 0.5km S Pabellón	Virilla sur	84°12'W	9°54'N	1590
3194	17/1	hybrid?	Cartago, San Nicolás, Quircot	Reventazón	83°56'W	9°54'N	1540
3195	17/1	*dumos* ?	Cartago, San Nicolás, Quircot	Reventazón	83°56'W	9°54'N	1540

N.B.: collection numbers in bold mean that herbarium vouchers were made and deposited initially at CR, INB and USJ (label in annex).

Per species

Phaseolus costaricensis Freytag & Debouck

We found this species but with populations of smaller size in Quircot (# 3127) and close to Poroses (# 3142). A few plants in the Quircot population display speckled black seed, while the normal phenotype is speckled brown grey. A new population (# 3193) of this species was found south of Pabellón, county of Santa Ana; it seems to be the one to the extreme north-west in the mountainous range "Cerros de Escazú". It was found reduced to a few scattered plants while gaining altitude in this sector in search of wild common bean. The latter species was not found, meaning that the population of Matinilla (# 3137) is the one to the extreme west in that mountainous range. With this addition (see label in annex), there are now twenty-one populations of *P. costaricensis* sampled. The site south of Pabellón has been much modified, with grassland replacing the original climax humid mountain forest. In this ecological zone, it is likely that common bean would be heavily affected by anthracnose, a fungal disease for which it might be useful to screen the *P. costaricensis* germplasm.

Phaseolus x hybrid

At Quircot we found again (# 3149) in the open vegetation (named sector 6, to the east of the Quircot site) a material that could well be a natural interspecific hybrid, and in the middle of the cultivated field (named sector 3, see Figure 1) another possible hybrid (# 3194). It is not sure that this material has been planted on

Figure 1. The experimental site of Quircot. To the right is the streamlet Quebrada Norberta, and sector 6 (outside the actual picture). The steep slope in the center has been planted in 2005-2006 with a maize- bean ('cuba', *P. dumosus*) association.

purpose by the farmer Mr. Tali, even if it was growing on a maize stem. Both materials showed pods with reduced fertility: on average only one ovule (out of 4-5) developed into full mature seed, although they both showed vigorous vine development. One should note that # 3149 was found at about the same place in January 2003 and January 2006, being the same plant or its progeny. As noted by Freytag & Debouck (2002), perennialism is a trait of the Phaseoli. While wild *P. vulgaris* behaves as an annual herb in Costa Rica, other sympatric species such as *P. costaricensis* and *P. dumosus* behave as short-lived perennial vines. If proven as interspecific hybrids (González-Torres et al. 2006), the materials # 3149 and 3194 could be used as to transfer (or better, say, to recover) perennialism to cultivated common bean, or as bridge in breeding programs (Singh 2001).

A special collection might be # 3195, and could tentatively be reported as *dumosus* hybrid (see below), possibly with other forms of the year-bean, or with *P. costaricensis*. The latter is sympatric in the valley of the streamlet Quebrada Norberta. Its red seeds, sometimes with bayo streaks, is quite unusual in *P. dumosus* (Schmit & Debouck 1991). Because it has been found since 2003, it seems to be positively selected for by the local farmers; it might also be a true stable variant of *P. dumosus*, though initially coming from open pollination.

Phaseolus hygrophilus Debouck
The two populations known to date of this species were visited again in 2006, basically in order to assess their status and phenology. While population # 3172 was found stable with more than twenty individuals (many flowering and setting seeds), population # 3173 was found reduced to just four plants. The forested sites should be included into some protection schemes, with less expensive weeding. Soil protection would invite to maintain a forest cover anyway. Overall morphology and pod attributes of this taxon would indicate its belonging to the *Brevilegumeni* section (Freytag & Debouck 2002), so increasing it to four taxa; if validated, there would be no interference with transgenical beans. Also because beans would not be able to survive in those rainy habitats; local informants reported about a 'dry' season of only two months per year (also marginal for the survival of the introduced year-bean *P. dumosus*; see Schmit & Debouck 1991).

Phaseolus leptostachyus Bentham
Although our visit was late for this early taxon, we still found flowering stems with mature seed, usually infested by weevils. We found it (# 3165) at Quircot on the edges of grasslands invaded by *Hyparrhenia rufa* (indicating frequent fires), and among rocks in Aserrí (# 3146). Its belonging to the section *Falcati* (Freytag & Debouck 2002) with 2n= 2x= 20 (Mercado Ruaro & Delgado Salinas 1996) makes it impossible to cross with common bean under natural conditions. This would be another species out of concern for biosafety.

