

**Figure 2-33.** Number of herbaria in the different states of Brazil.

**Source:** Peixoto & Barbosa (1998).

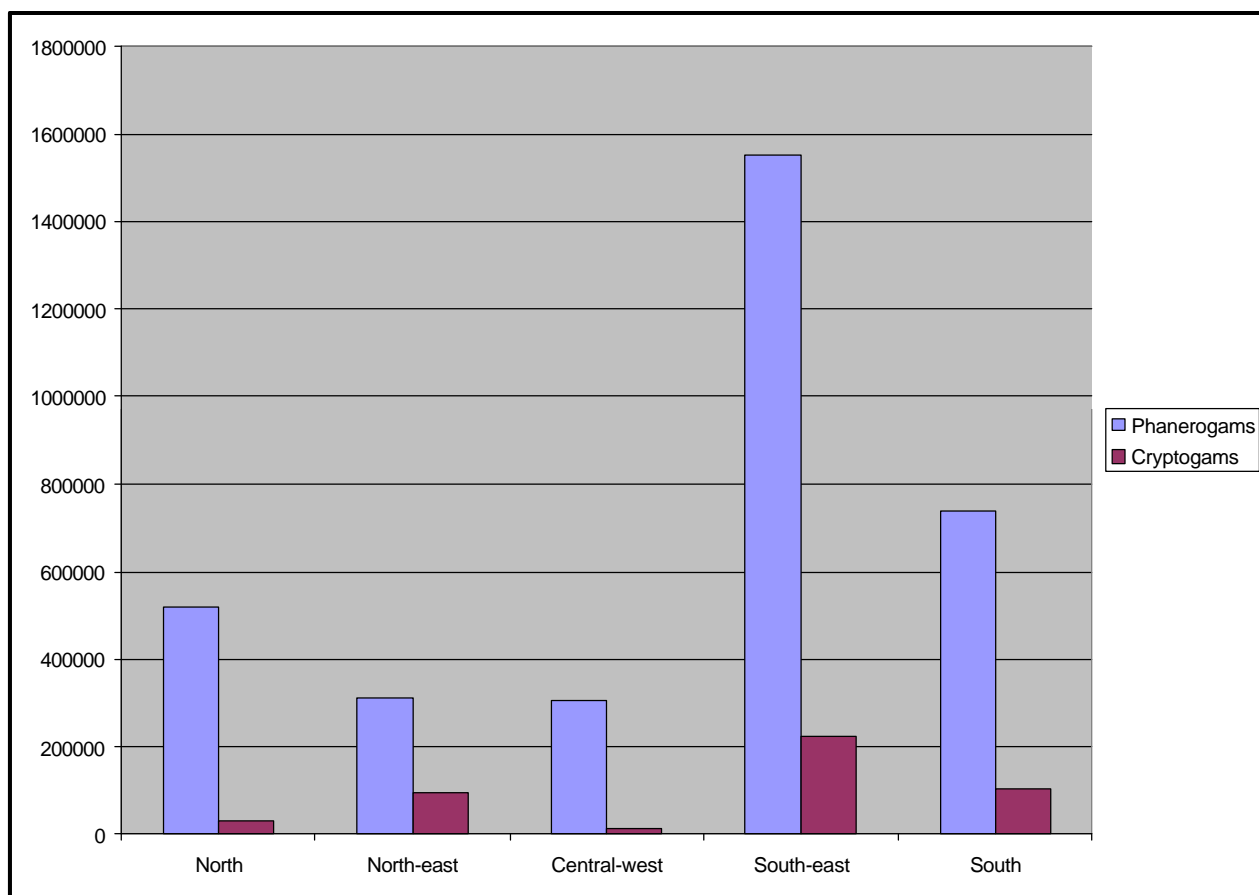
With a view to creating a programme for this sector, in 1982, the 'André Tosello' Tropical Research and Technology Foundation began a survey of the stocks of micro-organism collections of interest in terms of health, agriculture, industry and the environment, concentrated mainly in the state of Sao Paulo. The first Catalogue of Collections of Micro-organism Cultures was published in 1984. From 1985 onwards, the survey was extended to the other states, and resulted in the establishment of a Sectorial Programme of Culture Collections (Programa Setorial de Coleções de Culturas - PSCC), supported by FINEP. In 1986, the Second Catalogue of Lineages was published, and a further survey in the same year, sponsored by FINEP, identified 80 collections in 43 institutions.

A number of projects have been developed as a result of the PSCC. More than 40 courses and seminars, including participation of specialists from abroad, have been organised through the PSCC in combination with the Personnel Training Program for Strategic Activities (Programa de Capacitação de Recursos Humanos para Atividades Estratégicas - RHAE) of the Ministry of Science and Technology - MCT. Also within the PSCC, in 1988 FINEP provided emergency support to 13 collections.

The first volume of the 3rd Edition of the National Catalogue of Lineages/Bacteria was published in 1989. The second (Yeasts and Filamentous Fungi), and third (Cells and Live Animals) volumes were published in 1990. The national survey of collections has not been updated since 1990. All the information is available via the Tropical Data Base - BDT on the Internet.

EMBRAPA co-ordinates and maintains 10 micro-organism germplasm banks of agricultural interest, including bacteria, fungi and protozoa, in six institutions.

The Collection of Tropical Cultures (Coleção de Culturas Tropical - CCT) and the Rio de Janeiro Cellbank (Banco de Células do Rio de Janeiro - BCRJ) have both received funding through the biotechnology subprogramme of the Programme for Support of Scientific and Technological Development (Programa de Apoio ao Desenvolvimento Científico e Tecnológico - PADCT II), for infrastructure, expanding stocks, and the improvement of services to the scientific and technological community. The CCT has a stock of almost 6,000 lineages of micro-organisms of industrial and environmental interest. Information on these cultures is available on the Internet through the Tropical Data Base -



**Figure 2-34.** Number of specimens in herbaria in the different regions of Brazil.

**Source:** Peixoto & Barbosa (1998).

BDT. The BCRJ has a stock of around 130 lineages (animal cells) of interest to human health and tropical medicine. They are described in the *Catálogo Nacional de Linhagens Humanas e Animais* of 1994, and the addendum of 1996.

In view of the need for Depository Centres for Biological Material (Centros Depositários de Material Biológico), to comply with article 24, of the Law of Industrial Property (No 9.279/1996), the National Institute for Industrial Property (Instituto Nacional de Propriedade Industrial - INPI) has set up an advisory work group (GT-CREBIOT), to define legal and technical criteria for the selection of depository centres, to be accredited by INPI. This is to meet the demand for deposits associated with patent applications. Although there are 30 International Depository Centres recognised by the World Intellectual Property Organization - WIPO, none are in Latin America.

### 2.4.7 Breeding Wild Animals for Commercial Purposes

The Faunal Protection Law (Lei de Proteção à Fauna, No. 5.197/1967), which provides for the protection of wildlife, was significantly strengthened by the 1988 Constitution. The

Constitution determines that it is the duty of the State “to protect fauna and flora, forbidding, by law, practices that put its ecological function at risk, cause the extinction of species or submit animals to cruelty”. The Faunal Protection Law banned professional hunting and deliberate trade in species of Brazilian wildlife. It allowed, however, for amateur hunting, considered as a management strategy, and encouraged especially the establishment of breeding facilities for wild animals for economic or industrial purposes.

#### Breeding Brazilian wildlife in captivity for economic purposes

The breeding of native animals in captivity for commercial or economic purposes is provided for by Article 6 of Law No. 5197, 3rd January 1967 and regulated by edicts published by IBAMA. Edict No. 118/97 deals with the implantation of commercial breeding facilities for species that have no specific management plan. The species most often bred under the terms of this edict are: capybara, collared peccaries, white-lipped peccaries, quail, pacas, partridge, coypus, rheas, snakes, cayman, parrots, parakeets, and macaws. The recommendation given to IBAMA’s state agencies is that the initial breeding and reproductive stock should preferably originate from other registered breeding facilities or be the product of confiscation by the inspecting agencies. The cap-

**Table 2-43.** Type and location, size of collection and origins of the specimens in Brazilian Zoological Collections.

| Institution   | Region       | Taxon           | Total specimens | Ecosystems covered  |
|---|--------------|-----------------|-----------------|---|
| Zoology Reference Collection of the Universidade Federal do Mato Grosso do Sul (UFMS) | CW           | Mollusca        | 3,404           | Cerrado, Pantanal and continental waters  |
|   |              | Crustacea       | 835             |   |
|   |              | Insecta         | 1,571           |   |
|   |              | Pisces          | 9,655           |   |
|   |              | Mammalia        | 292             |   |
|   |              | Amphibia        | 667             |   |
| Instituto Nacional de Pesquisas da Amazonia (INPA)                                    | N            | Porifera        | n.i.            | Amazonia  |
|   |              | Platyhelminthes | n.i.            |   |
|   |              | Rotifera        | n.i.            |   |
|   |              | Nematoda        | n.i.            |   |
|   |              | Acanthocephala  | n.i.            |   |
|   |              | Mollusca        | 5,281           |   |
|   |              | Annelida        | n.i.            |   |
|   |              | Arachnida       | n.i.            |   |
|   |              | Crustacea       | 7,040           |   |
|   |              | Insecta         | over 200,000    |   |
|   |              | Chilopoda       | n.i.            |   |
|   |              | Diplopoda       | n.i.            |   |
|   |              | Pauropoda       | n.i.            |   |
|   |              | Symphyla        | n.i.            |   |
| Pisces  | over 100,000 |                 |                 |   |
| Coleção Mastozoológica Deoclécio Guerra, Universidade Federal de Pernambuco (UFPE)    | NE           | Mammalia        | 1,361           | Amazonia, Atlantic forest, Cerrado, Caatinga and urban ecosystems   |
|   |              |                 |                 |   |
| Universidade Federal do Rio Grande do Norte (UFRN)                                    | NE           | Pisces          | 1,000           | Continental waters  |
| Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS)                         | S            | Amphibia        | 1,853           | Amazonia, <i>Araucaria</i> pine forest, Cerrado, Caatinga, Pantanal, Atlantic Forest, Parkland Savannahs, and urban ecosystems. |
|   |              | Reptilia        | 7,058           |   |
|   |              | Arachnida       | 50,000          |   |
|   |              | Pisces          | 160,000         |   |

ture of wild animals may be authorised in situations where they are proved to be causing damage to agriculture, or where the species is abundant according to the demographic characteristics of each species, and only through a formal request containing a population survey of the species and information concerning capture methods.

Brazil currently has around 120 commercial breeding facilities registered with IBAMA. Of these, around 45% are capybara breeders, mainly in the state of Sao Paulo. Captive management plans and the norms for the breeding and maintenance of each species are published in specific edicts. The species which may be managed and the edict which regulates their breeding and management are as follows:

#### **Pantanal Cayman**

IBAMA Edict No. 126, 13th February 1990, deals the registration of breeding facilities for *Caiman crocodylus* *yacare* in the Rio Paraguay basin. Up to 1990, the Policy for

breeding crocodilians in captivity had been based on a system of 'Farming', while acquiring breeding stock from the wild. In the late 1980s, however, viability studies were carried out for the 'Ranching' system, where only eggs are collected from the wild. The research was carried out by the Federal University of Mato Grosso do Sul, at the Fazenda Olhos D'água in the municipality of Aquidauna, Mato Grosso do Sul, and resulted in the edict for breeding Pantanal caymans in the Rio Paraguay basin. The edict determines that eggs from up to 80% of the nests identified following a survey of the property. Incubation is artificial and the stock is raised under cover, where temperature, humidity and food are controlled which results in skin without osteoblasts and osteoderms, referred to by crocodile ranchers as the 'classic skin'. There are about 50 commercial breeding facilities for Pantanal caymans in Brazil, and about 30 of these work as co-operatives in the state of Mato Grosso.

