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Rubus and vacciniaceous germplasm resources in the Andes of Ecuador

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Summary

In Andean Ecuador the genus *Rubus* includes species in both subgenus *Rubus* and subgenus *Orobatus*, *Rubus glaucus* and at least two feral species in subgenus *Idaeobatus*. A germplasm expedition collected 22 seed samples of four known and two unidentified species in subg. *Rubus* and 18 seed samples of five known and one unidentified species in subg. *Orobatus*. Four seed samples of *R. glaucus* and one of *R. niveus* were also collected. *Rubus roseus* (subg. *Orobatus*), *R. adenothallus* and *R. robustus* (subg. *Rubus*) and *R. glaucus* appeared most promising for potential contributions to cultivated *Rubus* genepools. The Vaccinieae is represented by species of approximately 20 genera in the Andes of Ecuador. Eight genera, 28 known species and a total of 43 clonal and seed samples were collected. Species of *Cavendishia*, *Ceratostema*, *Macleania* and *Psammisia* appeared to have potential as new floricultural crops. *Vaccinium floribundum* was identified as an attractive ornamental and a potential source of genes for frost resistance during bloom.

Introduction

The Andean region of Ecuador is home to diverse taxa in the genus *Rubus* of the Rosaceae and the Vaccinieae (blueberries) of the Ericaceae.

In Ecuador, the genus *Rubus* includes species in both subgenus *Rubus* and subgenus *Orobatus* (Jennings, 1978). Subgenus *Rubus* also includes species occurring in Eurasia and North America, whereas *Orobatus* is strictly a Latin American group. *Rubus macrocarpus* Benth. (syn. *R. nubigenus* H.B.K.) (giant Colombian blackberry) and *R. roseus* Poir. are both especially interesting species in subg. *Orobatus*. They produce extremely large fruit with good quality, and with only moderately large seeds (Darrow, 1955; Jennings, 1978, 1988; Martin *et al.*, 1987; National Research Council, 1989; Popenoe, 1920, 1921, 1924). In subg. *Rubus*, *R. adenothallus* Focke (syn. *R. adenotrichus* Schlecht.) has also been noted to produce moderately large fruit of good quality (Martin *et al.*, 1987; Popenoe, 1924). The latter species is reported to have a widespread occurrence on the paramos along with vacciniaceous taxa.

In addition to these groups, *R. glaucus* Benth., often referred to as the Andean blackberry, is also fairly widespread. It is a unique species combining characteristics of the black raspberry (subg. *Idaeobatus*) and the blackberry (subg. *Rubus*) in a fertile amphidiploid (Jennings, 1988). *Rubus glaucus* is the only indigenous species cultivated. It produces large, high-quality fruit with small seeds and is cultivated widely in cool, humid tropical highlands in Central and South America (Jennings, 1978, 1988). Both wild and cultivated forms occur in Ecuador at altitudes of 2000-4000 masl (Popenoe, 1924).

All four of these *Rubus* spp. appear to have promise for either greatly increased production (*R. glaucus*) or as potential new crops (the other three) for the highland tropics. They also appear promising as parents for incorporating improved fruit size and quality into other cultivated *Rubus* genotypes.

Twenty-one genera and approximately 200 species of vacciniaceous taxa have been described in the region (Luteyn, 1989). They generally occur on cool, moist slopes at intermediate to high elevations. No horticultural or cytological information is available for the majority of these taxa. However, at least six genera include species worthy of consideration as potential new crops (Martin *et al.*, 1987).

One species in the genus *Vaccinium*, *V. floribundum* H.B.K., the Andean blueberry or *mortino*, although not cultivated, is widely harvested from native populations and sold in village and city markets (Macbride, 1959; National Research Council, 1989; Popenoe, 1924; personal observation). This species is abundant on the paramos or rolling plains at 3000-3700 masl throughout Ecuador. It is also the most common species of *Vaccinium* in Peru, the only species in Argentina and Bolivia and also occurs in Colombia and Venezuela. Frost can occur any night of the

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year at some of the higher elevations where it grows. Thus it could prove to be a potentially valuable source of genes for frost resistance during bloom.