Phaseolus lunatus L.
This is a wild species quite common in the Central Valley, though some populations are endangered by other land uses (e.g. urbanization, for # 3177; pasture land for cattle grazing, for 3191). For the record we added two novel populations on the southern slope of Cerros de Escazú (# 3191, 3192; see a label in annex). It has toxic seeds (Baudoin et al. 1991), and thus less prone to pests attacks. It is the type species of the *Paniculati*, and quite distant from the common bean (see a review by Debouck 1999), and thus not a concern in biosafety for the latter.

Phaseolus talamancensis Debouck & Torres
The population # 3182 was visited once more while searching for wild *P. vulgaris* (# 3168). It was already at the full seed dispersal phase. One should note that it is the first population of this species (there are only four known to date) reported outside the range of the Cordillera de Talamanca (an indication that the senior author walked outside his shoes when naming it ?!). But this opens the possibility if searches are carried out early enough to find it out in other mountainous ranges of Costa Rica. A preliminary report (Gaitán et al. 2000) indicates its closeness with *P. tuerckheimii* in the *Brevilegumeni* section, thus likely far away from the *Phaseoli*.

Phaseolus tuerckheimii Donnell-Smith
The population # 3170 (a beautiful picture of it was on display for the PITTA Frijol meeting of 2005) was visited when searching for more wild common bean in the county of Dota. It is currently threatened by the extension of coffee plantations. It belongs to the *Brevilegumeni* (Freytag & Debouck 2002), together with *P. oligospermus* Piper, *P. campanulatus* Freytag & Debouck, and possibly *P. hygrophilus* Debouck. Preliminary results with ITS sequencing (Gaitán et al. 2000) would indicate that it is quite remote from the *Phaseoli*, and thus out of concern in biosafety issues for common bean.

Phaseolus vulgaris L.
As indicated above, searches for new populations of wild common bean proved unsuccessful (with the exception of # 3168, see below). The total of populations for Costa Rica to date would thus be 22 (González Torres et al. 2004), and their precise location now fully documented (with samples in both genebanks and herbaria) is important for biosafety. Important variations in demography from year to year have been noticed. This is examplified by # 3168 (Sta María de Dota): in December 2003, only one single plant was found E of Santa María de Dota. In January 2006, the progeny of that plant was not found, but a large population W of Santa María (not noticed in 2003!). The population # 2111 was found abundant at the cross site of Piedra de Aserrí in 1987 and again in 2002, and absent in 2006.

Some variation was displayed in seed of the wild form (# 3126) at Quircot, with black seeded variants. Similarly, variants with large pods and purplish pods (at full physiological maturity) were found. Escaped forms found in 2003 all as pole types, i.e. black seeded (# 3154), brownish stripped ('Higuerilla', # 3152) and a solid yellow (# 3153) were again found in 2006 in the cultivated plots and borders, indicating that if certain ecological conditions are fulfilled (overall ecology fitting for wild forms, vegetation growing in waste ground, and absence of herbicides) some escaped forms can survive without human planting and harvesting.

The farmer community of Quircot continues to change crops and varieties (when they continue to practice agriculture), with increased interest towards cash crops (cabbage, onions, parsley, camomile, sweet pea, snap bean, year-bean), while maintaining some crops for consumption on-farm (maize, beans, arracacha, squash, cassava, cocoyam). The old system of the maize-bean crop association called 'tapado' with a long fallow period seems almost gone, but interestingly because of good prices in Cartago year-bean 'cuba' (*Phaseolus dumosus* Macfady.) has been planted repeatedly over the past years in Quircot. Apart from the frequent yellow seeded type (see Schmit & Debouck 1991), a red *P. dumosus* (# 3195) is also planted (see above); until more analysis is performed on that group it is not sure where that unusual variability is coming from (crosses within *P. dumosus* itself or with *P. costaricensis*). On the other hand, the farmer community of Quircot continues to "experiment" with new introductions of bean germplasm: they are keen on introducing 'chilenos' or Andean types of the 'Nueva Granada' race (Singh et al. 1991) or red speckled Calima group (Voysest 2000).