#### **Butterflies**

**Table 2-43.** (contd.) Type and location, size of collection and origins of the specimens in Brazilian Zoological Collections.

| Institution  | Region  | Taxon   | Total specimens | Ecosystems covered  |          |              |   |
|--|---------|---|-----------------|---|----------|--------------|---|
| Fundação Zoobotânica do Rio Grande do Sul (FZB)        | S       | Porifera  | 3,048           | Amazonia, Cerrado, Pantanal, Parkland   |          |              |   |
|  |         | Helmyntes                                       | 88              | agricultural and urban ecosystems, Atlantic forest, <i>Araucaria</i> pine forest marine and continental waters, Caatinga                    |          |              |   |
|  |         | Annelida  | 280 (lots)      |   |          |              |   |
|  |         | Arachnida                                       | 29,286 (lots)   |   |          |              |   |
|  |         | Chilopoda                                       | 480 (lots)      |   |          |              |   |
|  |         | Diplopoda                                       | 380 (lots)      |   |          |              |   |
|  |         | Insecta   | 81,796          |   |          |              |   |
|  |         | Echinodermata                                   | 100 (lots)      |   |          |              |   |
|  |         | Amphibia  | 13,400          |   |          |              |   |
|  |         | Aves  | 2,700           |   |          |              |   |
|  |         | Mammalia  | 2,700           |   |          |              |   |
|  |         | Mollusca  | 34,000 (lots)   |   |          |              |   |
| Federal University of Paraná (UFPR)                    | S       | Pisces  | 12,059          | Amazonia, Atlantic forest, Cerrado, <i>Araucaria</i> pine forest, Pantanal, Caatinga, Parkland Savannahs, agricultural and urban ecosystems |          |              |   |
|  |         | Insecta   | 3,000,000       |   |          |              |   |
|  |         | Federal University of Londrina                  | S               |   | Pisces   | 3,700        | Tibagi river valley   |
|  |         |   | S               |   | Pisces   | n.i.         | Upper Rios Paraná and Iguaçu  |
|  |         | Federal University of Rio Grande do Sul (UFRGS) | S               |   | Pisces   | 4,694 (lots) | Marine zone of Rio Grande do Sul  |
|  |         |   | SE              |   | Insecta  | n.i.         | Amazonia, Atlantic forest, Cerrado, Pantanal, agricultural and urban ecosystems |
|  |         | Santa Úrsula University (USU)                   | SE              |   | Pisces   | 15,000       | Amazonia, marine and continental waters   |
|  |         | Federal University of Viçosa (UFV)              | SE              |   | Pisces   | 1,700        | Atlantic Forest, Cerrado, Caatinga, agricultural and urban ecosystems           |
|  |         |   |                 |   | Amphibia | 2,500        |   |
|  |         |   |                 |   | Reptilia | 1,100        |   |
|  |         |   |                 |   | Aves     | 1,300        |   |
|  |         |   |                 |   | Mammalia | 500          |   |
| Insecta  | 100,000 |   |                 |   |          |              |   |
| Federal University of Rio de Janeiro - National Museum | SE      | Pisces  | Around 500,000  | n.i.  |          |              |   |
|  |         | Porifera  | 6,000           | Continental and marine waters   |          |              |   |
| São Paulo University (USP)                             | SE      | Pisces  | Around 200,000  | Continental (mainly) and marine waters  |          |              |   |

**Obs.:** n.i. - not informed. Region names according to Figure 1-1.

**Source:** Base de Dados Tropical. Coleções Zoológicas Brasileiras <http://www.bdt.org.br/bdt/museus/index?index> - Neotropical Fish Collections, 1997.

Edict No. 2.314, 26th November 1990, regulates the commercial breeding of Lepidoptera. The management system for butterflies includes their attraction to specially planted flowers on rural estates, the collection of eggs laid on these plants, and their transfer to net-covered sheds to complete their metamorphosis. The caterpillars show a sex ratio strongly biased towards males, 40:1. Females ready to fly are released in the ratio of 40 females to two males. The wings of the surplus males are then used or sold for craft products. Only two farms have been authorised to date, one in the state of Santa Catarina, the other in Amazonas.

#### Giant Amazon river turtle and tracajá turtles

Edict No. 142/92, 30th December 1992, regulates the breeding of *Podocnemis expansa* (giant Amazon river turtle) and *Podocnemis unifilis* (tracajá) in captivity in the Amazon. For authorisation to breed these turtles in captivity, the edict demands that a detailed management project be presented

to IBAMA. Once approved, IBAMA itself provides newborn turtles from the Amazon Chelonia Project bases administered by the National Centre for the Conservation and Management of Amazonian Turtles (Centro Nacional de Conservação e Manejo de Quelônios da Amazônia - CENAQUA). This centre monitors the activities of the breeding stations, and the growth of the young turtles up to their slaughter (from 2 kilos live weight upwards). The commercialisation of each animal is allowed only after they are tagged, tags being supplied by IBAMA/CENAQUA. There are 20 registered turtle farms in the Brazilian Amazon, the majority in the state of Amazonas.

The commercial breeding of animals on the Official List of Threatened Species of Brazilian Fauna, (Edict No. 1.522/89, 19th December 1989), has not yet not been regulated by IBAMA. The recommendation given to IBAMA's state agencies is refuse letters of consultation or complementary planning for commercial purposes which include these

**Table 2-44.** List of Botanical Gardens and similar institutions.

|     |  |
|-----|--|
| 1.  | Jardim Botânico de Belém - Bosque Rodrigues Alves, Belém, Pará   |
| 2.  | Complexo Botânico Monjolinho, Instituto Agronômico de Campinas, Campinas, São Paulo                        |
| 3.  | Jardim Botânico “Irmão Teodoro Luiz”, Pelotas, Rio Grande do Sul   |
| 4.  | Jardim Botânico da ALBRAS, Barcarena, Pará   |
| 5.  | Jardim Botânico do Instituto de Tecnologia da Amazônia, Manaus, Amazonas                                   |
| 6.  | Jardim Florestal da Universidade Federal de Sergipe, Aracaju, Sergipe                                      |
| 7.  | Jardim Zoobotânico de Dois Irmãos, Recife, Pernambuco  |
| 8.  | Jardim Botânico da UNICRUZ, Cruz Alta, Rio Grande do Sul   |
| 9.  | Jardim Botânico da Universidade Rural do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro                    |
| 10. | Jardim Botânico de Curitiba, Curitiba, Paraná  |
| 11. | Jardim Botânico de Brasília, Distrito Federal  |
| 12. | Jardim Botânico de Goiânia, Goiânia, Goiás   |
| 13. | Fundação Zoobotânica de Belo Horizonte, Belo Horizonte, Minas Gerais                                       |
| 14. | Jardim Botânico da Cidade do Recife, Recife, Pernambuco  |
| 15. | Jardim Botânico de Caxias do Sul, Caxias do Sul, Rio Grande do Sul   |
| 16. | Jardim Botânico de Lajeado, Lajeado, Rio Grande do Sul   |
| 17. | Jardim Botânico de Santa Maria, Santa Maria, Rio Grande do Sul   |
| 18. | Jardim Botânico de Porto Alegre, Porto Alegre, Rio Grande do Sul   |
| 19. | Horto Botânico do Museu Nacional do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro                         |
| 20. | Jardim Botânico Municipal de Bauru, Bauru, São Paulo   |
| 21. | Jardim Botânico de Botucatu, Botucatu, São Paulo   |
| 22. | Jardim Botânico Hermógenes de Freitas Leitão Filho, Universidade Estadual de Campinas, Campinas, São Paulo |
| 23. | Jardim Botânico de Paulínia, Paulínia, São Paulo   |
| 24. | Jardim Botânico Municipal de Santos “Chico Mendes”, Santos, São Paulo                                      |
| 25. | Jardim Botânico de São Paulo, São Paulo, São Paulo   |
| 26. | Jardim Botânico Particular Miraponga, São Paulo  |
| 27. | Jardim Botânico da Universidade Federal de Mato Grosso, Cuiabá, Mato Grosso                                |
| 28. | Jardim Botânico de Niterói, Niterói, Rio de Janeiro  |
| 29. | Jardim Botânico do Centro de Pesquisa Agropecuária dos Trópicos Úmidos da EMBRAPA, Manaus, Amazonas        |
| 30. | Instituto Jardim Botânico do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro                                |
| 31. | Museu de Biologia Mello Leitão, Santa Teresa, Espírito Santo   |
| 32. | Museu de História Natural e Jardim Botânico, Belo Horizonte, Minas Gerais                                  |
| 33. | Parque Zoobotânico do Museu Paraense Emílio Goeldi, Belém, Pará  |
| 34. | Parque Botânico do Instituto Nacional de Pesquisa da Amazônia, Manaus, Amazonas                            |
| 35. | Parque Zoobotânico de Teresina, Teresina, Piauí  |
| 36. | Sítio Roberto Burle Marx/IPHAN, Rio de Janeiro   |

**Source:** Siqueira & Joly (1996).

species. If the interested party insists, the breeding of such species can be authorised on the basis of the edict that deals with ‘breeding facilities for conservation purposes’, but the commercialisation of captive-bred threatened species can be authorised only for the F2 generation onwards. To do this, however, once it is proved that the breeding facility is

self-sufficient, the interested party must then request a change in status from a ‘conservationist’ to a ‘commercial’ breeding facility, and must meet the norms of the respective edict as well those of Edict No. 132/88 concerning the International Convention on Trade in Endangered Species - CITES. Only then can the animals be sold. The founder stock of such facilities cannot be wildcaught.

**Table 2-46.** Number of Animals in Captivity in Brazilian zoos.

| Taxon        | Males        | Females      | Sex unknown*  | Total         |
|--------------|--------------|--------------|---------------|---------------|
| Mammals      | 3,354        | 3,317        | 1,938         | 8,609         |
| Birds        | 3,204        | 3,053        | 12,766        | 19,023        |
| Reptiles     | 2,606        | 2,628        | 6,374         | 11,608        |
| Amphibians   | 24           | 20           | 18            | 62            |
| <b>TOTAL</b> | <b>9,188</b> | <b>9,018</b> | <b>21,096</b> | <b>39,302</b> |

\*Sex of the specimen was not informed.

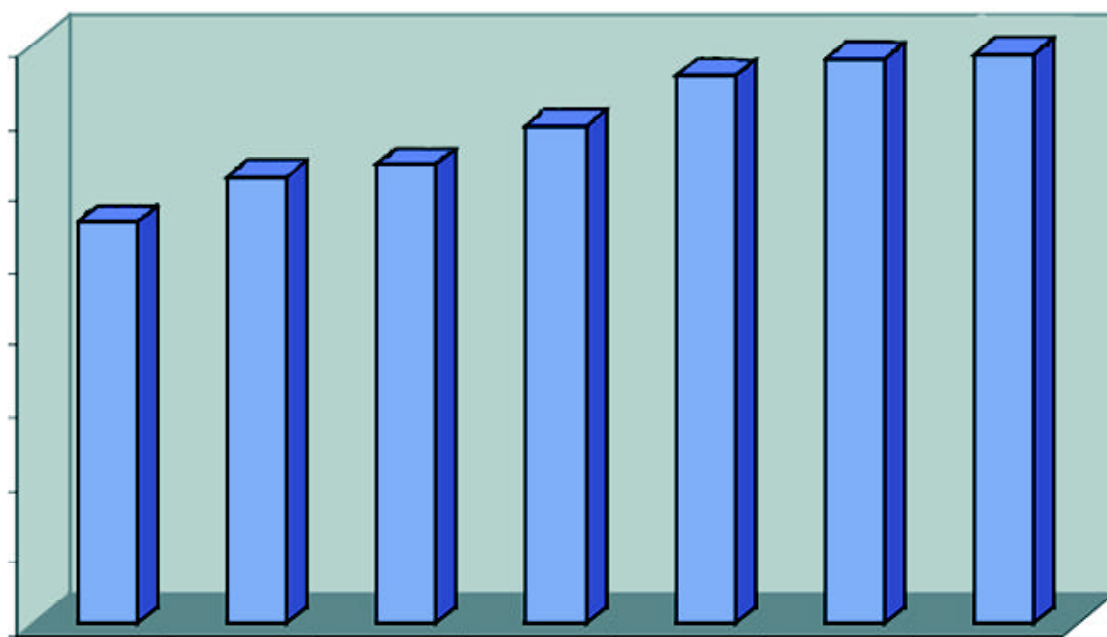
**Source:** Censo Anual de Animais da Sociedade de Zoológicos do Brasil, 1996.

**Table 2-45.** The number of zoological gardens in Brazil by state and the number registered with IBAMA.

| State and Region    | Zoological Gardens Institutions | Registered with IBAMA |
|---------------------|---------------------------------|-----------------------|
| <b>South-east</b>   | <b>46</b>                       | <b>20</b>             |
| RJ                  | 4                               | 4                     |
| SP                  | 42                              | 16                    |
| <b>South</b>        | <b>18</b>                       | <b>6</b>              |
| PR                  | 6                               | 3                     |
| RS                  | 7                               | 3                     |
| SC                  | 5                               |                       |
| <b>North</b>        | <b>6</b>                        | <b>2</b>              |
| AM                  | 3                               | 1                     |
| PA                  | 2                               | 1                     |
| RO                  | 1                               |                       |
| <b>North-east</b>   | <b>7</b>                        | <b>1</b>              |
| BA                  | 2                               |                       |
| CE                  | 1                               |                       |
| PB                  | 1                               |                       |
| PE                  | 1                               | 1                     |
| PI                  | 1                               |                       |
| SE                  | 1                               |                       |
| <b>Central-west</b> | <b>14</b>                       | <b>4</b>              |
| DF                  | 1                               | 1                     |
| GO                  | 1                               | 1                     |
| MG                  | 10                              | 2                     |
| MT                  | 2                               |                       |
| <b>Total</b>        | <b>91</b>                       | <b>33</b>             |

States, see Figure 1-1.

**Source:** Censo Anual de Animais da Sociedade de Zoológicos do Brasil, 1996.



**Figure 2-35.** Number of animals in Brazilian zoological gardens, 1990-1996.

**Source:** Annual censuses carried out by the Sociedade de Zoológicos do Brasil (SZB) (1996).

**Table 2-47.** Germplasm Banks (BAG) comprising the Brazilian system of *ex situ* conservation of plant germplasm\*.

| Germplasm Bank Denomination          | Instituição             | City/State**       | Taxon                                     |
|--------------------------------------|-------------------------|--------------------|---|
| 1 BaG of Wheat                       | EMBRAPA-CNPT            | Passo Fundo-RS     | <i>Triticum aestivum</i>                  |
| 2 BaG of Barley                      |                         |                    | <i>Hordeum vulgare</i>                    |
| 3 BaG of <i>Triticum</i>             |                         |                    | <i>T. aestivum</i> x <i>S. cereale</i>    |
| 4 BaG of Rye                         |                         |                    | <i>Secale cereale</i>                     |
| 5 BaG of Oats                        |                         |                    | <i>Avena sativa</i>                       |
| 6 BaG of <i>Cucurbita</i>            | EMBRAPA-CPACT           | Pelotas-RS         | <i>Cucurbita</i> spp.                     |
| 7 BaG of Onion                       |                         |                    | <i>Allium cepa</i>                        |
| 8 BaG of Melon                       |                         |                    | <i>Cucumis melo</i>                       |
| 9 BaG of Potato                      |                         |                    | <i>Solanum</i> spp.                       |
| 10 BaG of Carrot                     |                         |                    | <i>Daucus carota</i>                      |
| 11 BaG of Native fruits of the South |                         |                    |   |
| Araçá                                |                         |                    | <i>Psidium cattleyanum</i>                |
| Pitanga                              |                         |                    | <i>Eugenia uniflora</i>                   |
| 12 BaG of <i>Prunus</i>              |                         |                    |   |
| Peach                                |                         |                    | <i>Prunus persica</i>                     |
| Nectarine                            |                         |                    | <i>P. persica</i> var. <i>nucipersica</i> |
| Cherry                               |                         |                    | <i>Prunus cerasus</i>                     |
| Apricot                              |                         |                    | <i>Prunus armeniaca</i>                   |
| Plum                                 |                         |                    | <i>Prunus domestica</i>                   |
| Almond                               |                         |                    | <i>Prunus amygdalus</i>                   |
| 13 BaG of Mountain Guava tree        |                         |                    | <i>Feijoa sellowiana</i>                  |
| 14 BaG of Grapes                     | EMBRAPA-CNPUv           | Bento Gonçalves-RS | <i>Vitis vinifera</i>                     |
| 15 BaG of Fodder – South Region      | EMBRAPA-CPPSul          | Bagé-RS            | <i>Bromus</i>                             |
|                                      |                         |                    | <i>Paspalum</i>                           |
|                                      |                         |                    | <i>Adesmia</i>                            |
|                                      |                         |                    | <i>Trifolium</i>                          |
| 16 BaG of Paraná Pine                | EMBRAPA-CNPF            | Colombo-PR`        | <i>Araucaria angustifolia</i>             |
| 17 BaG of <i>Eucalyptus</i>          |                         |                    | <i>Eucalyptus benthamii</i>               |
|                                      |                         |                    | <i>Eucalyptus cloeziana</i>               |
|                                      |                         |                    | <i>Eucalyptus deanei</i>                  |
|                                      |                         |                    | <i>Eucalyptus maculata</i>                |
|                                      |                         |                    | <i>Eucalyptus pellita</i>                 |
|                                      |                         |                    | <i>Eucalyptus pilularis</i>               |
|                                      |                         |                    | <i>Eucalyptus resinifera</i>              |
|                                      |                         |                    | <i>Eucalyptus saligna</i>                 |
|                                      |                         |                    | <i>Eucalyptus urophylla</i>               |
|                                      |                         |                    | <i>Eucalyptus viminalis</i>               |
|                                      | <i>Eucalyptus dumii</i> |                    |   |
|                                      | <i>Eucalyptus</i> spp.  |                    |   |
| 18 BaG of Tropical Pines             |                         |                    | <i>Pinus caribaea</i>                     |
|                                      |                         |                    | <i>Pinus maximinoi</i>                    |
|                                      |                         |                    | <i>Pinus patula</i>                       |
|                                      |                         |                    | <i>Pinus tecunumanii</i>                  |
|                                      |                         |                    | <i>Pinus gregii</i>                       |
|                                      |                         |                    | <i>Pinus kessica</i>                      |
|                                      |                         |                    | <i>Pinus oocarpa</i>                      |
|                                      |                         |                    | <i>Pinus</i> spp.                         |
| 19 BaG of Cypress                    |                         |                    | <i>Cupressus lusitanica</i>               |
| 20 BaG of Soybean                    | EMBRAPA-CNPSo           | Londrina-PR        | <i>Glycine max</i>                        |
| 21 BaG of Sunflower                  |                         |                    | <i>Helianthus annuus</i>                  |
| 22 BaG of Manioc                     | EPAGRI                  | Itajaí-SC          | <i>Manihot esculenta</i>                  |
| 23 BaG of Vegetables and Plants      |                         |                    |   |
| Amazon condiments                    | EMBRAPA-CPATU           | Belém-PA           |   |
| Black Pepper                         |                         |                    | <i>Piper nigrum</i>                       |
| Jambu                                |                         |                    | <i>Spilanthes oleracea</i>                |
| Pepper                               |                         |                    | <i>Capsicum</i> spp.                      |

**Table 2-47.** (contd.) Germplasm Banks (BaG) comprising the Brazilian system of *ex situ* conservation of plant germplasm\*.

| Germplasm Bank Denomination  | Instituição   | City/State** | Taxon   |
|--|---------------|--------------|---|
| 24 BaG of Native Amazon Forests<br>Mahogany<br>Ucuuba  | EMBRAPA-CPATU | Belém-PA     | <i>Swietenia macrophylla</i><br><i>Virola surinamensis</i>  |
| 25 BaG of Manioc   |               |              | <i>Manihot esculenta</i>  |
| 26 BaG of Palm Trees<br>Açaí<br>Pupunha<br>Patauí<br>Bacaba<br>Tucuma  |               |              | <i>Euterpe oleracea</i><br><i>Bactris gassipaes</i><br><i>Oenocarpus bataua</i><br><i>Oenocarpus</i> spp.<br><i>Astrocaryum</i> spp.  |
| 27 BaG of Medicinal, Aromatic and<br>Condiment plants<br>Velame<br>Pedra hume-caa<br>Pau-Rosa<br>Crajiru                                     |               |              | <i>Croton cajucara</i><br><i>Myrcia sphaerocarpa</i><br><i>Aniba duckei</i><br><i>Arrabidaea chica</i>  |
| 28 BaG of Medicinal and Insecticide plants<br>Jaborandi<br>Timbó<br>Ipecacuanha  |               |              | <i>Pilocarpus microphyllus</i><br><i>Derris</i> sp.<br><i>Cephaelis ipecacuanha</i>   |
| 29 BaG of Amazon Industrial Cultivation<br>Annatto<br>Guaraná<br>Mallow<br>Jute  |               |              | <i>Bixa orellana</i><br><i>Paullinia cupana</i><br><i>Urena lobata</i><br><i>Corchorus</i> spp.   |
| 30 BaG of Dendê  | EMBRAPA-CPAA  | Manaus-AM    | <i>Elaeis guineensis</i>  |
| 31 BaG of Caiaué   |               |              | <i>Elaeis oleifera</i>  |
| 32 BaG of Guaraná  |               |              | <i>Paullinia cupana</i>   |
| 33 BaG of Autochthonous Amazon Species<br>Rubber<br>Cacao<br>Caiauê<br>Pupunha<br>Jacarandá<br>Jequitibá<br>Camu-camu<br>Sumaúma<br>Araticum |               |              | <i>Hevea brasiliensis</i><br><i>Theobroma cacao</i><br><i>Elaeis oleifera</i><br><i>Bactris gasipaes</i><br><i>Machaerium acutifolium</i><br><i>Cariniana estrelensis</i><br><i>Myrciaria dubia</i><br><i>Ceiba pentandra</i><br><i>Rollinia mucosa</i><br><i>Bertholetia excelsa</i> |
| 34 BaG of Brazil nut   |               |              | <i>Gossypium</i> spp.   |
| 35 BaG of Cotton   | IAC           | Campinas-SP  | <i>Oryza sativa</i>   |
| 36 BaG of Rice   |               |              | <i>Amaryllis</i> spp.   |
| 37 BaG of Amaryllis  |               |              | <i>Lilium candidum</i>  |
| 38 BaG of Açucena  |               |              | <i>Arachis hipogea</i>  |
| 39 BaG of Ground nuts  |               |              | <i>Persea americana</i>   |
| 40 BaG of Avocado  |               |              | <i>Allium sativum</i>   |
| 41 BaG of Garlic   |               |              | <i>Avena sativa</i>   |
| 42 BaG of Oats   |               |              | <i>Solanum tuberosum</i>  |
| 43 BaG of Potato   |               |              | <i>Musa</i> spp.  |
| 44 BaG of Banana   |               |              | <i>Coffea arabica</i>   |
| 45 BaG of Coffee   |               |              | <i>Saccharum officinarum</i>  |
| 46 BaG of Sugar-cane   |               |              | <i>Hordeum vulgare</i>  |
| 47 BaG of Barley   |               |              | <i>Citrus</i> spp.  |
| 48 BaG of Citrus Fruits  |               |              |   |



**Table 2-47.** (contd.) Germplasm Banks (BaG) comprising the Brazilian system of *ex situ* conservation of plant germplasm\*.

| Germplasm Bank Denomination          | Instituição      | City/State**   | Taxon                                  |
|--------------------------------------|------------------|----------------|--|
| 49 BaG of Cacao                      |                  |                | <i>Theobroma cacao</i>                 |
| 50 BaG of Guava                      |                  |                | <i>Psidium guajava</i>                 |
| 51 BaG of Sesame                     |                  |                | <i>Sesamum indicum</i>                 |
| 52 BaG of Papaya                     |                  |                | <i>Carica papaya</i>                   |
| 53 BaG of Mandioc                    |                  |                | <i>Manihot esculenta</i>               |
| 54 BaG of Mango                      |                  |                | <i>Mangifera indica</i>                |
| 55 BaG of Passion Fruit              |                  |                | <i>Passiflora</i> spp.                 |
| 56 BaG of Herbaceous plants          |                  |                | Diversas                               |
| 57 BaG of Pinhão                     |                  |                | <i>Araucaria angustifolia</i>          |
| 58 BaG of Palm trees                 |                  |                | Diversas                               |
| 59 BaG of Ramie                      | IAC              | Campinas-SP    | <i>Boehmeria nivea</i>                 |
| 60 BaG of Roses                      |                  |                | <i>Rosa</i> spp.                       |
| 61 BaG of Sisal                      |                  |                | <i>Agave sisalana</i>                  |
| 62 BaG of Triticum                   |                  |                | <i>T. aestivum</i> x <i>S. cereale</i> |
| 63 BaG of Wheat                      |                  |                | <i>Triticum aestivum</i>               |
| 64 BaG of Fruit tree species         |                  |                | Diversas                               |
| 65 BaG of Beans                      |                  |                | <i>Phaseolus vulgaris</i>              |
| 66 BaG of Rubber                     | EMBRAPA-CPAC     | Planaltina-DF  | <i>Hevea brasiliensis</i>              |
| 67 BaG of Quinoa                     |                  |                | <i>Chenopodium quinoa</i>              |
| 68 BaG of Species of Cerrado tree    |                  |                |  |
| Gonçalo-Alves                        |                  |                | <i>Astronium fraxinifolium</i>         |
| Cherry tree                          |                  |                | <i>Amburana cearensis</i>              |
| Jequitibá                            |                  |                | <i>Cariniana estrelensis</i>           |
| Copaiba                              |                  |                | <i>Copaifera langsdorfii</i>           |
| Louro-Pardo                          |                  |                | <i>Cordia trichotoma</i>               |
| Baru                                 |                  |                | <i>Dipterix alata</i>                  |
| Braúna                               |                  |                | <i>Schinopsis brasiliensis</i>         |
| Ipê-Roxo                             |                  |                | <i>Tabebuia impetiginosa</i>           |
| Ipê Amarelo do Cerrado               |                  |                | <i>Tabebuia caraiba</i>                |
| Pau D'Arco Amarelo                   |                  |                | <i>Tabebuia serratifolia</i>           |
| Peroba                               |                  |                | <i>Aspidosperma polyneuron</i>         |
| 69 BaG of Cerrado Forrage            |                  |                | <i>Arachis</i>                         |
|                                      |                  |                | <i>Stylosanthes</i>                    |
|                                      |                  |                | <i>Sesbania</i>                        |
|                                      |                  |                | <i>Brachiaria</i>                      |
|                                      |                  |                | <i>Calopogonium</i>                    |
|                                      |                  |                | <i>Centrosema</i>                      |
|                                      |                  |                | <i>Panicum maximum</i>                 |
|                                      |                  |                | <i>Paspalum</i>                        |
|                                      |                  |                | <i>Manihot esculenta</i>               |
| 70 BaG of Manioc                     |                  |                |  |
| 71 BaG of Pumpkins and Squash        | EMBRAPA-CNPH     | Brasília-DF    | <i>Cucurbita</i> spp.                  |
| 72 BaG of Garlic                     |                  |                | <i>Allium sativum</i>                  |
| 73 BaG of Sweet Potato               |                  |                | <i>Ipomoea batatas</i>                 |
| 74 BaG of Mandioquinha-salsa         |                  |                | <i>Arracacia xanthorrhiza</i>          |
| 75 BaG of Arachis                    | EMBRAPA-Cenargen | Brasília-DF    | <i>Arachis</i> spp. ***                |
| 76 BaG of Sorghum                    | EMBRAPA-CNPMS    | Sete Lagoas-MG | <i>Sorghum</i> spp.                    |
| 77 BaG of Maize                      |                  |                | <i>Zea mays</i>                        |
| 78 BaG of Millet                     |                  |                | <i>Pennisetum glaucum</i>              |
| 79 BaG of Elephant Grass             |                  |                | <i>Pennisetum purpureum</i>            |
| 80 BaG of Alfalfa                    |                  |                | <i>Medicago sativa</i>                 |
| 81 BaG of Rice                       | EMBRAPA-CNPAF    | Goiânia-GO     | <i>Oryza sativa</i>                    |
| 82 BaG of Beans                      |                  |                | <i>Phaseolus vulgaris</i>              |
| 83 BaG of Caupi                      |                  |                | <i>Vigna unguiculata</i>               |
| 84 BaG of Baru                       | EMBRAPA-EMGOPA   | Goiânia-GO     | <i>Dipterix alata</i>                  |
| 85 BaG of Cashew and similar species | EMBRAPA-CNPAT    | Fortaleza-CE   | <i>Anacardium</i> spp.                 |
| Cashew                               |                  |                | <i>Anacardium occidentale</i>          |

**Table 2-47.** (contd.) Germplasm Banks (BaG) comprising the Brazilian system of *ex situ* conservation of plant germplasm\*.

| Germplasm Bank Denomination                                      | Instituição    | City/State**      | Taxon                            |
|--|----------------|-------------------|----------------------------------|
| 86 BaG of Custard apple  |                |                   | <i>Annona muricata</i>           |
| 87 BaG of Hog-plum (Cajá)  |                |                   | <i>Spondias lutea</i>            |
| 88 BaG of Papaya   | EMBRAPA-CNPMF  | Cruz das Almas-BA | <i>Carica papaya</i>             |
| 89 BaG of Pineapple  |                |                   | <i>Ananas</i> spp.               |
| 90 BaG of Banana   |                |                   | <i>Musa</i> spp.                 |
| 91 BaG of Acerola  |                |                   | <i>Malpighia glabra</i>          |
| 92 BaG of Castor   | EMBRAPA-CNPA   | Campina Grande-PB | <i>Ricinus communis</i>          |
| 93 BaG of Manioc   | EMBRAPA-CNPMF  | Cruz das Almas-BA | <i>Manihot esculenta</i>         |
| 94 BaG of Passion Fruit  |                |                   | <i>Passiflora</i> spp.           |
| 95 BaG of Cacao  | EMBRAPA-CEPLAC | Itabuna-BA        | <i>Theobroma cacao</i>           |
| 96 BaG of Native and Exotic fruit trees                          | EMBRAPA-CNPMF  | Cruz das Almas-BA |                                  |
| Avocado  |                |                   | <i>Persea americana</i>          |
| Abiu   |                |                   | <i>Pouteria caimito</i>          |
| Abricó-do-Pará   |                |                   | <i>Mammea americana</i>          |
| Ameixa do Peru   |                |                   | <i>Bunchosia armeniaca</i>       |
| Akee   |                |                   | <i>Blihia sapida</i>             |
| Custard apple (Araticum-do-Brejo)                                |                |                   | <i>Annona glabra</i>             |
| Guava (Araça)  |                |                   | <i>Psidium</i> spp.              |
| Araça-boi  |                |                   | <i>Eugenia stipitata</i>         |
| Cabeludinha  |                |                   | <i>Eugenia tomentosa</i>         |
| Cainito  |                |                   | <i>Chrysophyllum cainito</i>     |
| Hog-plum (Cajá)  |                |                   | <i>Spondias lutea</i>            |
| Cashew   |                |                   | <i>Anacardium occidentale</i>    |
| Canistel   |                |                   | <i>Richardella nervosa</i>       |
| Carambola  |                |                   | <i>Averrhoa carambola</i>        |
| False Mangosteen   |                |                   | <i>Cariniana colchighinensis</i> |
| Guava  |                |                   | <i>Psidium guajava</i>           |
| Custard apple  |                |                   | <i>Annona muricata</i>           |
| Grumichama   |                |                   | <i>Eugenia brasiliensis</i>      |
| Guabiroba  |                |                   | <i>Campomanesia</i> sp.          |
| Jaboticaba   |                |                   | <i>Myrciaria cauliflora</i>      |
| Lichee   |                |                   | <i>Lichi chinensis</i>           |
| Macadamia  |                |                   | <i>Macadamia integrifolia</i>    |
| Pinha  |                |                   | <i>Annona squamosa</i>           |
| Sapodilla plum   |                |                   | <i>Achras sapota</i>             |
| 97 BaG of Guava and Acerola - Araripe Vale do Rio Moxotó Regions | EMBRAPA-CPATSA | Petrolina-PE      |                                  |
| Guava  |                |                   | <i>Psidium guajava</i>           |
| Acerola  |                |                   | <i>Malpighia glabra</i>          |
| 98 BaG of Umbu   |                |                   | <i>Spondias tuberosa</i>         |
| 99 BaG of Mango of the Semi-Arid Region                          |                |                   | <i>Mangifera indica</i>          |
| 100 BaG of North-east Region                                     |                |                   | <i>Cenchrus</i>                  |
| Cactaceous fodder  |                |                   | <i>Opuntia</i> spp.              |
|  |                |                   | <i>Nopalea</i> spp.              |
| 101 BaG of <i>Cucurbitas</i> for the Nordeste                    |                |                   |                                  |
| Pumpkin (Jerimum)  |                |                   | <i>Cucurbita maxima</i>          |
| Watermelon   |                |                   | <i>Citrulus vulgaris</i>         |
| Melon  |                |                   | <i>Cucumis melo</i>              |
| Maxixe   |                |                   | <i>Cucumis anguria</i>           |
| 102 BaG of Coconut   | EMBRAPA-CPATC  | Aracaju-SE        | <i>Cocos nucifera</i>            |
| 103 BaG of Mangaba   | EMBRAPA-CNPA   | Campina Grande-PB | <i>Hancornia speciosa</i>        |
| 104 BaG of Ramie   |                |                   | <i>Boehmeria nivea</i>           |
| 105 BaG of Sisal   |                |                   | <i>Agave sisalana</i>            |
| 106 BaG of Herbaceous Cotton                                     |                |                   | <i>Gossypium</i> spp.            |
| 107 BaG of Cotton tree   |                |                   | <i>Gossypium</i> spp.            |

\* In 1997 around 200,000 GERMPASM entries were being conserved in these banks, approximately 76% of them exotic species and 34% Brazilian native species. \*\* States, see figure 1.1. \*\*\* The Banks has some 1,000 entries, representing 75 of the 80 known *Arachis* species. Of these, 68 have been described and 12 are now being described. Sixty-one of them are native to Brazil.