Most other Vaccinieae taxa produce more-or-less edible fruit. In addition, genera such as *Cavendishia*, *Ceratostema*, *Macleania* and *Psammisia* are highly ornamental with leathery, evergreen leaves and large, brightly coloured flowers adapted to hummingbird pollination (Luteyn, 1983, 1989). *Cavendishia* also has large colourful bracts subtending the flowers and infloresences. These and perhaps other genera appear to have potential as new floricultural crops, based on the limited information available.

Occasional minor living collections have been made of neotropical vaccinioids by botanists, and of *R. glaucus*, *R. macrocarpus* and *R. roseus* by plant breeders. However, none of these *Rubus* or vacciniaceous species has been systematically collected for long-term conservation or evaluation. Therefore, a collecting expedition was conducted between October 29 and November 26, 1990. The main objectives of the expedition were to collect seed, clonal and herbarium accessions of vacciniaceous genera and *Rubus* species that are potential sources of genes for frost tolerance during bloom, large fruit size, improved fruit quality and small seed size, or that have potential as new ornamental or floricultural crops. Secondarily, other genera such as *Fragaria* and *Ribes* were collected as available.

Materials and Methods

Collecting sites were mainly along side roads leading from the Pan-American Highway, from Tulcan near the Colombian border in the north to Loja in southern Ecuador. In addition, a number of market samples of *R. glaucus* and *V. floribundum* fruits were purchased for seed extraction. Species designations for vacciniaceous species were made by Luteyn. At the time of writing there was no comprehensive published treatment of Ecuadorean *Rubus*[1], and the circumscriptions of Macbride (1959) and Popenoe (1920, 1924) were therefore largely followed. Most emphasis was given to collecting the seeds of populations, but representative or elite clonal accessions were also collected, particularly where it was not possible to take seed samples.

Seeds were extracted with a battery-powered blender and then packaged and stored using established procedures. In addition, in the vacciniaceous genera *Ceratostema*, *Macleania* and *Psammisia*, where each seed is surrounded by a gelatinous sheath, a small sample of seeds was also kept moist until it could be determined if this characteristic affected germination. Cuttings were stored in plastic bags at 4°C until they could be placed under intermittent mist for rooting. Prior to sticking, they were wounded at the base and dipped in 1000 ppm IBA dispersed in talc. They were then placed in 10 cm deep flats filled with composted pine bark and placed on an intermittent mist bench in a greenhouse. Seedlings, where collected, were also held at 4°C until shipping and/or reestablishment. Herbarium vouchers were collected for all accessions except market samples.

All germplasm collected was equally shared by the USA and the Department of Plant Genetic Resources, INIAP, Quito, Ecuador. Most of the germplasm sent back to the USA is housed at the USDA-ARS National Clonal Germplasm Repository, Corvallis, Oregon; small samples of a number of species were deposited at North Carolina State University, Raleigh, North Carolina. Herbarium vouchers were shared between the Catholic University in Quito, the New York Botanical Garden and the USDA-ARS Clonal Repository, Corvallis, Oregon.

Results and Discussion

Seed samples of species of Vaccinieae that were sent to North Carolina, USA, were germinated in winter 1990/91 using standard procedures for *Vaccinium* on an intermittent mist bench in a greenhouse. Germination was generally good. A preliminary effort was made to ascertain the possible role of the gelatinous sheath (when it occurred) surrounding each seed on viability and germination. Duplicate samples of seeds of *Psammisia ulbrichiana*, a species with the gelatinous sheath, and *Cavendishia tarapotana*, a species where it does not occur (or is not evident), were germinated. One seed sample of each was kept moist from extraction to sowing, and the other was dried after extraction. The sample of *P. ulbrichiana* held moist began germinating within seven days, while the dried seed sample did not germinate. Both samples of *C. tarapotana* germinated equally well, with germination beginning 13 days after sowing. Only small numbers of seeds of *Macleania* and *Ceratostema* species were available for germination, so all were kept moist until sowing. Both samples of *Macleania* germinated, but germination was not successful with the single sample of *Ceratostema*, quite possibly because the fruits (and seeds) were not fully mature. It cannot be definitely ascertained from these preliminary studies whether drying seeds of *Ceratostema*, *Macleania* and *Psammisia* results in onset of dormancy or loss of viability.