Phaseolus xanthotrichus Piper
Plants of this species at the moment of our visit were all in stage of mature pods and almost completely defoliated. Its tuberous root makes it a bit tolerant to frequent fires of secondary bushes, and thus it is still frequent although often unnoticed because of its earliness, but urbanization means the extinction of local populations (e.g. # 3176). The special flower structure that resulted in the definition of a special section *Xanthotricha* (Delgado Salinas 1985; Freytag & Debouck 2002) makes the possibility of widecrossing with common bean quite remote, and thus leaves this species outside the biosafety considerations for common bean.

Acknowledgements
The Authors warmly thank BMZ for the financial support, and the University of Costa Rica and the Centro Internacional de Agricultura Tropical for logistical and administrative support. The help of CONAGEBIO to provide access and collection permits is fully acknowledged. Gratitude is expressed to colleagues and

collaborators, namely Walter Barrantes, Nestor Chaves, Rosa González, Zaida Lentini, Carmenza Llano, Joseph Tohme, Orlando Toro, for their interest and input at different times of this research.

Literature Cited

Aragao F.J.L., G.R. Vianna, M.M.C. Albino & E.L. Rech. 2002. Transgenic dry bean tolerant to the herbicide glufosinate ammonium. Crop Sci. 42: 1298-1302.

Araya Villalobos, R., W.G. González Ugalde, F. Camacho Chacón, P. Sánchez Trejos & D.G. Debouck. 2001. Observations on the geographic distribution, ecology and conservation status of several *Phaseolus* bean species in Costa Rica. Genet. Resources & Crop Evol. 48: 221-232.

Baudoin, J.P., J.P. Barthlemy & V. Ndungo. 1991. Variability of cyanide contents in the primary and secondary genepools of the Lima bean, *Phaseolus lunatus* L. FAO/IBPGR Plant Genetic Resources Newsl. 85: 5-9.

Beebe, S., O. Toro Ch., A.V. González, M.I. Chácon & D.G. Debouck. 1997. Wild-weed-crop complexes of common bean (*Phaseolus vulgaris* L., Fabaceae) in the Andes of Peru and Colombia, and their implications for conservation and breeding. Genet. Resources & Crop Evol. 44: 73-91.

Debouck, D.G. 1999. Diversity in *Phaseolus* species in relation to the common bean. *In:* S.P. Singh (ed.), Common bean improvement in the twenty-first century. Kluwer Academic Publishers, Dordrecht, The Netherlands. pp. 25-52.

Debouck, D.G., R. Araya Villalobos, R.A. Ocampo Sánchez & W.G. González Ugalde. 1989. Collecting *Phaseolus* in Costa Rica. FAO/IBPGR Plant Genetic Resources Newsl. 78/79: 44-46.

Delgado Salinas, A.O. 1985. Systematics of the genus *Phaseolus* (Leguminosae) in North and Central America. Ph.D. thesis, Univ. of Texas--Austin, Texas, USA. 363p.

Ellstrand, N.C., H.C. Prentice & J. Hancock. 1999. Gene flow and introgression from domesticated plants into their wild relatives. Annu. Rev. Ecol. Syst. 30: 539-563.

Freytag G.F. & D.G. Debouck. 2002. Taxonomy, distribution and ecology of the genus *Phaseolus* (Leguminosae-Papilionoideae) in North America, Mexico and Central America. SIDA Botanical Miscellany 23: 1-300.

Gaitán, E., O. Toro, J. Tohme & D.G. Debouck. 2000. Molecular taxonomy of the genus *Phaseolus* through ITS sequencing. Annual report. Centro Internacional de Agricultura Tropical, Cali, Colombia. pp. 56-60.

Gepts P. & R. Papa. 2003. Possible effects of (trans)gene flow from crops on the genetic diversity from landraces and wild relatives. Environ. Biosafety Res. 2: 89-103.

González-Torres R., R. Araya Villalobos, E. Gaitán Solís & D.G. Debouck. 2004a. Wild common bean in the Central Valley of Costa Rica: ecological distribution and molecular characterization. Agron. Mesoam. 15 (2): 145-153.

González-Torres R., E. Gaitán, R. Araya, O. Toro, J. Tohme & D.G. Debouck. 2004b. Additional evidence on gene flow events in *Phaseolus vulgaris* in Costa Rica. Annu. Rept. Bean Improvement Coop. (USA) 47: 167-168.

González-Torres R.I., M. Carvajal, O. Toro, M.C. Duque, R. Araya & D.G. Debouck. 2006. Evidence of gene flow among bean species of section *Phaseoli* in Colombia and Costa Rica using microsatellite markers. Annu. Rept. Bean Improvement Coop. (USA) 49: *in press*.