Source: CENARGEN/Instituto Agronômico de Campinas (IAC), 1998.

**Box 2-1**

**Threatened Species of the Brazilian Fauna  
IBAMA Edict No. 1.522, 19th December 1989**

**MAMMALIA**

**Primates**

- Alouatta belzebul belzebul* (Linnaeus, 1766). CEBIDAE. Red-handed howling monkey.  
*Alouatta fusca* (E. Geoffroy, 1812). CEBIDAE. Brown howling monkey  
*Ateles belzebuth* (E. Geoffroy, 1806). CEBIDAE. White-bellied spider monkey  
*Ateles paniscus* (Linnaeus, 1758). CEBIDAE. Red-faced black spider monkey  
*Brachyteles arachnoides* (E. Geoffroy, 1806). CEBIDAE. Muriqui  
*Cacajao calvus* (I. Geoffroy, 1847). CEBIDAE. Bald uakari  
*Cacajao melanocephalus* (Humboldt, 1811). CEBIDAE. Black uakari  
*Callicebus personatus* (E. Geoffroy, 1812). CEBIDAE. Masked titi monkey  
*Callimico goeldii* (Thomas, 1904). CALLIMICONIDAE. Goeldi's monkey  
*Callithrix argentata leucippe* (Thomas, 1922). CALLITRICHIDAE. Golden-white bare-ear marmoset  
*Callithrix aurita* (E. Geoffroy in Humboldt, 1812). CALLITRICHIDAE. Buffy tufted-ear marmoset  
*Callithrix flaviceps* (Thomas, 1903). CALLITRICHIDAE. Buffy headed marmoset  
*Callithrix humeralifer* (E. Geoffroy in Humboldt, 1812). CALLITRICHIDAE. Santarém marmoset  
*Cebus apella xanthosternos* (Wied, 1820). CEBIDAE. Buffy headed capuchin monkey  
*Chiropotes albinasus* (I. Geoffroy & Deville, 1848). CEBIDAE. White-nosed saki  
*Chiropotes satanas utahicki* Hershkovitz, 1985. CEBIDAE. Uta Hick's bearded saki  
*Chiropotes satanas satanas* (Hoffmannsegg, 1807). CEBIDAE. Guianan bearded saki  
*Lagothrix lagotricha* (Humboldt, 1812). CEBIDAE. Woolly monkey  
*Leontopithecus chrysomelas* (Kuhl, 1820). CALLITRICHIDAE. Golden-headed lion tamarin  
*Leontopithecus chrysopygus* (Mikan, 1823). CALLITRICHIDAE. Black lion tamarin  
*Leontopithecus rosalia* (Linnaeus, 1766). CALLITRICHIDAE. Golden lion tamarin  
*Pithecia albicans* Gray, 1860. CEBIDAE. White saki, buffy saki  
*Saguinus bicolor bicolor* (Spix, 1823). CALLITRICHIDAE. Pied tamarin  
*Saguinus imperator* (Goeldi, 1907). CALLITRICHIDAE. Emperor tamarin  
*Saimiri vanzolinii* Ayres, 1985. CEBIDAE. Black-crowned squirrel monkey

**Carnivora**

- Atelocynus microtis* (Sclater, 1883). CANIDAE. Short-eared dog  
*Chrysocyon brachyurus* (Illiger, 1815). CANIDAE. Maned wolf  
*Leopardus pardalis* (Linnaeus, 1758). FELIDAE. Ocelot  
*Leopardus tigrinus* (Schreber, 1775). FELIDAE. Oncilla  
*Leopardus wiedii* (Schinz, 1821). FELIDAE. Margay  
*Lutra longicaudis* (Olfers, 1818). MUSTELIDAE. Neotropical otter  
*Mustela africana* (Demarest, 1818). MUSTELIDAE. Amazonian weasel  
*Oncifelis colocolo* (Molina, 1810). FELIDAE.  
*Oncifelis geoffroyi* (d'Orbigny & Gervais, 1844). FELIDAE. Geoffroy's cat  
*Panthera onca* (Linnaeus, 1758). FELIDAE. Jaguar  
*Pteronura brasiliensis* (Gmelin, 1788). MUSTELIDAE. Giant otter  
*Puma concolor* (Linnaeus, 1771). FELIDAE. Puma  
*Speothos venaticus* (Lund, 1842). CANIDAE. Bush dog

**Xenarthra**

- Bradypus torquatus* Illiger, 1811. BRADYPODIDAE. Three-toed sloth  
*Myrmecophaga tridactyla* Linnaeus, 1758. MYRMECOPHAGIDAE. Giant anteater  
*Priodontes maximus* (Kerr, 1792). DASYPIDIDAE. Giant armadillo

*Tolypeutes tricinctus* (Linnaeus, 1758). DASYPODIDAE. Three-banded armadillo

### **Sirenia**

*Trichechus inunguis* (Natterer, 1883). TRICHECHIDAE. Amazon manatee

*Trichechus manatus* Linnaeus, 1758. TRICHECHIDAE. West Indian manatee

### **Cetacea**

*Eubalaena australis* (Desmoulins, 1822). BALAENIDAE. Southern right whale

*Megaptera novaeangliae* (Borowski, 1781). BALAENOPTERIDAE. Humpback whale/

*Pontoporia blainvillei* (Gervais & d'Orbigny, 1844). PLATANISTIDAE. River Plate dolphin

### **Rodentia**

*Abrawayaomys ruschii* Cunha & Cruz, 1979. MURIDAE. Abrawaya's spiny rat

*Chaetomys subspinosus* (Olfers, 1818). ECHIMYIDAE. Thin-spined porcupine

*Juscelinomys candango* Moojen, 1965. MURIDAE.

*Kunsia tomentosus* (Lichtenstein, 1830). CRICETIDAE.

*Phaenomys ferrugineus* (Thomas, 1894). MURIDAE.

*Rhagomys rufescens* (Thomas, 1886). MURIDAE. Brazilian arboreal mouse

### **Artiodactyla**

*Blastocercus dichotomus* (Illiger, 1815). CERVIDAE. Marsh deer

*Odocoileus virginianus* (Zimmermann, 1780). CERVIDAE. White-tailed deer

*Ozotoceros bezoarticus* (Linnaeus, 1758). CERVIDAE. Pampas deer

### **AVES**

#### **Tinamiformes**

*Crypturellus noctivagus* (Wied, 1820). TINAMIDAE. Yellow-legged tinamou

*Nothura minor* (Spix, 1825). TINAMIDAE. Lesser nothura

*Taoniscus nanus* (Temminck, 1815). TINAMIDAE. Dwarf tinamou

*Tinamus solitarius* (Vieillot, 1819). TINAMIDAE. Solitary tinamou

#### **Ciconiiformes**

*Eudocimus ruber* (Linnaeus, 1758). THRESKIORNITHIDAE. Scarlet ibis

*Tigrisoma fasciatum fasciatum* (Such, 1825). ARDEIDAE. Fasciated tiger heron

#### **Phoenicopteriformes**

*Phoenicopterus ruber* Linnaeus, 1758. PHOENICOPTERIDAE. American flamingo

#### **Anseriformes**

*Mergus octosetaceus* Vieillot, 1817. ANATIDAE. Brazilian merganser

#### **Falconiformes**

*Accipiter poliogaster* (Temminck, 1824). ACCIPITRIDAE. Gray-bellied hawk

*Falco deiroleucus* Temminck, 1825. FALCONIDAE. Orange-breasted falcon

*Harpia harpyja* (Linnaeus, 1758). ACCIPITRIDAE. Harpy eagle

*Harpyhaliaetus coronatus* (Vieillot, 1817). ACCIPITRIDAE. Crowned eagle

*Leucopternis lacernulata* (Temminck, 1827). ACCIPITRIDAE. White-necked hawk

*Leucopternis polionota* (Kaup, 1847). ACCIPITRIDAE. Mantled hawk

*Morphnus guianensis* (Daudin, 1800). ACCIPITRIDAE. Crested eagle

*Spizastur melanoleucus* (Vieillot, 1816). ACCIPITRIDAE. Black-and-white hawk eagle

#### **Galliformes**

*Crax blumenbachii* Spix, 1825. CRACIDAE. Red-bellied curassow

*Crax fasciolata pinima* Pelzeln, 1870. CRACIDAE. Natterer's curassow

*Mitu mitu mitu* (Linnaeus, 1766). CRACIDAE. Razor-billed curassow

*Penelope jacucaca* Spix, 1825. CRACIDAE. White-browed guan.

*Penelope obscura bronzina* Hellmayr, 1914. CRACIDAE. Dusky-legged guan

*Penelope ochrogaster* Pelzeln, 1870. CRACIDAE. Chestnut-bellied guan

*Pepile jacutinga* (Spix, 1825). CRACIDAE. Black-fronted piping guan

#### **Charadriiformes**

*Numenius borealis* (Foster, 1772). SCOLOPACIDAE. Eskimo curlew

#### **Columbiformes**

*Claravis godefrida* (Temminck, 1811). COLUMBIDAE. Purple-winged ground dove

*Columbina cyanopis* (Pelzeln, 1870). COLUMBIDAE. Blue-eyed ground dove

#### **Psittaciformes**

*Amazona brasiliensis* (Linnaeus, 1766). PSITTACIDAE. Red-tailed amazon

*Amazona pretrei* (Temminck, 1830). PSITTACIDAE. Red-specatacled amazon

*Amazona rhodocorytha* (Salvadori, 1890). PSITTACIDAE. Red-browed amazon

*Amazona vinacea* (Kuhl, 1820). PSITTACIDAE. Vinaceous amazon

*Anodorhynchus glaucus* (\*) (Vieillot, 1816). PSITTACIDAE. Glaucous macaw

*Anodorhynchus hyacinthinus* (Latham, 1720). PSITTACIDAE. Hyacinth macaw

*Anodorhynchus leari* Bonaparte, 1856. PSITTACIDAE. Lear's macaw

*Aratinga guarouba* (Gmelin, 1778). PSITTACIDAE. Golden parakeet

*Cyanopsitta spixii* (Wagler, 1832). PSITTACIDAE. Spix's macaw

*Pyrrhura cruentata* (Wied, 1820). PSITTACIDAE. Ochre-marked parakeet

*Pyrrhura leucotis* (Kuhl, 1820). PSITTACIDAE. Maroon-faced parakeet

*Touit melanonota* (Wied, 1820). PSITTACIDAE. Black-eared parrotlet

*Touit surda* (Kuhl, 1820). PSITTACIDAE. Golden-tailed parrotlet

*Triclarina malachitacea* (Spix, 1824). PSITTACIDAE. Blue-bellied parrot

#### **Cuculiformes**

*Neomorphus geoffroyi dulcis* Sneath, 1927. CUCULIDAE. Rufous-vented ground-cuckoo

*Neomorphus geoffroyi geoffroyi* (Temminck, 1820). CUCULIDAE. Rufous-vented ground-cuckoo

#### **Caprimulgiformes**

*Caprimulgus candicans* (Pelzeln, 1867). CAPRIMULGIDAE. White-winged nightjar

*Eleothreptus anomalus* (Gould, 1837). CAPRIMULGIDAE. Sickle-winged nightjar

*Macropsalis creagra* (Bonaparte, 1850). CAPRIMULGIDAE. Long-trained nightjar

*Nyctibius leucopterus* (Wied, 1821). NYCTIBIIDAE. White-winged potoo

#### **Apodiformes**

*Phaethornis superciliosus margaretae* (Ruschi, 1972). TROCHILIDAE. Long-tailed hermit

*Ramphodon dohrnii* (Boucier & Mulsant, 1852). TROCHILIDAE. Hook-billed hermit

#### **Piciformes**

*Campephilus robustus* (Lichtenstein, 1819). PICIDAE. Robust woodpecker

*Celeus torquatus tinnunculus* (Wagler, 1829). PICIDAE. Ringed woodpecker

*Dryocopus galeatus* (Temminck, 1822). PICIDAE. Helmeted woodpecker

*Jacamaralcyon tridactyla* (Vieillot, 1817). GALBULIDAE. Three-toed jacamar

#### **Passeriformes**

*Amaurospiza moesta* (Hartlaub, 1853). EMBERIZIDAE. Blackish-blue seedeater

*Alectrurus risora* (Vieillot, 1816). TYRANNIDAE. Strange-tailed tyrant

*Anthus nattereri* (Sclater, 1878). MOTTACILLIDAE. Ochre-breasted pipit

*Calyptura cristata* (\*) (Vieillot, 1818). COTINGIDAE. Kinglet calyptura

*Carduelis yarrellii* (Audubon, 1839). EMBERIZIDAE. Yarrell's cardinal

*Carpornis melanocephalus* (Wied, 1820). CONTINGIDAE. Black-headed berry-eater

*Cercomacra carbonaria* Sclater & Salvin, 1873. FORMICARIIDAE. Rio Branco antbird  
*Clibanornis dendrocolaptoides* (Pelzeln, 1859). FURNARIIDAE. Canebreak groundcreeper  
*Conothraupis mesoleuca* (Berlioz, 1939). EMBERIZIDAE. Cone-billed tanager  
*Cotinga maculata* (Muller, 1776). COTINGIDAE. Banded cotinga  
*Culicivora caudacuta* (Vieillot, 1818). TYRANNIDAE. Sharp-tailed tyrant  
*Curaeus forbesi* (Sclater, 1886). ICTERIDAE. Forbes's blackbird  
*Dacnis nigripes* Pelzeln, 1856. EMBERIZIDAE. Black-legged dacnis  
*Formicivora erythronotos* Hartlaub, 1852. FORMICARIIDAE. Black-hooded antwren  
*Formicivora iheringi* Hellmayr, 1909. FORMICARIIDAE. Narrow-billed antwren  
*Gubernatrix cristata* (Vieillot, 1817). EMBERIZIDAE. Yellow cardinal  
*Hemitriccus aenigma* (Zimmer, 1940). TYRANNIDAE. Pygmy tyrant  
*Hemitriccus furcatus* (Lafresnaye, 1846). TYRANNIDAE. Fork-tailed pygmy tyrant  
*Hemitriccus kaempferi* (Zimmer, 1953). TYRANNIDAE. Kaempfer's tody tyrant  
*Herpsilochmus pectoralis* Sclater, 1857. FORMICARIIDAE. Pectoral antwren  
*Iodopleura pipra* (Lesson, 1831). COTINGIDAE. Buff-throated purpletuft  
*Lipaugus lanioides* (Lesson, 1844). COTINGIDAE. Cinnamon-vented piha  
*Megaxenops paraguayae* Reiser, 1905. FURNARIIDAE. Great xenops  
*Merulaxis stresemanni* Sick, 1960. RHINOCRYPTIDAE. Stresemann's bristlefront  
*Myadestes leucogenys* (Cabanis, 1851). TURDIDAE. Rufous-brown solitaire  
*Myrmeciza ruficauda* (Wied, 1831). FORMICARIIDAE. Scalloped antbird  
*Myrmeciza stictothorax* (Todd, 1927). FORMICARIIDAE. Spot-breasted antbird  
*Mymotherula minor* Salvadori, 1867. FORMICARIIDAE. Salvadori's antwren  
*Nemosia rourei* Cabanis, 1870. EMBERIZIDAE. Cherry-throated tanager  
*Oryzoborus maximiliani* Cabanis, 1851. EMBERIZIDAE. Great-billed seedfinch  
*Phibalura flavirostris* (Vieillot, 1816). COTINGIDAE. Swallow-tailed cotinga  
*Phylloscartes ceciliae* Teixeira, 1987. TYRANNIDAE. Alagoas tyrannulet  
*Phylloscartes roquettei* (Snethlage, 1928). TYRANNIDAE. Minas Gerais tyrannulet  
*Philydor novaesi* Teixeira & Gonzaga, 1983. FURNARIIDAE. Alagoas foliage-gleaner  
*Piprites pileatus* (Temminck, 1822). COTINGIDAE. Black-capped manakin  
*Platyrinchus leucoryphus* (Wied, 1831). TYRANNIDAE. Russet-winged spadebill  
*Poecilurus kollari* (Pelzeln, 1856). FURNARIIDAE. Hoary-throated spinetail  
*Poospiza cinerea* Bonaparte, 1850. EMBERIZIDAE. Cinereous warbling finch  
*Procnias averano averano* (Illermann, 1783). COTINGIDAE. Bearded bellbird  
*Pyriglena atra* (Swainson, 1825). FORMICARIIDAE. Fringe-back fire-eye  
*Pyroderus scutatus scutatus* (Shaw, 1792). COTINGIDAE. Red-ruffed fruitcrow  
*Rhopornis ardesiaca* (Wied, 1831). FORMICARIIDAE. Slender antbird  
*Scytalopus novacapitalis* Sick, 1958. RHINOCRYPTIDAE. Brasília tapaculo  
*Sporophila falcirostris* (Temminck, 1820). EMBERIZIDAE. Temminck's seedeater  
*Sporophila frontalis* (Verreaux, 1869). EMBERIZIDAE. Buffy-fronted seedeater  
*Sporophila palustris* (Barrows, 1883). EMBERIZIDAE. Marsh seedeater  
*Sturnella defilipii* (Bonaparte, 1850). ICTERIDAE. Lesser red-breasted meadowlark  
*Synallaxis infuscata* Pinto, 1950. FURNARIIDAE. Plain spinetail  
*Tangara fastuosa* (Lesson 1831). EMBERIZIDAE. Seven-coloured tanager  
*Terenura sicki* Teixeira & Gonzaga, 1983. FORMICARIIDAE. Orange-bellied antwren  
*Thamnomanes plumbeus* (Wied, 1831). FORMICARIIDAE. Plumbeous antshrike  
*Thripophaga macroura* (Wied, 1821). FURNARIIDAE. Striated softtail  
*Xanthopsar flavus* (Gmelin, 1788). ICTERIDAE. Saffron-cowled blackbird  
*Xiphocolaptes falcirostris* Spix, 1824. DENDROCOLAPTIDAE. Moustached woodcreeper  
*Xiphocolaptes franciscanus* Snethlage, 1927. DENDROCOLAPTIDAE. Snethlage's woodcreeper  
*Xipholena atropurpurea* (Wied, 1820). COTINGIDAE. White-winged cotinga.

## REPTILIA

### Chelonia

- Caretta caretta* (Linnaeus, 1758). CHELONIIDAE. Loggerhead turtle  
*Chelonia mydas* (Linnaeus, 1758). CHELONIIDAE. Green turtle  
*Dermochelys coriacea* (Linnaeus, 1766). DERMOCHELYDAE. Leatherback turtle  
*Eretmochelys imbricata* (Linnaeus, 1766). CHELONIIDAE. Hawksbill turtle  
*Lepidochelys olivacea* (Eschscholtz, 1829). CHELONIIDAE. Olive Ridley turtle  
*Phrynops hoguei* Mertens, 1957. CHELIDAE. Hoge's sideneck turtle

### Squamata

- Lachesis muta rhombeata* Wied, 1825. VIPERIDAE

### Crocodylia

- Caiman latirostris* (Daudin, 1802). ALLIGATORIDAE. Caiman  
*Melanosuchus niger* (Spix, 1825). ALLIGATORIDAE. Black caiman

## AMPHIBIA

- Paratelmatobius gaigeae* (Cochran, 1938). LEPTODACTYLIDAE.

## INSECTA

### Lepidoptera - Butterflies and moths

- Dasyophthalma vertebralis* (\*) (Butler, 1969). NYMPHALIDAE.  
*Eresia orysice* (\*) (Geyer, 1832). NYMPHALIDAE.  
*Eurytides iphitas* (\*) (Hubner, 1821). PAPILIONIDAE.  
*Eurytides lysithous harrisianus* (Swainson, 1822). PAPILIONIDAE.  
*Eutresis hypereia imeriensis* (Brown, 1977). NYMPHALIDAE.  
*Heliconius nattereri* Felder&Felder, 1865. Família NYMPHALIDAE.  
*Hyalyris fiammctta* (\*) (Hewitson, 1852). NYMPHALIDAE.  
*Hyalyris leptalina leptalina* (\*) (Felder & Felder, 1865). NYMPHALIDAE.  
*Hypoleria fallens* (Haensch, 1905). NYMPHALIDAE.  
*Hypoleria mulviana* (D'Almeida, 1958). NYMPHALIDAE.  
*Hypothiris mayi* (D'Almeida, 1945). NYMPHALIDAE.  
*Joiceya praeclara* (Talbot, 1928). LYCAENIDAE.  
*Mechanitis bipuncta* (Forbes, 1948). NYMPHALIDAE.  
*Melinaea mnasias* (Hewitson, 1855). NYMPHALIDAE.  
*Moschoneura methymna* (Godart, 1819). PIERIDAE.  
*Napeogenes cyrianassa xanthone* (Bates, 1862). NYMPHALIDAE.  
*Orobrossolis ornamentalis* (Stichel, 1906). NYMPHALIDAE.  
*Papilio himeros himeros* (Hopffer, 1865). PAPILIONIDAE.  
*Papilio himeros baia* (Rothschild & Jordan, 1906). PAPILIONIDAE.  
*Papilio zagreus zagreus* (Doubleday, 1847). PAPILIONIDAE.  
*Papilio zagreus neyi* (Niepelt, 1909). PAPILIONIDAE.  
*Papilio zagreus bedoci* (LeCerf, 1925). PAPILIONIDAE.  
*Parides ascanius* (Cramer, 1776). PAPILIONIDAE.  
*Parides lysander mattogrossensis* (Talbot, 1928). PAPILIONIDAE.  
*Perrhybris flava* (Oberthür, 1895). PIERIDAE.  
*Scada karschina delicata* (Talbot, 1932). NYMPHALIDAE.

### Odonata - Dragonflies

- Leptagrion dardanoi* Santos, 1968. COENAGRIONIDAE.  
*Leptagrion siqueirai* Santos, 1968. COENAGRIONIDAE.  
*Mecistogaster asticta* (Selys, 1860). PSEUDOSTIGMATIDAE.  
*Mecistogaster pronoti* (\*) (Sjöstedt, 1918). PSEUDOSTIGMATIDAE.

**ONYCHOPHORA**

*Peripatus acacioi* Marcus & Marcus, 1953. PERIPATIDAE.

**CNIDARIA**

*Millepora nitidae* (Verreill, 1868). MILLEPORIDAE. Fire coral.

(\*) Species probably extinct.

Species included under IBAMA Edict No. 45, April 27th 1992:

**MAMMALIA - Primates**

*Leontopithecus caissara* Lorini & Persson, 1990. CALLITRICHIDAE. Black-faced lion tamarin

Species included under IBAMA Edict No. 62, June 17th 1997:

**MAMMALIA - Chiroptera**

*Saccopteryx gymnura* Thomas, 1901 EMBALLONURIDAE. White-lined sac-winged bat

*Vampyrum spectrum* (Linnaeus, 1758) PHYLLOSTOMIDAE. False vampire bat

*Lonchophylla bokermanní* Sazima *et al.*, 1978 PHYLLOSTOMIDAE. Spear-nosed long-tongued bat

*Lichonycteris obscura* Thomas, 1895 PHYLLOSTOMIDAE. Dark long-tongued bat

*Chiorderma doriae* Thomas, 1901 PHYLLOSTOMIDAE. Big-eyed bat

*Platyrrhinus recifinus* (Thomas, 1901) PHYLLOSTOMIDAE. White-lined fruit bat

*Lasiurus ebenus* Fazzolari-Corrêa, 1994 VESPERTILIONIDAE. Hoary or hair-tailed bat

*Lasiurus egregius* (Peters, 1870) VESPERTILIONIDAE. Hoary or hair-tailed bat

*Myotis ruber* (E. Geoffroy, 1806) VESPERTILIONIDAE. Little brown bat

**AVES - Passeriformes**

*Stynphalornis acutirostris* (Bornschein, Reinet & Teixeira, 1995). FORMICARIDAE.



## Box 2-2

## Endangered or rare Brazilian plant species

## IBAMA Edict No. 06/92

| Species Category | Family  |   |                  |
|------------------|---|---|------------------|
|                  | <i>Acanthococos emensis</i> Toledo                                      | R | Palmae           |
|                  | <i>Aechmea apocalyptica</i> Reitz                                       | R | Bromeliaceae     |
|                  | <i>Aechmea blumenavii</i> Reitz   | R | Bromeliaceae     |
|                  | <i>Aechmea kleinii</i> Reitz  | E | Bromeliaceae     |
|                  | <i>Aechmea pimenti-velosii</i> Reitz                                    | R | Bromeliaceae     |
|                  | <i>Aniba rosaeodora</i> Ducke   | E | Lauraceae        |
|                  | <i>Araucaria angustifolia</i> (Bertol.) O Kuntze                        | V | Araucariaceae    |
|                  | <i>Aspilia grazielae</i> Santos   | I | Compositae       |
|                  | <i>Aspilia paraensis</i> (Huber)Santos                                  | R | Compositae       |
|                  | <i>Aspilia pohlii</i> Baker   | I | Compositae       |
|                  | <i>Aspilia procumbens</i> Baker   | R | Compositae       |
|                  | <i>Astronium urundeuva</i> Engl   | V | Anacardiaceae    |
|                  | <i>Bauhinia smilacina</i> (Schott)Steudel                               | V | Leguminosae      |
|                  | <i>Bertholletia excelsa</i> HBK   | V | Lecythidaceae    |
|                  | <i>Billbergia alfonsi-joannis</i> Reitz                                 | E | Bromeliaceae     |
|                  | <i>Bowdichia nitida</i> Spruce ex Benth.                                | V | Leguminosae      |
|                  | <i>Brosimum glaucum</i> Taubert   | R | Moraceae         |
|                  | <i>Brosimum glazioui</i> Taubert  | R | Moraceae         |
|                  | <i>Bumelia obtusifolia</i> Roem. & Schult. var. <i>excelsa</i> (DC)Miq. | V | Sapotaceae       |
|                  | <i>Caesalpinia echinata</i> Lam   | E | Leguminosae      |
|                  | <i>Cariniana ianeirensis</i> Knuth                                      | R | Lecythidaceae    |
|                  | <i>Cattleya schilleriana</i> Reichbach                                  | E | Orchidaceae      |
|                  | <i>Costus cuspidatus</i> (Nees et Martius)Maas                          | R | Zingiberaceae    |
|                  | <i>Costus fragilis</i> Maas   | R | Zingiberaceae    |
|                  | <i>Costus fusiformis</i> Maas   | R | Zingiberaceae    |
|                  | <i>Couepia schottii</i> Fritsch   | V | Chrysobalanaceae |
|                  | <i>Dalbergia nigra</i> (Vell.)Fr. All.                                  | V | Leguminosae      |
|                  | <i>Dicksonia sellowiana</i> (Presl.) Hook.                              | E | Dicksoniaceae    |
|                  | <i>Dicypellium caryophyllatum</i> Nees                                  | V | Lauraceae        |
|                  | <i>Ditassa arianae</i> Font. & Schw.                                    | E | Asclepiadaceae   |
|                  | <i>Ditassa maricaensis</i> Font. & Schw.                                | V | Asclepiadaceae   |
|                  | <i>Dorstenia arifolia</i> Lam.  | V | Moraceae         |
|                  | <i>Dorstenia cayapia</i> Vell.  | E | Moraceae         |
|                  | <i>Dorstenia elata</i> Hook.  | R | Moraceae         |
|                  | <i>Dorstenia ficus</i> Vell.  | R | Moraceae         |
|                  | <i>Dorstenia fischeri</i> Bureau  | E | Moraceae         |
|                  | <i>Dorstenia ramosa</i> (Desv.) Car. et al.                             | V | Moraceae         |
|                  | <i>Dorstenia tenuis</i> Bonpl. ex Bur.                                  | V | Moraceae         |
|                  | <i>Dyckia cabrerai</i> Smith & Reitz                                    | E | Bromeliaceae     |
|                  | <i>Dyckia distachya</i> Hassler   | E | Bromeliaceae     |
|                  | <i>Dyckia hatschbachii</i> L.B.Smith                                    | E | Bromeliaceae     |
|                  | <i>Dyckia ibiramensis</i> Reitz   | E | Bromeliaceae     |
|                  | <i>Euxylophora paraensis</i> Huber                                      | V | Rutaceae         |
|                  | <i>Fernseea itatiaiae</i> (Wawra)Baker                                  | R | Bromeliaceae     |
|                  | <i>Gonolobus dorotheanus</i> Font. & Schw.                              | E | Asclepiadaceae   |

## Box 2-2 (continued)

## Endangered or rare Brazilian plant species

## IBAMA Edict No. 06/92

| Species  | Category | Family           |
|--|----------|------------------|
| <i>Heliconia angusta</i> Vell.                                       | V        | Musaceae         |
| <i>Heliconia citrina</i> LEm. & Em.Santos                            | V        | Musaceae         |
| <i>Heliconia farinosa</i> Raddi                                      | V        | Musaceae         |
| <i>Heliconia fluminensis</i> LEm. & Em.Santos                        | V        | Musaceae         |
| <i>Heliconia lacletteana</i> LEm. & Em.Santos                        | V        | Musaceae         |
| <i>Heliconia sampaiiana</i> LEm.                                     | V        | Musaceae         |
| <i>Helosis cayennensis</i> (Swartz) Sprengel var. <i>cayennensis</i> | V        | Balanophoraceae  |
| <i>Hirtella insignis</i> Briquet ex Prance                           | E        | Chrysobalanaceae |
| <i>Hirtella parviunguis</i> Prance                                   | E        | Chrysobalanaceae |
| <i>Hirtella santosii</i> Prance                                      | E        | Chrysobalanaceae |
| <i>Ipomoea carajaensis</i> D.Austin                                  | E        | Convolvulaceae   |
| <i>Ipomoea cavaleantei</i> D.Austin                                  | E        | Convolvulaceae   |
| <i>Jacquinia brasiliensis</i> Mez                                    | V        | Theophrastaceae  |
| <i>Laelia fidelensis</i> Pabst.                                      | K        | Orchidaceae      |
| <i>Laelia grandis</i> Lindl. & Paxt.                                 | E        | Orchidaceae      |
| <i>Laelia jongheana</i> Reichbach                                    | V        | Orchidaceae      |
| <i>Laelia lobata</i> (Lindl.) Veitch                                 | E        | Orchidaceae      |
| <i>Laelia perrinii</i> (Lindl.) Paxt.                                | E        | Orchidaceae      |
| <i>Laelia tenebrosa</i> Rolfe  | E        | Orchidaceae      |
| <i>Laelia virens</i> Lindl.  | R        | Orchidaceae      |
| <i>Laelia xanthina</i> Lindl.  | E        | Orchidaceae      |
| <i>Lavoisiera itambana</i> DC.                                       | R        | Melastomataceae  |
| <i>Licania aracaensis</i> Prance                                     | R        | Chrysobalanaceae |
| <i>Licania bellingtonii</i> Prance                                   | E        | Chrysobalanaceae |
| <i>Licania indurata</i> Pilger                                       | E        | Chrysobalanaceae |
| <i>Lomatozona artemisaefolia</i> Baker                               | R        | Compositae       |
| <i>Lychnophora ericoides</i> Mart.                                   | V        | Compositae       |
| <i>Melanoxylon brauna</i> Schott.                                    | V        | Leguminosae      |
| <i>Mollinedia gilgiana</i> Perkins                                   | R        | Monimiaceae      |
| <i>Mollinedia glabra</i> (Sprengel) Perkins                          | V        | Monimiaceae      |
| <i>Mollinedia lamprophylla</i> Perkins                               | E        | Monimiaceae      |
| <i>Mollinedia longicuspidata</i> Perkins                             | R        | Monimiaceae      |
| <i>Mollinedia stenophylla</i> Perkins                                | E        | Monimiaceae      |
| <i>Ocotea basicordatifolia</i> Vattimo                               | R        | Lauraceae        |
| <i>Ocotea catharinenais</i> Mez                                      | V        | Lauraceae        |
| <i>Ocotea cymbanum</i> H.B.K.  | V        | Lauraceae        |
| <i>Ocotea langsdorffii</i> Mez                                       | V        | Lauraceae        |
| <i>Ocotea porosa</i> (Nees) Angely                                   | V        | Lauraceae        |
| <i>Ocotea pretiosa</i> (Nees) Mez                                    | E        | Lauraceae        |
| <i>Parinari brasiliensis</i> (Schott) Hook                           | R        | Chrysobalanaceae |
| <i>Pavonia alnifolia</i> St.Kl.                                      | V        | Malvaceae        |
| <i>Phyllanthus gladiatus</i> Muell.Arg.                              | E        | Euphorbiaceae    |
| <i>Pilocarpus jaborandi</i> Holmes                                   | E        | Rutaceae         |
| <i>Pilocarpus microphyllus</i> Stapf.ex Wardl.                       | E        | Rutaceae         |
| <i>Pilocarpus trachylophus</i> Holmes                                | E        | Rutaceae         |

## Box 2-2 (continued)

## Endangered or rare Brazilian plant species

## IBAMA Edict No. 06/92

| Species Category | Family   |   |                |
|------------------|--|---|----------------|
|                  | <i>Pithecellobium racemosum</i> Ducke                                      | V | Leguminosae    |
|                  | <i>Pouteria psamophila</i> var. <i>xestophylla</i> (Miq. et Eichl.) Baehni | V | Sapotaceae     |
|                  | <i>Prepusa hookeriana</i> Gardner  | E | Gentianaceae   |
|                  | <i>Schinopsis brasiliensis</i> Engl.                                       | V | Anacardiaceae  |
|                  | <i>Simaba floribunda</i> St.Hil.   | * | Simaroubaceae  |
|                  | <i>Simaba suaveolens</i> St.Hil.   | * | Simaroubaceae  |
|                  | <i>Swartzia glazioviana</i> (Taubert) Glaziou                              | E | Leguminosae    |
|                  | <i>Swietenia macrophylla</i> King  | E | Meliaceae      |
|                  | <i>Torresea aereana</i> Ducke  | V | Leguminosae    |
|                  | <i>Virola surinamensis</i> Warb  | V | Myristicaceae  |
|                  | <i>Vouacapoua americana</i> Aubl.  | E | Leguminosae    |
|                  | <i>Vriesia biguassuensis</i> Reitz   | I | Bromeliaceae   |
|                  | <i>Vriesia brusquensis</i> Reitz   | R | Bromeliaceae   |
|                  | <i>Vriesia muelleri</i> Mez  | R | Bromeliaceae   |
|                  | <i>Vriesia pinottii</i> Reitz  | E | Bromeliaceae   |
|                  | <i>Vriesia triangularis</i> Reitz  | I | Bromeliaceae   |
|                  | <i>Worsleya rayneri</i> (Hook.) Traub.& Moldenke                           | E | Amaryllidaceae |

CATEGORIES: \* = Probably extinct, E = Endangered, V = Vulnerable, R = Rare, I = Indeterminate, K = Insufficiently known.

**Box 2-3**

**Legal framework for the establishment of different categories of Protected Areas in Brazil.**

| <b>Instrument</b>        | <b>Date</b> | <b>Article</b>                               | <b>Categories involved</b>                             | <b>Category</b>         | <b>Subject</b>   |
|--------------------------|-------------|--|--|-------------------------|--|
| Federal Constitution     | 1988        | 255, para. 1, clauses I, II & III            | All  | Direct and indirect use | Preservation of samples of ecosystems  |
| Law N° 4.771 Forest Code | 15/9/65     | 5, line a                                    | National, State & Municipal Parks, Biological Reserves | Indirect use            | To safeguard exceptional natural attributes and for scientific purposes                                    |
| Law N° 4.771 Forest Code | 15/9/65     | 5, line b                                    | National, State & Municipal Forests                    | Direct use              | For economic, social and technical purposes  |
| Law N° 5.197 species     | 30/1/67     | 5, line a                                    | National, State & Municipal Biological Reserves        | Indirect use            | Prohibits hunting, use, and the introduction of flora and fauna, except for scientific activities.         |
| Faunal Protection Law    | 21/09/79    | 1, para. 1,2 & 3                             | National parks   | Indirect use            | Regulates and establishes norms  |
| Decree N° 84.017         | 27/4/81     | 1, para. 1,2 & 3                             | Ecological Stations                                    | Indirect Use            | Establishes ESECS <sup>1</sup> , promotes environmental protection, research and education                 |
| Law N° 6.902             | 27/4/81     | 9, lines a, b & c                            | Environmental Protection Areas                         | Direct use              | Establishes norms, limiting or prohibiting activities  |
| Decree N° 99.274         | 6/6/90      | 30   | Ecological Stations                                    | Indirect use            | Regulates ESECS <sup>1</sup> , subordinates activities that may harm the biota in the surrounding areas to |
| CONAMA <sup>2</sup>      |             |  |  |                         |  |
| Decree N° 89.336         | 31/1/84     | 1  | Ecological Reserves                                    | Indirect use            | Areas of Permanent preservation cited in Art. 18 of Law N° 6.939 of 31/1/81                                |
| Decree N° 89.336         | 31/1/84     | 2  | Areas of Relevant Ecological Interest                  | Direct use              | For the protection of rare examples of the regional biota  |
| Law N° 7.804             | 18/7/89     | 9, clause VI                                 | Extractivist Reserves                                  | Direct use              | Establishes extractivist reserves and the exploitation of natural resources on a sustainable basis         |
| Decree N° 98.897         | 30/1/90     | 1,2 & 3                                      | Extractivist Reserves                                  | Direct use              | Regulates Extractivist Reserves  |
| Decree N° 1.298          | 27/10/94    | 1, clauses I, II & III; 2, lines a, b, c & d | National Forests                                       | National Forests        | Direct use Regulates National Forests  |
| Decree N° 1.922          | 5/6/96      |  | Private Natural Heritage Reserves                      |                         | Indirect use Sets out provisions for the recognition of RPPNs <sup>3</sup>                                 |

Source: Soavinski, R.J. 1997. Sistema Nacional de Unidades de Conservação: Legislação e Política. IBAMA, Brasília.

<sup>1</sup> ESEC - Ecological Station; <sup>2</sup> CONAMA - National Council of the Environment; <sup>3</sup>RPPN - Private Natural Heritage Reserve

#### Box 2-4

### The National System of Protected Areas

The first attempt to establish conservation areas in this country dates from 1861 with the establishment of the Tijuca and Paineiras Forest by a Decree of the Ministry of Agriculture, Trade and Public Works on 11th December 1861 and confirmed by Decree No. 577. The first legal protection for this forest, however, was in 1817, with a norm issued by the Prince Regent, Dom João, which declared it “covert,” that is the woods around the sources of the Rios Carioca and Paineiras were given a status equivalent to a protected hunting area (“couto de caça”) for the Royal Household, in order to safeguard the water sources which supplied the then capital of Brazil, Rio de Janeiro. The decree also determined indemnities for the landowners. The forest was later, in 1961, turned into a National Park, the Tijuca National Park.

Another precursor to current initiatives was the creation of the first Park as a protected area in 1896, the Parque Estadual da Cidade (State City Park) in a suburb of the city of São Paulo, now the Cantareira State Park.

The first Forest Code (Código Florestal) for the country was established in 1934. In the same year, the Brazilian Forestry Service (Serviço Florestal) was created. This was the predecessor of the Brazilian Forestry Development Institute (Instituto Brasileiro de Desenvolvimento Florestal - IBDF) set up in 1965 but which was subsequently absorbed by the Brazilian Institute for the Environment and Renewable Natural Resources (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis - IBAMA) in 1989. As a result of the Forest Code, the first National Parks were created, in Itatiaia in 1937, and Iguaçu and Serra dos Orgãos in 1939.

Plans for a coherent national system of protected areas arose, however, only in the second half of the 1970s. This resulted in an important document prepared by IBDF, with technical support from the Food and Agriculture Organization (FAO), the “Analysis of Priorities for the Conservation of Nature in Amazonia,” as part of the Project for Forestry Research and Development (Projeto de Desenvolvimento e Pesquisa Florestal - PRODEPEF). The proposals were based on biogeographical aspects, and resulted in 1979 in the “Plan of the National System of Protected Areas.” In 1982, IBDF published the “Plan of the System of Protected Areas in Brazil - 2nd Stage,” prepared in collaboration with the Brazilian Foundation for the Conservation of Nature (Fundação Brasileira para a Conservação da Natureza - FBCN); a detailed and well-grounded plan which laid the foundations for the major advances observed in Brazil in this respect in the 1980s. Also in the 70s and 80s, the Programme of Ecological Stations, co-ordinated by the Special Secretariat for the Environment (Secretaria Especial do Meio Ambiente - SEMA) (also absorbed by IBAMA in 1989) contributed greatly to the expansion and consolidation of a system of protected areas in the country.

In 1989, IBAMA requested the Fundação Pró-Natureza (FUNATURA) to prepare the first version of a draft law for the “National System of Protected Areas” (Sistema Nacional de Unidades de Conservação - SNUC). After long and lengthy discussions with IBAMA and the National Environment Council (Conselho Nacional do Meio Ambiente - CONAMA), a revised version was sent to congress in 1992 in the form of Draft Law No. 2.892. A process of extensive consultation with society was subsequently co-ordinated by the Commission for the Defence of the Consumer, the Environment and Minorities (Comissão de Defesa do Consumidor, Meio Ambiente e Minorias) of the Chamber of Deputies, stimulating discussion on various aspects, in particular the relations between Protected Areas and traditional and indigenous local communities.

An amended Draft Law was drawn up in 1996 in the National Congress, and is under discussion to this day. It proposes a new paradigm for protected areas, based on four general principles:

- Protected areas should be an integral part of regional socio-economic development planning;
- The creation of protected areas should be preceded by studies and consultations with the communities affected;
- The management of protected areas should be participative, and include all parties involved in the conservation of the national patrimony and its sustainable use;
- The involvement of private enterprise, as well as the landowners surrounding protected areas, is indispensable for the financial and administrative aspects and to ensure the viability of the protected areas.

The amendment under discussion provides for a number of categories of protected areas:

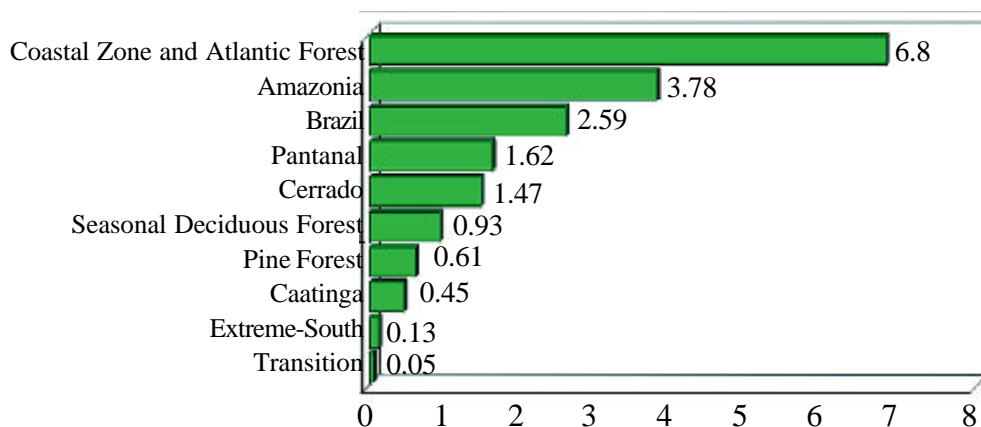
- Of indirect use (strict protection): Ecological Stations, National Parks, Natural Monuments, Wildlife Sanctuaries, and Private Natural Heritage Reserves;

**Box 2-4 (contd.)**

**The National System of Protected Areas**

- Direct use: Environmental Protection Areas, National Forests, Extractivist Reserves, Wildlife Reserves, Water-Producing Reserves, Biosphere Reserves;
- Provisional management (until technical and scientific studies suggest a better destination).

The amendment also proposes the category of Areas of Relevant Ecological Interest (ARIE) (already regulated under Decree No. 89.336, 31st January 1984), Cultural Ecological Reserves and Integrated Ecological Reserves (mosaics), all of which maintain private ownership and provide for the sustainable use of resources. It proposes a mechanism for provisional administrative interdiction for two years, (renewable for two more years) of important natural areas under threat of degradation, in order to allow for the definition of the most appropriate measures for their protection.



**Figure 2-36.** Percentages of the area of each of the Brazilian ecosystems, and of Brazil, in protected areas of indirect use (strictly protected).

**Sources:** Marino (1997), PNMA (1997).