Seeds of *Rubus* species were either treated with sodium hypochlorite prior to sowing (Galletta *et al.*, 1989) or sown without pretreatment. Seeds were sown on the surface of sterilized sand in 15.2 cm pots that were placed under intermittent mist in a greenhouse. Germination has been slow and sporadic and continues after 12 months irrespective of pretreatment. Seedlings germinated in North Carolina and Oregon have been very sensitive to damping-off fungi and spider mites (*Tetranychus urticae* Koch.).

All seedlings of Vaccinieae collected possessed lignotubers. Nearly all have survived and initiated new

[1] Romoleroux is currently preparing a taxonomic treatment of *Rubus* for the *Flora of Ecuador*.

Table 1. Small fruit taxa collected in Andean Ecuador, 1990

Genus and species	Type and number of accessions		
	Seed	Clonal	Herbarium
Rubus subgenus *Rubus*			
Rubus adenothallus Focke	2		5
Rubus bogotensis H.B.K.	5		5
Rubus robustus Presl	4		7
Rubus urticaefolius Poir.	3		4
Rubus spp.	8		9
Rubus subgenus *Orobatus*			
Rubus acanthophyllus Focke	1		1
Rubus coriaceus Poir.	4		7
Rubus glabratus H.B.K.	3		4
Rubus macrocarpus Benth.	3		5
Rubus roseus Poir.	6	2	9
Rubus spp.	1		3
Rubus subgenus *Idaeobatus*			
Rubus ellipticus Smith	1		1
Rubus niveus Wall.	1		2
Rubus glaucus Benth.[1]	4		2
Vaccinieae			
Cavendishia bracteata (R.& P. ex J. St.Hil.) Hoer.	2	2	3
Cavendishia tarapotana (Meissn.) Benth. & Hook.	1	1	1
Cavendishia spp.		1	1
Ceratostema alatum (Hoer.) Sleumer			2
Ceratostema lanigera (Sleumer) Luteyn		1	1
Ceratostema reginaldii (Sleumer) A.C. Smith		1	1
Disterigma alaternoides (H.B.K.) Nied.	1		
Disterigma empetrifolium (H.B.K.) Drude	1		1
Disterigma pentendrum Blake		1	
Vaccinieae (cont'd)			
Disterigma popenoi Blake	1		1
Disterigma spp.	2		3
Macleania bullata Yeo		2	1
Macleania coccoloboides A.C. Smith		2	1
Macleania ecuadorensis Hoer.		1	1
Macleania farinosa Hoer.			1
Macleania loeseneriana Hoer.		1	1
Macleania poortmanii Drake			1
Macleania rupestris (H.B.K.) A.C. Smith	2		3
Macleania salapa (Benth.) Benth. & Hook.		1	1
Macleania spp.			1
Psammisia coarctata (Ruiz & Pav.) A.C. Smith		1	1
Psammisia ecuadorensis Hoer.		1	1
Psammisia ferruginea A.C. Smith		1	1
Psammisia fissilis A.C. Smith			1
Psammisia sodiroi Hoer.		1	1
Psammisia ulbrichiana (Britton) A.C. Smith	1	1	1
Themistoclesia cutucuensis A.C. Smith		1	1
Thibaudia jorgensenii A.C. Smith			1
Thibaudia harlingii Luteyn			1
Vaccinium crenatum (Don) Sleumer	2		2
Vaccinium floribundum H.B.K.	10		10
Fragaria vesca L.	1		2
Ribes andicola Jancz.			5
Ribes hirtum H.B.K.			2
Ribes lehmanii Jancz.	1		1
Ribes spp.			1

[1]Considered a subgeneric hybrid between black raspberry (subgenus *Idaeobatus*) and blackberry (subgenus *Rubus*).

growth. For each species collected as cuttings, at least one cutting rooted. These genera appear relatively easy to propagate asexually, especially under intermittent mist. Cuttings of *R. roseus* sent to the Santa Catalina Experiment Station in Quito failed to root. The numbers of seed and clonal and herbarium samples collected are given in Table 1.

The horticultural potential of a number of the genera and species collected on the expedition is summarized in Table 2. The species collected in *Rubus* subg. *Rubus* that appeared to have the most promise are *R. adenothallus* and *R. robustus*. Both species have large inflorescences and reasonably large fruits with small to modest seed size. Fruit flavour was good, but not the equal of *R. glaucus*. These two species (and possibly their hybrids, if fertile) are candidates worthy of domestication and would probably be more productive than *R. glaucus*. *Rubus urticaefolius* also had large inflorescences and the fruit separated easily from the pedicel (in some cases it separated too readily and shattered). It is therefore a potential source of genes for improved productivity and ease of separation (important for adaptation to mechanical harvesting). However, fruit size was very small and fruits were soft and prone to preharvest rots. *Rubus bogotensis* had extremely large seeds (nutlets or 'stones') and poor fruit set or poor fertility was often observed. Thus there would appear to be serious limitations to the utility of this species in breeding. This is evidently not the same taxon as the *R. bogotensis* mentioned by Jennings (1978) as a possible parent of *R. glaucus*. None of the unidentified accessions of subg. *Rubus* appeared particularly promising.

Accessions of *Rubus* subg. *Orobatus* included both simple (*R. acanthophyllus* and *R. coriaceus*) and trifoliate-leaved species and several unidentified forms. They were only uniform in sepal and flower petal form and magenta colour. Of the species collected, only *R. macrocarpus* and *R. roseus* appeared especially promising. Both species have extremely large fruits, with some compensation in inflorescence size. Individual fruits of *R. roseus* were larger than those of *R. macrocarpus*, but the number of

Table 2. Horticultural potential of noteworthy *Rubus* and Vaccinieae collected in Ecuador, 1990

Species	Potential utility	
	Direct	Parental value[1]
Rubus subgenus *Rubus*		
R. adenothallus	New fruit crop	Improved productivity
R. robustus	New fruit crop	Improved productivity
R. urticaefolius		Improved productivity, mechanical harvesting
Rubus subgenus *Orobatus*		
R. macrocarpus	New fruit crop	Very large fruit size
R. roseus	New fruit crop	Very large fruit size
Rubus glaucus	Major fruit crop	Large fruit size, excellent quality, small seed size
Vaccinieae		
Cavendishia spp.	Florist crops, ornamentals	Large fruit size
Ceratostema spp.	Florist crops, ornamentals	Very large fruit size
Disterigma spp.	Ornamentals	
Macleania spp.	Florist crops, ornamentals	Large fruit size
Psammisia spp.	Florist crops, ornamentals	Very large fruit size
V. crenatum	Ornamental groundcover	
V. floribundum	New fruit crop, ornamental	Frost resistance

[1]Potential parental value for improving current cultivated crops in these or related genera.

flowers in the inflorescence (often three) typically was correspondingly lower. However, there was considerable variation in both species for both fruit size and number of flowers per inflorescence. A general observation was that seed size in *R. roseus* was significantly smaller than in *R. macrocarpus*, even though the fruit size of the former was larger. Most of the fruits collected were only partly ripe, making it difficult to evaluate fruit quality. However, both have been rated as pleasantly subacid and are utilized for beverages and in other ways in a number of Andean areas (Popenoe, 1924). The ripe fruits of *R. macrocarpus* collected on this expedition were dull black rather than dark red as usually described (Popenoe, 1920, 1924). However, these accessions fit the description of this species for all other characters. Jennings *et al.* (1990) indicated that *R. macrocarpus* (i.e. *R. nubigenus*) is a hexaploid species. Considering the morphological similarities between it and *R. roseus* it is probable that the latter species is also a high polyploid. Both *R. macrocarpus* and *R. roseus* appear to have potential as new crops for the Andes, and as parents for increased fruit size in *Rubus* breeding. Susceptibility to rust fungi appeared to be one potential problem, especially with *R. macrocarpus*.

Rubus glaucus has been placed in both *Rubus* subg. *Rubus* and *Rubus* subg. *Idaeobatus* (raspberry) by various taxonomists (Jennings *et al.*, 1990). It is clearly a hybrid between a black raspberry (based on leaf and stem morphology, plant habit and chemical composition of fruits) and a blackberry (based on retention of the receptacle with mature harvested fruits) and an amphidiploid (Jennings *et al.*, 1990). Most of the fruit found in markets in Ecuador came from small, cultivated plots in either the Ibarra or Ambato regions. It was the obvious first choice for domestication among the species occurring in the Andes because of its fruit size and quality. It is already widely grown as a dooryard fruit in the neotropical highlands and has spawned a commercial and export industry in several countries in the region (Jennings *et al.*, 1990). There would appear to be tremendous potential for expansion of this species as a commercial small fruit crop in the Andean region. Selection for improved fruit firmness is needed for *R. glaucus* if it is to reach its potential as a fresh fruit export crop. Most containers holding *R. glaucus* fruits, even in local markets in Ecuador, had a great deal of juice in them, even when a significant percentage of the fruit in the container was only marginally ripe. *Rubus glaucus* also appears to have a great deal of potential as a parent for improved size and quality in cultivated *Rubus*. Backcrossing to species of either subg. *Rubus* or subg. *Idaeobatus* may result in reduced fertility (Jennings *et al.*, 1990), but this is not an insurmountable difficulty.

The escaped species *R. ellipticus* and *R. niveus* (subg. *Idaeobatus*) appeared to be vigorous and successfully established wherever they were located. They both have plant characteristics worthy of note, but only fair (*R. ellipticus*) to poor (*R. niveus*) fruit quality. *Rubus ellipticus* appeared especially well adapted in the Ibarra area and could become a serious weed problem.

Cavendishia species are much more diverse in Colombia than in Ecuador (Luteyn, 1983). However, accessions collected in Ecuador on this expedition clearly indicate the potential of this genus as florist crops. *Cavendishia bracteata* is also a vigorous and adaptable shrub of good ornamental form. Both *C. bracteata* and *C. tarapotana* produce fruit with good size potential. *Cavendishia bracteata* is often very susceptible to powdery mildew in the greenhouse in North Carolina, whereas *C. tarapotana* is resistant. *Cavendishia tarapotana* may also be a source of genes for heat tolerance within this genus.

The large and brightly coloured, pendent flowers of *Ceratostema* species were one of the highlights of the trip. This genus includes a number of species with excellent potential as florist crops, as well as ornamental shrubs (in cool-mild climatic zones). *Ceratostema alatum* (Fig. 1) and *C. reginaldii* were particularly noteworthy in these respects. They are also potential sources of genes for very large fruit size in the Vaccinieae. In addition, *C. lanigera* should be a potential source of genes for heat tolerance.

Disterigma species were quite distinct and generally more diminutive than most other genera. Overall, the most attractive species was *D. empetrifolium*, a dwarf shrub to subshrub that resembles a heather in overall aspect, with

Fig. 1. Close-up of *Ceratostema alatum* infloresence. Individual flowers are approximately 3.7 cm long and bright red

Fig. 2. *Psammisia fissilis.* Flowers are approximately 3 cm in length, the basal two-thirds are bright red and the apical one-third is pure white

pink-rose flowers and translucent white fruits. It is a very fine ornamental that would probably make an excellent specimen in rock gardens in cool-mild climate regions.

A number of species of *Macleania* appear to have potential as florist crops and ornamentals. The very floriferous *M. bullata* was quite spectacular with its bright orange, tubular corollas, in inflorescences often at every node on lateral branches, and was the most attractive species observed in this genus. *Macleania rupestris* was also quite floriferous and the very large, leathery, evergreen leaves of *M. coccoloboides* were also quite attractive, as were the deep orange-red flowers of *M. poortmanii*. Fruit size of these species was in the same range as cultivated blueberries in North America.

The species of *Psammisia* were also quite variable. All had corollas with a distinct constriction about one-third of the distance down from the apex. Included in this genus were several apparent species-pairs with large and strikingly attractive flowers that should have potential as florist crops. These include the *P. ecuadorensis*-*P. ferruginea* pair with corollas that are yellow below the constriction and bright green above, and the especially attractive *P. fissilis*-*P. ulbrichiana* pair (Fig. 2) with bright red pedicels, calyces, and corollas below the constriction and pure white above. Species such as *P. ulbrichiana* also make large, vigorous, attractive evergreen shrubs and produce very large fruit.

Vaccinium crenatum was a decumbent evergreen shrub with attractive foliage, flowers and fruits, and apparent potential as a groundcover in cool-mild climates.

Vaccinium floribundum was an extremely variable plant, as noted by a number of authors (Macbride, 1959; Popenoe, 1924), ranging from decumbent to narrowly erect. Plant form was very ornamental, as were the generally glaucous, small, closely-spaced, leathery, evergreen leaves and the white to rose flowers. Fruit was mostly glaucous, blue to blue-black and variable in size (samples collected were up to 9.5 mm in diameter). It seems reasonable to assume that genotypes with fruit whose diameter exceeds 12.7 mm (the original fruit size goal established for wild highbush blueberry parent clones in the USA) probably occur in this species. Therefore, it would appear that there is approximately the same variation for fruit size in *V. floribundum* in the Andes as occurs in *V. corymbosum* L. (highbush blueberry) in eastern North America (Galletta, 1975). Macbride (1959) noted that he found genotypes of *V. floribundum* in Peru with good flavour. This was not the case with the samples collected on this expedition, but this does not mean that such genotypes do not occur in Ecuador. *Vaccinium floribundum* occurred across a fairly broad elevational gradient in Ecuador, from approximately 2200 to over 3800 masl. Frost could literally occur any night of the year at the highest elevation visited, Volcan Cotopaxi. It was quite evident that *V. floribundum* is a tough, adaptable plant, with tremendous potential for domestication as a fruit crop in the Andes or similar regions, and as a parent for incorporation of traits such as frost resistance during bloom into blueberry cultivars grown in frost-prone regions.

Ribes species were scattered throughout the paramo and cloud forest areas. They were mostly in bloom during the expedition. *Fragaria vesca* was typical for the species and probably an escape from cultivation.

Conclusions and Recommendations

The potential of a number of the species collected on this expedition is evident. However, where this potential appears to lie with development of new cultivated crops, all the problems associated with domestication of any new species will have to be solved. Realistically, most, if not all of these same problems may also have to be solved to be able to carry out large-scale attempts to incorporate genes from these species into related cultivated crops.

The cloud forest, subparamo and paramo plant communities, where most of these species occur, are unique environments and difficulties might be expected in attempting to grow them outside the areas where they occur naturally (Simpson and Todzia, 1990; Van der Hammen and Cleef, 1986). There is little variation in daylength throughout the year in Ecuador and most species would be expected to be short-day plants. These climatic zones are cool throughout the year, but frost and freezing temperatures only occur at higher elevations on the paramos. In addition, both diurnal and year-round temperature ranges are typically quite narrow, although these can vary significantly with aspect.

In this regard, Darrow (1955) reported almost 100% loss of giant Colombian blackberry seedlings established outdoors at Beltsville, Maryland, during their first summer in the field. Jennings (1978) also noted that when plants of *R. macrocarpus* can be kept alive in temperate zones, no one has yet been able to induce flowering or fruiting to occur. Williams *et al.* (1949) were only successful in inducing flowering of *R. glaucus* in North Carolina after establishing it in a controlled environment chamber. However, in the very mild, temperate climate of New Zealand, certain forms of this species flower and fruit with temperate zone *Rubus* species (H.K. Hall, pers. comm.). Luteyn has had reasonable success growing and producing flowers on a number of genera of neotropical Vaccinieae in a greenhouse and office at the New York Botanical Garden. Therefore, limited experience with a small number of these species indicates varying degrees of success with attempts to grow them outside their natural environment.

The most desirable scenario for development of new crops from these species would be to establish research and development programmes for this purpose in the equatorial highlands of the Andes, or perhaps expand or redirect ongoing programmes in this region. This may also be the most viable approach to incorporating genes from certain of these species into current cultivated crops and vice versa. For example, the North American blackberry cultivars 'Cherokee', 'Commanche', 'Shawnee' and 'Black Satin' successfully passed through vegetative, flowering and fruiting cycles throughout the year at the Experiment Station of the Technical University of Ambato. These cultivars could be used for hybridization with native subg. *Rubus* species and also with *R. glaucus*. This does not imply that all species or cultivars of other cultivated temperate-zone small fruits, or even all other blackberry cultivars, can be grown this successfully in the equatorial highlands of the Andes. Only cultivar trials will determine success or failure of temperate-zone small-fruit cultivars and other crops in equatorial regions.

Improvement or hybridization programmes with any of these Andean small fruit species should involve scientists and graduate students from the region as integral research team leaders and/or members throughout the life of such programmes. Particular efforts must also be made to ensure that production technologies developed in the course of such programmes be made available to agricultural and horticultural research, extension and industry personnel in the region.

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Résumé

Ressources phytogénétiques des genres Rubus *et* Vaccinium *dans les Andes de l'Equateur*
Dans les Andes de l'Equateur, le genre *Rubus* comprend à la fois des espèces du sous-genre *Rubus* et du sous-genre *Orobatus, Rubus glaucus* et au moins deux espèces retournées à l'état sauvage dans le sous-genre *Idaeobatus.* Une expédition spécialisée a collecté 22 échantillons de semences de quatre espèces connues et de deux espèces non identifiées dans le sous-genre *Rubus* et 18 échantillons de semences de cinq espèces connues et d'une espèce non identifiée dans le sous-genre *Orobatus.* Quatre échantillons de semences de *R. glaucus* et un de *R. niveus* ont aussi été collectés. Les exemplaires de *Rubus roseus* (sous-genre *Orobatus*), *R. adenothallus* et *R. robustus* (sous-genre *Rubus*) et *R. glaucus* semblent les plus prometteurs pour leurs contributions possibles aux pools de gènes de *Rubus* cultivé. Les vacciniées sont représentées par des espèces appartenant à environ 20 genres dans les Andes de l'Equateur. Huit genres, 28 espèces connues et au total 43 échantillons clonaux et de semences ont été collectés. Les espèces de *Cavendishia, Ceratostema, Macleania* et *Psammisia* semblent prometteuses comme nouveautés en floriculture. *Vaccinium floribundum* a été identifié comme plante ornementale intéressante et source possible de gènes pour la résistance au gel pendant la floraison.

Resumen

Recursos de germoplasma de Rubus *y de vaciniáceas en los Andes y el Ecuador*
En la región andina del Ecuador hay especies del género *Rubus* pertenecientes a los subgéneros *Rubus* y *Orobatys, Rubus glaucos* y por lo menos dos especies silvestres del subgénero *Idaeobatus.* En una expedición para la recolección de germoplasma se obtuvieron 22 muestras de semillas de cuatro especies conocidas y dos sin identificar del subgénero *Rubus* y 18 muestras de semillas de cinco especies conocidas y una sin identificar del subgénero *Orobatus.* También se recogieron cuatro muestras de semillas de *R. glaucus* y una de *R. niveus.* Las más prometedoras por su posible contribución a los acervos génicos cultivados de *Rubus* fueron *Rubus rosoeus* (subgénero *Orobatus*), *R. adenothallus* y *R. robustus* (subgénero *Rubus*) y *R. glaucus.* La subfamilia de las vacineas está representada por especie de unos 20 géneros en los Andes del Ecuador. Se recogieron muestras de semillas de ocho géneros, 28 especies conocidas y un total de 43 clones. Diversas especies de *Cavendishia, Ceratostema, Macleania* y *Psammisia* parecen ofrecer posibilidades como nuevos cultivos destinados a la floricultura. *Vaccinium floribundum* podría ser interesante como planta ornamental y como posible puente de genes por su resistencia a las heladas durante la floración.