Hucl, P. & G.J. Scoles. 1985. Interspecific hybridization in the common bean: a review. HortScience 20: 352-357.

Mercado Ruaro, P. & A. Delgado Salinas. 1996. Karyological studies in several Mexican species of *Phaseolus* L. and *Vigna* Savi (Phaseolinae, Fabaceae). *In*: B. Pickersgill & J.M. Lock (eds.), Advances in legume systematics part 8, Legumes of economic importance, Royal Botanic Gardens, Kew, England. pp. 83-87.

Rissler J. & M. Mellon. 1996. The ecological risks of engineered crops. Massachusetts Institute of Technology Press, Cambridge, Massachusetts, USA. 168p.

Schmit, V. & D.G. Debouck. 1991. Observations on the origin of *Phaseolus polyanthus* Greenman. Econ. Bot. 45: 345-364.

Singh, S.P. 2001. Broadening the genetic base of common bean cultivars: a review. Crop Sci. 41:1659-1675.

Singh, S.P., P.L. Gepts & D.G. Debouck. 1991. Races of common bean (*Phaseolus vulgaris*, Fabaceae). Econ. Bot. 45: 379-396.

Smartt, J. 1970. Interspecific hybridization between cultivated American species of the genus *Phaseolus*. Euphytica 19: 480-489.

Voysest, O. 2000. Mejoramiento genético del frijol (*Phaseolus vulgaris* L.) – Legado de variedades de América Latina 1930-1999. Centro Internacional de Agricultura Tropical, Cali, Colombia. 195p.

Trabajo de Recolección de Germoplasma de *Phaseolus*

Misión colaborativa entre el Centro Internacional de Agricultura Tropical (Cali, Colombia) y la ~~Estación Experimental Fabio Baudrit de la Universidad de Costa Rica, con el apoyo de Bundesministerium für Wirtschaftliche Zusammenarbeit und Entwicklung de Alemania.~~

HERBARIO

Nombre científico: Phaseolus lunatus L. forma silvestre
Determinavit: D.G. Debouck Fecha: 20/01/2006
Nombre vulgar: desconocido
País/Estado/Municipio/Localidad: COSTA RICA, SAN JOSE, Santa Ana, 1 km al N de Pabellón.

Longitud: 84 º 12 ´ W Latitud: 9 º 55 ´ N Altitud: 1280 m

Fecha de Recolección: 20 de Enero de 2006.

Observaciones: en bosque tropical de transición muy modificado convirtiendose en matorral con Compuestas, Gramineas, Senna, Rubus, Vigna. Soleado, abierto. Suelo café orgánico derivado de esquistos. Escaso. En floración (flor rosado lila), vainas verdes. Tallos volubles 2-4 m de alto.

Colectores: D.G. Debouck, Walter Barrantes & Nestor Chaves
Nº: 3192 Se colectaron semillas bajo el Nº:

Trabajo de Recolección de Germoplasma de *Phaseolus*

Misión colaborativa entre el Centro Internacional de Agricultura Tropical (Cali, Colombia) y la ~~Estación Experimental Fabio Baudrit Moreno de la Universidad de Costa Rica, con el apoyo de Bundesministerium für Wirtschftliche Zusammenarbeit und Entwicklung de Alemania~~.

HERBARIO

Nombre científico: Phaseolus costaricensis Freytag & Debouck
Determinavit: D.G. Debouck Fecha: 20/01/2006
Nombre vulgar: desconocido
País/Estado/Municipio/Localidad: ~~COSTA RICA, SAN JOSE, Santa Ana, 0.5 km al S de Pabellón.~~

Longitud: 84 º 12 ´ W Latitud: 9 º 54 ´ N Altitud: 1590 m

Fecha de Recolección: 20 de Enero de 2006.

Observaciones: en bosque de Ciprés muy alterado convirtiendose en potreros. Helechos, Compuestas, Gramineas, Orquideas terrestres. Mi soleado abierto. Suelo amarillo beige detrítico derivado de esquistos, orgánico fresco, lado de cañada. Grupo pequeño, en floración (flor rosado fuschia) - vainas verdes. Plantas trepadoras 2-3 m alto. Encontrado a 1 km de la cima que está en 1750 m.

Colectores: D.G. Debouck, Walter Barrantes & Nestor Chaves
Nº: 3193 Se colectaron semillas bajo el Nº: