

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Twelfth meeting of the Conference of the Parties
Santiago (Chile), 3-15 November 2002

Strategic and administrative matters

Committee reports and recommendations

NOMENCLATURE COMMITTEE REPORT

Introduction

1. At its 10th meeting (Harare, 1997), the Conference of the Parties appointed Dr Marinus S. Hoogmoed, National Museum of Natural History, Leiden, the Netherlands, as the zoologist of the Nomenclature Committee (NC), and Mr Noel McGough, Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland as its botanist. At the 11th meeting of the Conference of the Parties (CoP11, Gigiri, 2000), they were reappointed. They carried out their duties as specified in Resolution Conf. 11.1 on the Establishment of Committees, and as directed in Decisions 11.119 regarding the work programme and 11.120 regarding nomenclature of amphibian species.
2. The NC would like to take this opportunity to invite Parties again to make suggestions for the names and field of competence of specialists who could provide input in fulfilling the responsibilities assigned to the NC by the Parties.
3. This report is presented in three parts: an introduction, fauna nomenclature and flora nomenclature. Each part covers the main activities since CoP11, including notable enquiries received since CoP11, the proposed work programme for the next period and a proposed operating budget.
4. Recommendations of the NC, calling for decisions of the Conference of the Parties (CoP), are included in Annexes 1, 2 and 3 to this document.
5. The NC will continue to provide timely services to the Parties and the Secretariat, including: responding to enquiries regarding the nomenclature of taxa listed in the Appendices; designating appropriate taxonomic authorities for the nomenclature of taxa listed in the Appendices that are not included in standard references that have been adopted by the Parties; reviewing the nomenclature of the taxa that have been listed in the Appendices, in consultation with the Secretariat; reviewing the nomenclature of species proposed for listing in the Appendices prior to their consideration at the meetings of the Conference of the Parties; and advising the Secretariat of recommended changes in the nomenclature that should be used in the Appendices.

Fauna nomenclature

6. The zoologist of the NC convened meetings on the nomenclature of fauna on 12 December 2000, on 31 July and 2 August 2001, and on 9 April 2002 in conjunction with the 16th, 17th and 18th meetings of the Animals Committee (Shepherdstown, 11-15 December 2000; Hanoi, 30 July-3 August 2001, and San José, 8-12 April 2002). The zoologist of the NC, a small number of scientists and observers interested in nomenclature matters, and the Secretariat attended these meetings. In Hanoi (spread over two sessions) and San José, 10 to 15 people participated in the debates, which may indicate an

increased interest in nomenclature and taxonomic issues. The zoologist of the NC recommends that the agenda for the future meetings of the NC on the nomenclature of fauna be circulated with the agenda of meetings of the Animals Committee.

7. Germany announced to the NC that it had provided funding for a review of the taxonomy and subspecies of *Ovis vignei*, based on a DNA analysis, and the NC will consider the results of this review in due course.
8. A number of new species of mammals were described recently that belong to taxonomic groups that are entirely included in the Appendices. The scientific names and the references of these species are listed in Annex 1, and should be considered as additions to the main reference for mammals (Wilson and Reeder, 1993).
9. Considering that the new series, *Handbook of the Brds of the World*, edited by J. del Hoyo, Lynx Edicions, provides a concise update of the present knowledge of species of Psittaciformes and Trochilidae, the NC proposes to adopt *Handbook of the Birds of the World* (1997) 4: 246 – 477 (Psittaciformes) and *Handbook of the Birds of the World* (1999) 5: 468-680 (Trochilidae) as standard references for these taxa, and thus replacing the current one (Sibley and Monroe, 1990).
10. A number of new species of birds were described that belong to taxonomic groups that are included in the Appendices. The scientific names and the references of these species are listed in Annex 1 and should be considered additions to the main standard reference for birds (Sibley and Monroe, 1990).
11. The standard reference for turtles, tortoises, crocodiles and tuataras (Wermuth and Mertens, 1996) is somewhat complicated to use and recently a layout problem was noted that affects the presentation of several taxa in the Annex updating the original publication. The zoologist of the NC therefore offered to produce a clear list of valid scientific names, but was unable to complete this task until now. It was noted that in this standard reference, *Crocodylus mindorensis* is considered a valid species. In order to address this, the name *Crocodylus novaeguineae mindorensis* in Appendix I has to be changed into *Crocodylus mindorensis*, and the annotation = 399 has to be removed (See Annex 1).
12. Dr D. Broadley of Zimbabwe was contracted by the Secretariat to develop a checklist of the taxonomy and nomenclature of the genus *Cordylus*. At the time of writing of this report, Dr Broadley had submitted the first draft of this checklist to the Secretariat. It is expected that a final checklist will be available to the Parties at the 12th meeting of the Conference of the Parties (CoP12), and the NC recommends the adoption of this checklist as a standard reference (see Annex 1).
13. To address the rather dynamic taxonomy and nomenclature of Varanidae, Dr W. Böhme of Germany, a specialist of this taxon, was contracted by the Secretariat to produce a checklist. The NC reviewed and discussed a draft checklist (see document CoP12 Inf. 6), and comments will be relayed to the author. The checklist will be published in a Dutch scientific journal (*Zoologische Verhandelingen Leiden*), and copies will be made available to Parties. The NC recommends the adoption of this checklist as the standard reference for Varanidae (see Annex 1).
14. The NC discussed the taxonomy of Colubridae and Elapidae in view of the publication of the first volume of *Snake species of the world: A Taxonomic and Geographic Reference* (Campbell, McDiarmid and Touré, 1999), the standard reference for snakes adopted at CoP11. The volume covers only a small number of species (two more volumes are scheduled), and does not include the families Colubridae and Elapidae. The NC had therefore suggested to contract a consultant to develop a checklist for the species concerned. However, the number of CITES-listed species is small, and the problematic taxonomy of *Naja naja* has been addressed separately (see paragraph 16). The NC therefore concludes that a consultancy for developing checklists of Colubridae and Elapidae is no longer warranted.
15. The NC noted the recent publication *Systematics of pythons of the Morelia amethystina complex (Serpentes: Boidae) with the description of three new species* (Harvey, M.B., D.G. Barker,

L.K. Ammerman, and P.T. Chippindale, 2000. *Herpetological Monographs* 14: 139-185), revising the taxonomy of known populations of *Morelia amethystina* and describing three new species in this genus and elevating a subspecies to specific rank. The NC proposes to add this publication to the standard reference for snakes (see Annex 1). The NC concluded that when the revision of the taxonomy or nomenclature of a species or a group of species results in the description or recognition of one or more new species in addition to or replacing the previously known species, Parties should continue to use the species names provided in the standard references until the new species names are adopted by the CoP.

16. Regarding *Naja naja*, it was decided to adopt *Taxonomic change and toxinology: Systematic revisions of the Asiatic Cobras (Naja naja species complex)* (Wüster, W., 1996, *Toxicon* 34(4): 339-406) and *A new cobra (Elapidae: Naja) for Myanmar* (Slowinski, J.B. and W. Wüster, 2000, *Herpetologica* 56: 257-270) as the combined standard reference for this taxon (see Annex 1).
17. Several new species of other groups of reptiles were described recently that belong to taxonomic groups that are included in the Appendices. The scientific names and the references of these species are listed in Annex 1 and should be considered as additions to the main standard references for reptiles. In one instance, it is proposed to change the name of a species currently included in the Appendices: on the basis of literature and studies of the type specimens, Massary and Hoogmoed [2001. *Crocodylus amazonicus* Spix, 1825: The valid name for *Crocodylus lacertinus auctorum* (nec Daudin, 1802) (Squamata: Teiidae). *Journal of Herpetology* 35(2): 353 - 357)] concluded that the name of the lizard *Crocodylus lacertinus* should be replaced by *Crocodylus amazonicus* Spix, 1825.
18. At its meeting in April 2002, the NC reviewed an abbreviated printout of the standard reference *Amphibian Species of the World* by Dr Frost, as instructed under Decision 11.120. After having made some minor corrections (which were communicated to Dr Frost) and advised about its layout, the NC adopted the checklist. In compliance with Decision 11.167, the Secretariat will, through a Notification to the Parties, announce the accepted standard reference for amphibians valid as from the date of distribution of the Notification, and with the Notification provide the pertinent pages regarding CITES-listed species of amphibians.
19. The Scientific Authority of Viet Nam requested clarification about the name of the common frog exported from the country. The zoologist of the NC advised that the species concerned is *Hoplobatrachus rugulosus*, and that *Hoplobatrachus tigerinus* (included in Appendix II) does not occur in Viet Nam.
20. It was brought to the attention of the NC that *Pandinus imperator* only occurs in some West African countries but that the CITES database for this species also includes East African countries. The NC advises that the database be changed according to the data provided in *Catalog of the Scorpions of the World* (Fet et al., 2000).
21. The coral working group of the Animals Committee agreed on a suitable standard reference for coral species, but indicated that this checklist contains several errors, which the authors were amending. The NC therefore will wait for an improved version before recommending the adoption of a standard reference for corals. However, the NC noted that the order Coenothecalia Bourne, 1893 (Cnidaria: Anthozoa) is more correctly known as Helioporacea Bock, 1938 (S. P. Parker, 1982 *Synopsis and Classification of Living Organisms*; G. C. Williams & S. D. Cairns, 2002 *Systematic List of Valid Octocoral Genera*, www.calacademy.org/research/izg/OCTOCLASS.htm) and that this order comprises two families: Helioporidae Moseley, 1876 and Lithotelestidae Bayer & Muzik, 1977. The listing in CITES Appendix II of COENOTHECALIA spp. has an annotation: 'Includes only the family Helioporidae with one species *Heliopora coerulea*', but this has overlooked the existence of the Lithotelestidae. It is proposed to replace COENOTHECALIA spp. in Appendix II by Helioporidae spp. (see Annex 1).
22. The NC noted that Parties do not always use the scientific names provided in the adopted standard references. The NC recognized that not all accepted standard references might be available to Management Authorities, that some references are very difficult to obtain, and that information on the

nomenclature of CITES-listed species remains scattered for certain groups or has become complex owing to the reference to various scientific publications. The *Checklist of CITES species* (UNEP World Conservation Monitoring Centre, 2001), produced under contract with the Secretariat, is considered to be a very useful tool to address this problem. This checklist is updated after each meeting of the CoP, and fully reflects the standard references adopted by the CoP. The NC therefore recommends that Parties, in case of doubt, follow the nomenclature followed in this Checklist (see Annex 1). The Checklist was provided free of charge as a publication and on a CD-ROM to all Parties and the information is also contained in the species database on the website of the Secretariat and of UNEP-WCMC. The NC advises that changes to existing standard references due to new taxonomic interpretations should be submitted to the CoP and, after adoption, be included in the Checklist. The NC notes however that the adoption of this approach would have serious implications for its workload, and that under the current limited composition and with negligible resources, it will be difficult to accomplish this new task within the time-frames provided by the Convention.

23. The NC discussed the need to adapt the Appendices to new taxonomic findings. On the one hand it was felt that much useful information on trade in newly described species would be lost if Parties were to stick too rigidly to outdated taxonomic publications, and that the scientific integrity of the Convention could be contested by both scientists and administrators. On the other hand, it was also recognized that frequent changes in nomenclature could lead to misunderstandings between Parties. Furthermore, new scientific names in the Appendices have to be reflected in legislative texts, official documents and other published materials, computerized data files, etc., and may therefore have wide-ranging practical implications. Too many amendments to the CITES nomenclature and taxonomy could therefore impact on the implementation of the Convention. The NC therefore concluded that it is preferable to remain pragmatic and realistic when considering amending names of taxa, to maintain stability in nomenclature, and to keep the enforcement and implementation aspects in mind when changes are proposed for adoption by the CoP.
24. There was consensus to recommend that Parties be advised not to accept permits and certificates, and for the Secretariat not to accept quotas, unless species names are provided in accordance with the adopted standard references.
25. It was noted by the NC that recent research on phylogenetic relationships between the main groups of vertebrates resulted in noteworthy changes in classification, thereby modifying the previous common understanding of taxonomic groups and their main classes. To avoid that the Appendices of CITES become incomprehensible to the layman, the NC believes that it is best to be pragmatic and to continue following the current concepts of the groups, i.e. mammals (Mammalia), birds (Aves), reptiles (Reptilia) and amphibians (Amphibia), although that not all correspond to current scientific knowledge. It may be noted that the formerly used 'Pisces', referring to all fish, is scientifically no longer recognized as such, and that fish species are now divided into five classes: Myxini, Cephalaspidomorphi, Elasmobranchii, Holocephali and Actinopterygii (W.N. Eschmeyer, 1998 *Catalog of Fishes*).
26. The NC noted that especially among mammals and birds, many subspecies have recently been elevated to specific rank by some authors. This is often based on DNA research, but may also be proposed for other (non-taxonomic) reasons. As long as the validity of such amendments to the taxonomic status is under discussion within the scientific community, the NC advises not to adopt these changes (see also paragraph 27).

Notable enquiries

27. Zimbabwe inquired about *Loxodonta africana* and the possible new species *Loxodonta cyclotis*. The forest elephant, generally known as *Loxodonta africana cyclotis*, was recently proposed to be elevated to become a full species. The NC briefly discussed this matter, but concluded that for CITES, the status quo is maintained and that *L. africana cyclotis* remains a subspecies of *L. africana* in view of the fact that specialists are not yet unanimous in their evaluation of the proposed taxonomic revision.

28. At the request of the Secretariat, the NC addressed the treatment of *Equus asinus* versus *E. africanus* because there was confusion about the name to be used for the wild and for the domestic form. The matter became urgent because glue made of the hide of domestic donkeys was exported under the name *E. africanus*, listed in Appendix I, and had therefore been refused by some importing countries. It was noted that some confusion was created by the standard reference for mammals (Wilson and Reeder, 1993) in this regard. The NC proposes to resolve this matter by recommending an amendment to annotation = 336 concerning *E. africanus* as follows: "Excludes the domesticated form of *Equus africanus* referenced as *Equus asinus*" (see Annex 1).
29. At the request of South Africa, the NC provided an explanation about the scope of the Appendix-III listing by Ghana of *Damaliscus lunatus*. It was noted that the species contains five subspecies, of which only *D. l. korrigum* occurs in Ghana. As Ghana listed the species name, the entire species was listed in Appendix III, although that this may not have been Ghana's intent. The Secretariat, on behalf of the NC, is in the process of consulting with Ghana concerning this listing.
30. The NC was consulted by the Secretariat concerning a question from Italy about the validity of the name *Ovis ammon dalailamae*. Italy was informed through the Secretariat that this name was a synonym of *O. a. hodgsoni*, included in Appendix I.
31. There was broad consensus amongst representatives of Parties attending a meeting for European CITES authorities in Bonn, Germany, that controlling trade in captive-bred colour mutants (of mainly birds and reptiles) that differ substantially from the wild original forms was of no conservation value or importance to wild populations of these species. Switzerland therefore asked the NC whether colour forms and mutants of commonly-bred specimens of CITES-listed species could be differentiated from wild forms using distinct scientific names. The NC clarified that in many instances, this would not be possible and advised that the matter should best be resolved through an annotation of the Appendices, and particularly of annotation °602 (see document CoP12 Prop. 1).
32. At the request of the United States of America the NC looked into the nomenclature of *Gallicolumba luzonica*, listed in Appendix II since 1975, to determine whether *G. criniger* should be considered part of that taxon or not. Although at the time of listing there may have been differing opinions on the taxonomic status of *G. luzonica*, the Committee concluded that the current listing cannot be interpreted to refer to other *Gallicolumba* species. The Secretariat agreed to write to the sole range State of this taxon (Philippines) and to explain the matter.
33. The Secretariat, at the request of South Africa, asked the zoologist of the NC for advice on the use of the scientific name *Pyrrhura thodogaster* on export documents. The taxonomy, and consequently the nomenclature, of some species in the genus were recently changed. Although aware of these changes, South Africa has continued using the scientific names contained in the standard reference, but Malaysia has refused to accept export documents because of the names used. The NC pointed out that as long as the standard reference for birds has not changed, the current nomenclature for this species should be used on all CITES permits and certificates, in accordance with Annex 1 of Resolution Conf. 10.2 (Rev.).
34. At the request of the Secretariat, the zoologist of the NC verified the scientific names that were used in the proposals to amend the Appendices that are to be submitted at CoP12.

Future work of the Committee

35. A discussion document provided by Mr Tim Inskipp of UNEP-WCMC and listing newly described species and changes in nomenclature status of a number of taxa, is currently under review by the NC. It seems useful that the NC prepares and evaluates a document for each of its meetings, and presents the result to the CoP for adoption. The Secretariat should liaise with UNEP-WCMC in this regard.
36. No standard references have been adopted yet for the frequently traded lizards of the genera *Phelsuma* (Gekkonidae) and *Uromastyx* (Agamidae), both of which are included in the Appendices of CITES.

Several new species have recently been described in the genera *Phelsuma* (Gekkonidae) and *Uromastyx* (Agamidae): *Phelsuma hielscheri* Rösler, Obst & Seipp, 2001 (Zool. Abh. Staatl. Mus. Tierk. Dresden 51: 51-60); *P. malamakibo* Nussbaum, Raxworthy, Raselimanana & Ramanamanjato, 2000 (Copeia 2000 (3): 763-770); *Uromastyx alfredschmidti* Wilms & Böhme, 2001 (Zool. Abh. Staatl. Mus. Tierk. Dresden 51: 73-104); *U. flavifasciata* Mateo, Geniez & Lopez, 1998 and *U. occidentalis* Mateo, Geniez & Lopez, 1998 (Rev. Esp. Herpet. 12: 97-109); *U. leptieni* Wilms & Böhme, 2000 (Herpetozoa 13: 133-148). The NC, with regard to the nomenclature of fauna, therefore intends to have standard reference checklists developed for the lizard genera *Phelsuma* and *Uromastyx*.

37. The zoologist of the NC should develop a clear list of species mentioned in the standard reference for turtles, tortoises, crocodiles and tuataras (Wermuth and Mertens, 1996), taking into account the original text, the text in the tables updating the original text and any additional references adopted by the Conference of Parties. This list could then be distributed by the Secretariat through a Notification to the Parties.

Budget

38. The NC proposes a budget of USD 58,000 for the period between CoP12 and CoP13 to cover expenditures related to its activities concerning the nomenclature of fauna, and particularly those referred to in paragraph 35 and 36.

Project/Year	2003	2004	2005	Total
<i>Phelsuma</i>	USD 5,000	USD 5,000		USD 10,000
<i>Uromastyx</i>	USD 8,000			USD 8,000
Publication support; Database maintenance by WCMC		USD 5,000	USD 5,000	USD 10,000
Preparation of updates for new species	USD 10 000	USD 10,000	USD 10,000	USD 30,000
Total	USD 23,000	USD 20,000	USD 15,000	USD 58,000

Acknowledgements

39. The NC is grateful to Mr Tim Inskipp, who was always prepared to provide advice, and who was instrumental in providing discussion documents concerning standard nomenclature and how to treat newly described taxa.

Flora nomenclature

40. Nomenclature matters concerning flora were discussed in association with the 10th, 11th and 12th meetings of the Plants Committee (PC10, Shepherdstown, 11-15 December 2000; PC11, Langkawi, 3-7 September 2001; and PC12, Leiden, 13-17 May 2002). In future, the agenda for the NC meetings on the nomenclature of flora will be circulated with the agenda of meetings of the Plants Committee.

Status of checklists

41. The following CITES Orchid Checklists were compiled by the Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland, and accepted by the NC as a guideline when making reference to the names of species of:
- Cattleya*, *Cypripedium*, *Laelia*, *Paphiopedilum*, *Phalaenopsis*, *Phragmipedium*, *Pleione* and *Sophranitis* (Volume 1, published in 1995);
 - Cymbidium*, *Dendrobium*, *Disa*, *Dracula* and *Encyclia* (Volume 2, published in 1997);

- c) *Aerangis*, *Angraecum*, *Ascocentrum*, *Bletilla*, *Brassavola*, *Calanthe*, *Catasetum*, *Miltonia* and *Miltoniopsis*, *Renanthera*, *Rhynchostylis*, *Rossioglossum*, *Vanda* and *Vandopsis* (Volume 3, published in 2001); and
 - d) *Aerides*, *Coelogyne*, *Compartmentia*, *Lycaste* and *Masdevallia* (Volume 4, in preparation).
42. The NC recommends that Volume 3 of the CITES Orchid Checklist series, covering *Aerangis*, *Angraecum*, *Ascocentrum*, *Bletilla*, *Brassavola*, *Calanthe*, *Catasetum*, *Miltonia* and *Miltoniopsis*, *Renanthera*, *Rhynchostylis*, *Rossioglossum*, *Vanda* and *Vandopsis* be adopted as a standard reference to the names of the orchid genera concerned (see Annex 1).
43. A CITES checklist for *Aloe* and *Pachypodium* (Apocynaceae), compiled by the Städtische Sukkulentensammlung, Zürich, Switzerland, in collaboration with the Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland, was published in 2001. The NC proposes to adopt this publication as standard reference for the species concerned (see Annex 1).
44. A CITES checklist for carnivorous plants was compiled by members of the IUCN/SSC Carnivorous Plant Specialist Group and published in 2001. The NC proposes to adopt this publication as standard reference for the species concerned (see Annex 1).

Notable enquiries

Cactaceae

45. During recent years, an increase in the trade of nopal as well as several other preparations made from parts and derivatives of *Opuntia* spp. has been noticed:
- a) Two species, namely *Opuntia streptacantha* and *O. ficus-indica*, are mainly used.
 - b) The interpretation of Appendix I and II, annotation #4 e), stipulates that "separate stem joints (pads) and parts and derivatives thereof of naturalized or artificially propagated plants of the genus *Opuntia* subgenus *Opuntia*" are exempted from the provisions of the Convention.
 - c) However, there is no clear definition of which species are actually listed in the subgenus *Opuntia*. There are over 300 *Opuntia* species and more than 900 names can be found in the literature. Different taxonomic opinions are found in the literature. The species mentioned in paragraph a) above are clearly part of this subgenus.
46. The representative and the alternate representative for North America on the Plants Committee have cooperated to review the present lists available for the subgenus *Opuntia*. The list will be further reviewed and finalized and, when approved by the NC, either incorporated in a revised Cactus Checklist or, if necessary, proposed for adoption as a separate checklist at CoP13.

Valerianaceae: *Nardostachys grandiflora*

47. This species was included in Appendix II in 1997. The proposal put forward by India included the synonyms *Valeriana jatamans* sensu D. Don, *Patrinia jatamanis* D. Don, *Fedia grandiflora* Wall., *Nardostachys jatamansi* DC. and *Nardostachys gracilis* Kitamura.
48. The homonym *Valeriana jatamans* sensu D. Don has caused some confusion as regard to what is included in *Nardostachys grandiflora*, and is a misapplied name. There is no indication in the proposal that the intent was to regulate trade in *Valeriana jatamasi* Jones, which is mentioned in the proposal but only as a similar species.

49. The original intent of the proposal was to regulate trade in *Nardostachys grandiflora* and its accepted synonyms, which does not include *Valeriana*. The NC recommends clarifying this with a note in paragraph 10 of the interpretation of Appendices I and II (see Annex 1 for recommended wording).

Scrophulariaceae: *Picrorhiza kurrooa*

50. *Picrorhiza kurrooa* was included in Appendix II in 1997. The proposal put forward by India included no synonyms.
51. *Picrorhiza scrophulariiflora* is considered to be a synonym of this species in Nepal and China. Some authors however consider *Picrorhiza scrophulariiflora* to be a separate species.
52. The original intent of the proposal was to regulate trade in *Picrorhiza kurrooa*. In fact the original proposal treated *Picrorhiza scrophulariiflora* as a similar species and noted characters by which the two could be distinguished. The NC recommends clarifying this with a note in paragraph 10 of the interpretation of Appendices I and II (see Annex 1 for recommended wording).

Taxaceae: *Taxus wallichiana*

53. India proposed *Taxus wallichiana* for inclusion in Appendix II at the ninth meeting of the Conference of the Parties in 1994. The proposal mentioned as scientific synonyms '*Taxus baccata sensu* Hook. F. 1888. Auct non L. and *Taxus baccata* L. ssp. *wallichiana* (Zucc.) Pilger'.
54. The taxonomy and nomenclature of the genus is subject to some confusion and gives rise to problems in the interpretation of the listing. The problems relating to the taxonomy of *Taxus* are under review at present by a number of experts.
55. To assist Parties in implementing the listing it is important to clarify the original intent of the listing proposal. Until a full review of the taxon becomes available, the NC therefore proposes to use a standard reference that meets the original intent of the listing.
56. There is no taxonomic consensus with regard to the validity of *Taxus wallichiana*. Reference to the original proposal does not clarify the full intent of the listing. The information in the proposal and a review of the literature available at the time suggest that the intent of the proposal is nearest to the conservative approach adopted in the *World Checklist and Bibliography of Conifers* by Farjon (2001, second edition). Farjon does include *T. yunnanensis* as a synonym and it is not clear whether this was the intent of the original listing. Based on available information, the NC recommends that Farjon (2001) and its updates be used as the standard reference for CITES (see document CoP12 Inf. 7 and Annex 1).

Cedrela odorata

57. This subject was referred to the NC by the Management Authority of Argentina because it felt that the taxonomy of the genus was not clear. There was no consensus on whether the species *Cedrela odorata* occurred in Argentina, or whether it might be another species (*C. angustifolia*).
- a) Zuloaga and Morrone (1999, *Catálogo de plantas vasculares de la República Argentina*), following the classification by Pennington, Styles & Taylor (1981, *Flora Neotropica Monograph* No 28, Meliaceae, 459 pp) indicate that *C. lilloi*, *C. fissilis* and *C. odorata* occur in the northwest of Argentina. This revision, probably the most complete one, of the distribution of *Cedrela* is exclusively based on herbarium material from this region (Bolivia, Argentina, Paraguay and the south of Brazil).
- b) Pennington *et al.* noted that *C. angustifolia* is not a very well known entity, and that previous authors considered it as being close to *C. odorata* or *C. fissilis*.

- c) Digilio and Legname (1966. *Los árboles indígenas de la provincia de Tucumán. Opera Lilloana XV*) recognize only the entity *C. lilloi* as occurring in Tucumán, and consider *C. angustifolia* and *C. lilloi* to occur in the northern part of las yungas.
- d) Smith (1960. *A Revision of Cedrela, Meliaceae*) and the Commonwealth Forestry Institute 1980 (*Progress with provenance exploration and seed collection of Cedrela spp.*, C.E. Chaplin) regard *C. angustifolia* as a separate species.
- e) The botanist of the NC consulted Mr Pennington on the subject who noted that, as far as he was aware, only three species occur in Argentina, namely *C. odorata*, *C. fissilis* and *C. lilloi*, the latter confined to altitudes above 1,000 m. He also indicated that the name *C. angustifolia* could be safely ignored, because it refers to a plant described from Mexico. In the unlikely event that it can be proved distinct from *C. odorata*, it will be a taxon from the north of Mexico.

The application of the Convention to Fungi

58. At PC10, the application of the Convention to Fungi was briefly discussed, and whether at the time of its negotiation and agreement the term 'flora' was taken to include Fungi. The Chairman of the Plants Committee requested the botanist of the NC to review the situation and to report back at PC11. At PC11, a preliminary review noted that a decision on this matter would be required from the CoP. On that basis, the Secretariat and the botanist of the NC have prepared a review for consideration by the CoP (see Annex 2).

Proposed work plan

59. The work programme for the NC that was proposed to and agreed at CoP11 anticipated Volume 4 of the CITES Orchid Checklist series to be the last to be partly sponsored from the CITES Trust Fund (see Decision 11.119). In addition, Decision 11.119 indicated that it was hoped that the provision of limited seed funding will encourage organizations and institutions to develop, host and maintain websites and transfer checklists to CD-ROMs.
60. The use of CITES funding to encourage Parties, institutions and organizations to sponsor CITES checklists fully or jointly has proved to be very successful. Of the eight checklists published to date, four have been fully funded by sponsors and the remaining four have only required partial funding by CITES. The commitment of some CITES budget funds to CITES plant checklists gives the programme a status that encourages participation and funding by Parties, specialized organizations and institutions. The NC is therefore of the opinion that it is vital to continue funding of the flora nomenclature programme beyond CoP12 to sustain this successful initiative. Withdrawal of CITES funds would discourage outside sponsors.
61. Decision 11.119 required the NC to establish searchable checklists on the World Wide Web. However CITES Parties frequently stress the need to also have such references available as inexpensive hard copies. The CITES checklists whose publication have been funded by the Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland, can be made available free of charge to developing countries in as much as funds can be found to cover postage. This situation can hopefully continue. For the future, it is proposed that seed funding be the target of the budget, looking at encouraging maintenance of databases, continuing the development of websites, and assisting where production and publication would not otherwise be possible. The overall aim is to have inexpensive, user-friendly checklists available to the Parties.

Websites

62. A pdf file of combined CITES Orchid Checklist Volumes 1, 2 and 3 is now accessible on the website www.kew.org. Further checklists will be added as agreements from copyright holders are obtained.

Orchid checklists

63. The Institute of Botany, Vienna, Austria, plans to produce in cooperation with relevant international experts a checklist of the genus *Bulbophyllum* that it will submit to the NC for approval. Some seed funding would be required to allow this checklist to move forward. Volume 4 of the *CITES Orchid Checklists* also remains to be completed.
64. UNEP-WCMC has obtained funding from the European Commission for commencing the checklist production, but not for its publication. Data from the CITES trade database are being used to assess the need for possible additional checklists which might be produced through this mechanism. No CITES funding would be required other than some support for publication.

Cactus checklist

65. The *CITES Cactaceae Checklist* (1999) is probably the most frequently used plant checklist. A significant number of new names are published every year within the *Cactaceae*. However, the cactus volume of the Lexicon is presently being updated and will be published in 2004. This is likely to include over 1,500 new names and some important revisions. However this book is expensive (it is likely to cost more than USD 100), not widely available and daunting to the non-specialist. It is therefore proposed to prepare an update of the *CITES Cactaceae Checklist* in the user friendly CITES format based on the revised Lexicon. Work on this will not commence until the Lexicon is finalized. The revised CITES Checklist would also be included on the web.

Succulent *Euphorbia* checklist

66. A number of new species have been described since the publication of the *CITES Checklist of Succulent Euphorbia Taxa* (1997). Some of these are now appearing in trade and are giving rise to confusion among Parties as to whether or not they are subject to regulation under CITES. A small addendum would need to be produced to cover these taxa. Germany is looking into whether it can support the production and publication of this update.

Tree ferns

67. The revision of the listing of tree ferns with the annotation '*Dicksonia* spp., populations of the Americas' had lead to some confusion among Parties with regard to which taxa are covered. Germany has sought to clarify this in a paper presented at PC12. Germany will continue to work on this document in cooperation with UNEP-WCMC and produce it in the CITES checklist format. Some funding support may be required for publication.

Cycads

68. *A World list of Cycads* (Stevenson *et al.* 1995 and its updates) is the CITES standard reference. However IUCN/SSC maintains a website which includes a more current checklist. The PC will investigate whether the IUCN/SSC list is suitable to be adopted as a standard reference. The Review of Significant Trade of the taxa, which the Plants Committee has initiated, may also highlight certain problems and indicate whether a customized CITES checklist is preferable.

Thymeleaceae (Aquilariaceae): *Aquilaria* spp.

69. *Aquilaria malaccensis* was included in Appendix II in 1995. The proposal by India included only one synonym, *A. agallocha*. The genus is considered to contain some 15 species. There are however conflicting views with regard to the species that are included in the entity known as *A. malaccensis* as indeed there are with the number of species included in the genus. For example, *A. malaccensis* may include *A. sinensis* and some consider *A. agallocha* to be a separate species.

70. At its 11th meeting, the Conference of the Parties directed the PC to continue its review of the genus *Aquilaria* to consider *inter alia* how species might be distinguished from each other when traded as agarwood.
71. The report of the Chairman of the Plants Committee (see document CoP12 Doc. 10.2) refers to other issues related to this taxon (Decision 11.112). The review of the genus *Aquilaria* referred to in her report will include a review of the present taxonomic status of the species, which the NC intends to use as the basis for recommendations concerning the nomenclature to be used for this species.

Proposed budget for flora nomenclature

72. The 12th meeting of the CoP is requested to approve a budget of USD 68,000 for activities to be undertaken by the NC on the nomenclature of flora during the period between CoP12 and CoP13, and specified in paragraphs 58 to 70 above, and summarized in a table below.

Project/Year	2003	2004	2005	Total
Orchids	USD 18,000	USD 18,000	USD 12,000	USD 48,000
Cacti		USD 5,000	USD 5,000	USD 10,000
Publication support; websites; database maintenance		USD 5,000	USD 5,000	USD 10,000
Total	USD 18,000	USD 28,000	USD 22,000	USD 68,000

COMMENT FROM THE SECRETARIAT

The Secretariat proposes that the Conference of the Parties adopt the *Checklist of CITES species* compiled by UNEP World Conservation Monitoring Centre, 2001, and its updates accepted by the Nomenclature Committee, as the standard reference for species of animals included in the Appendices. This would avoid having to make regular amendments to Resolution Conf. 11.22 on standard nomenclature, and resolve the problems with the current standard references outlined in paragraph 22 because the *Checklist of CITES species* is readily accessible and easy to consult (available on various media: website, publication, CD-ROM). If the *Checklist of CITES species* were to become the standard reference for species of animals, the Nomenclature Committee would be required to provide relevant species names after each meeting of the Conference of the Parties, based on the scientific references and literature it deems appropriate, for inclusion in this Checklist. These names would then be regarded as the standard reference for the purpose of implementing the Convention. To accomplish this task effectively, the Nomenclature Committee may need additional support. A decision in this regard by the Conference of the Parties would require the adoption of amendments to Resolution Conf. 11.1 on the Establishment of Committees and to Resolution Conf. 11.22 on Standard nomenclature.

Recommendations of the Nomenclature Committee

The Nomenclature Committee recommends:

Regarding annotations to and nomenclature changes in the Appendices

Fauna

1. To replace the current annotation concerning *Equus africanus* that reads "= 336 Also referenced as *Equus asinus*" by the following:

= 336 Excludes the domesticated form of *Equus africanus* referenced as *Equus asinus*

2. To remove annotation = 399

Flora

3. To annotate *Nardostachys grandiflora* under the 300-500 series in the following manner:

= 4XX Excludes *Valeriana jatamasi* Jones

4. To annotate *Picrorhiza kurrooa* under the 300-500 series in the following manner:

= 4XX Excludes *Picrorhiza scrophulariiflora*

Regarding amendments to Resolution Conf. 11.22 on standard nomenclature

Fauna

5. To adopt the following species of mammals and the associated references as additions to the standard reference for mammals (Wilson and Reeder, 1993):

MONOTREMATA: Tachyglossidae: *Zaglossus attenboroughi* Flannery and Groves, 1998 (Mammalia 62: 367-396);

CHIROPTERA: Pteropodidae: *Pteropus banakrisi* Richards and Hall, 2002 (Austr. Zool. 32: 69-75);

PRIMATES: Cheirogaleidae: *Cheirogaleus minusculus* Groves, 2000 and *Cheirogaleus ravus* Groves, 2000 (Int. J. Primatology 21: 943-962); *Microcebus berthae* Rasoloarison, Goodman and Ganzhorn, 2000, *Microcebus sambiranensis* Rasoloarison, Goodman and Ganzhorn, 2000 and *Microcebus tavaratra* Rasoloarison, Goodman and Ganzhorn, 2000 (Int. J. Prim 21: 963-1019); *Microcebus ravelobensis* Zimmerman, Cepok, Rakotoarison, Zietemann and Radespiel, 1998 (Folia Primat. 69: 106-114); Indridae: *Avahi unicolor* Thalmann and Geissmann, 2000 (Int. J. Prim. 21: 915-941); Loridae: *Pseudopotto martini* Schwartz, 1996 (Anthrop. Pap. Am. Mus. Nat. Hist. 78: 1-14); Galagonidae: *Galagoides rondoensis* and *Galagoides udzungwensis* Honess and Bearder, 1997 (Afr. Prim. 2: 75-79); Callitrichidae: *Callithrix acariensis* v. Roosmalen, v. Roosmalen, Mittermeier and Rylands, 2000 and *Callithrix manicorensis* v. Roosmalen, v. Roosmalen, Mittermeier and Rylands, 2000 (Neotrop. Prim. 8: 2-18); *Callithrix humilis* v. Roosmalen, v. Roosmalen, Mittermeier and Fonseca, 1998 (Goeldiana Zool. 22: 1-27); *Callithrix marcai* Alperin, 1993 (Bol. Mus. Para. E. Goeldi Ser. Zool 9: 317-328); *Callithrix mauesi* Mittermeier, Schwartz and Ayres, 1992 (Goeldiana Zool. 14:1-17); *Callithrix nigriceps* Ferrari and Lopes, 1992 (Goeldiana Zool. 12: 1-13); *Callithrix saterei*

Silva and Noronha, 1998 (Goeldiana Zool. 21: 1-28); Cebidae: *Callicebus coimbrai* Kobayashi and Langguth, 1999 (Rev. Bras. Zool. 16: 531-551); *Callicebus bernhardi* v. Roosmalen, v. Roosmalen and Mittermeier, 2002 and *Callicebus stephennashi* v. Roosmalen, v. Roosmalen and Mittermeier, 2002 (Neotrop. Prim, 10 (suppl.): 1-52).

CETACEA: Ziphiidae: *Mesoplodon perrini* Dalebout, Mead, C. Baker, A. Baker and Van Helden, 2002 (*Marine Mammal Science* 18: 577-608); *Mesoplodon traversii* (Gray, 1874) with *Mesoplodon bahamondi* Reyes, Van Waerebeek, Cardenas and Yáñez, 1995 as a synonym.

6. To adopt *Handbook of the Birds of the World* (1997) 4: 246 - 477 (Psittaciformes) and *Handbook of the Birds of the World* (1999) 5: 468-680 (Trochilidae) as the standard reference for the order Psittaciformes and the family Trochilidae in replacement of the same parts in the main standard reference to birds (Sibley and Monroe, 1990).

The consequences of this would be that the following names of Appendix-I listed species would be changed: *Aratinga guarouba* to *Guarouba guarouba*, *Cyanoramphus auriceps forbesi* to *Cyanoramphus forbesi*, *Cyanoramphus cookii* to *Cyanoramphus novaezelandiae cookii* and *Ramphodon dohrnii* to *Glaucis dohrnii*.

7. To adopt the following species of birds and the associated references as additions to the standard reference for birds (Sibley and Monroe, 1990):

STRIGIFORMES: Strigidae: *Glaucidium nubicola* Robbins and Stiles, 1999 (Auk 116: 305-315); *Glaucidium parkeri* Robbins and Howell, 1995 (Wilson Bull. 107: 7-25); *Ninox ios* Rasmussen, 1999 (Wilson Bull. 111: 457-464); *Otus alius* Rasmussen, 1998 (Bull. Br. Ornith. Club 118: 141-153); *Otus collari* Lambert and Rasmussen, 1998 (Bull. Br. Ornith. Club 118: 204-217); *Otus moheliensis* Lafontaine and Moolaert, 1998 (J. Afr. Zool. 112: 163-169).

8. To adopt *A new species of Testudo* (Testudinides: Testudinidae) *from the Middle East, with implications for Conservation* (J. Perälä, 2001. J. Herpet. 35 (4): 567-582) as an addition to the standard reference for chelonians.

As a consequence, *Testudo wernerii* Perälä, 2001 would need to be added to the list of species for which a separate standard reference is adopted. It also would mean that this new species has to be included in Appendix I, as it was formerly considered to be *T. kleinmanni* Lortet, 1883.

9. In case *Leucocephalon yuwonoi* is included in the Appendices at CoP12, to adopt *A new genus of Geoemydid turtle from Asia* (McCord, W.P., J.B. Iverson, P.Q. Spinks and H.B. Shaffer, 2000. (Hamadryad 25(2): 86-90) as a further addition to the standard reference for chelonians, in order to adhere to present usage of the name of the Geoemydid turtle occurring in northern Sulawesi, which in the standard reference is referred to as *Geoemyda yuwonoi*, but recently was shown to be rather different from other species of *Geoemyda* and was placed in the new monotypic genus *Leucocephalon*.

The consequence of this is that the name used in the CITES Appendices will be in conformity with present common usage.

10. To adopt *Checklist of Cordylus spp.* (D.G. Broadley) and its future updates accepted by the Nomenclature Committee, as a standard reference for species names of the genus *Cordylus* (the text of the document is under review, but the final text should be available at CoP12).
11. To replace *Crocodylus novaeguineae mindorensis* in Appendix I by *Crocodylus mindorensis* as a consequence of the adoption of the standard reference for turtles, tortoises, crocodiles and tuataras (Wermuth and Mertens, 1996).

12. To adopt *Checklist of Varanidae spp.* (W. Böhme) and its future updates accepted by the Nomenclature Committee, as a standard reference for species names of the Varanidae (the text of the document is under review, but the final text should be available at CoP12).
13. To adopt *Eine neue Chamäleon Art aus der Calumma gastrotaenia – Verwandtschaft Ost-Madagaskars* (W. Böhme, 1997. *Herpetofauna* (Weinstadt) 19 (107): 5-10), *Two new chameleons (Sauria: Chamaeleonidae) from isolated Afromontane forests in Sudan and Ethiopia* (C. Tilbury, 1998. *Bonn. Zool. Beitr.* 47: 293-299), *On the discovery of a new large chameleon inhabiting the limestone outcrops of western Madagascar: Furcifer nicosiai sp.nov.* (Reptilia, Chamaeleonidae) (Jesu, R., F. Mattioli and G. Schimenti, 1999. *Doriana* 7 (311): 1-14) and *Two new chameleons of the genus Calumma from north-east Madagascar, with observations on hemipenial morphology in the Calumma furcifer group* (Reptilia, Squamata, Chamaeleonidae) (Andreone, F., F. Mattioli, R. Jesu, R. and J.E. Randrianirina, 2001. *Herpetological Journal* 11: 53-68) as additions to the standard reference for Chamaeleonidae.

The consequence of this would be that the species *Calumma glawi* Böhme, 1997, *Calumma vatosoa* Andreone, Mattioli, Jesu and Randrianirina, 2001, *Calumma vencesi* Andreone, Mattioli, Jesu and Randrianirina, 2001, *Chamaeleo balebicornutus* Tilbury, 1998, *Chamaeleo conirostratus* Tilbury, 1998 and *Furcifer nicosiai* Jesu, Mattioli and Schimenti, 1999 have to be added to the list of species for which a separate standard reference is adopted.

14. To replace the name *Crocodylus lacertinus* by *Crocodylus amazonicus* Spix, 1825, on the basis of '*Crocodylus amazonicus Spix, 1825: The valid name for Crocodylus lacertinus auctorum (nec Daudin, 1802) (Squamata: Teiidae)*'. (Massary and Hoogmoed, 2001. *Journal of Herpetology* 35(2): 353 - 357)'.

The consequence of this proposal is that the name of *Crocodylus lacertinus* in Appendix II should be changed into *Crocodylus amazonicus*.

15. To adopt *Heavily exploited but poorly known: systematics and biogeography of commercially harvested pythons (Python curtus group) in Southeast Asia* (Keogh J.S., D.G. Barker and R. Shine, 2001. *Biol. J. Linn. Soc.* 73(1): 113-129) as an addition to the standard reference on snakes.

The consequence of this would be that *Python brongersmai* Stull, 1938 and *Python breitensteini* Steindachner, 1880 should no longer be considered as subspecies of *Python curtus* Schlegel 1837, but as separate species that need to be added to the list of species for which a separate standard reference is adopted.

16. To adopt *Anakondas* (L. Dirksen, 2002, NTV Wissenschaft) as an addition to the standard reference on snakes.

The consequence of this would be that in addition to the three species of *Eunectes* mentioned in the standard reference, one new species, *Eunectes beniensis* Dirksen, 2002 would be added to the list of species for which a separate standard reference is adopted.

17. To adopt *Systematics of pythons of the Morelia amethystina complex (Serpentes: Boidae) with the description of three new species* (Harvey, M.B., D.G. Barker, L.K. Ammerman, and P.T. Chippindale, 2000. *Herpetological Monographs* 14: 139- 185) as an addition to the standard reference for snakes.

The consequence of this would be that in addition to the species of *Morelia* mentioned in the standard reference, three new species (*Morelia clastolepis* Harvey, Barker, Ammerman and Chippindale, 2000, *Morelia nauta* Harvey, Barker, Ammerman and Chippindale, 2000 and *Morelia tracyae* Harvey, Barker, Ammerman and Chippindale, 2000) would be recognized, while *Morelia amethystina kinghorni* would be elevated to specific status: *Morelia kinghorni*.

18. To adopt *New snake (Tropidophis) from western Cuba* (Hedges, B.S., A.R. Estrada and L.M. Diaz, 1999. *Copeia* 1999 (2): 376-381), *A new snake of the genus Tropidophis (Tropidopiidae) from central Cuba* (Hedges, B.S., and O. Garrido, 1999. *J. Herpet.* 33: 436-441) and *A new banded snake of the genus Tropidophis (Tropidophiidae) from north-central Cuba* (Hedges, B.S., O. Garrido and L.M. Diaz, 2001. *Journal of Herpetology.* 35: 615-617) as additions to the standard reference for snakes.

As a consequence, three species (*Tropidophis celiae* Hedges, Estrada and Diaz, 1999, *Tropidophis morenoi* Hedges, Garrido and Diaz, 2001 and *Tropidophis. spiritus* Hedges and Garrido, 1999) would need to be added to the list of species for which a separate standard reference is adopted.

19. To adopt *Taxonomic change and toxinology: Systematic revisions of the Asiatic Cobras Naja naja species complex* (Wüster, W., 1996, *Toxicon* 34(4): 339-406) and *A new cobra (Elapidae: Naja) for Myanmar* (Slowinski, J.B. and W. Wüster, 2000, *Herpetologica* 56: 257-270) as the combined standard reference for this taxon.

The consequence of this would be that in addition to *Naja naja* (Linnaeus, 1758), the following 10 species would have to be included in Appendix II because the former concept of *Naja naja* covered these taxa: *Naja atra* Cantor, 1842, *Naja kaouthia* Lesson, 1831, *Naja mandalayensis* Slowinsky and Wüster, 2000, *Naja oxiana* (Eichwald, 1831), *Naja philipinensis* Taylor, 1922, *Naja sagittifera* Deraniyagala, 1960, *Naja samarensis* W.Peters, 1861, *Naja siamensis* Laurenti, 1768, *Naja sputatrix* F.Boie, 1827, *Naja sumatrana* F. Müller.

20. To adopt the printout of the online version of *Amphibian Species of the World: a taxonomic and Geographic reference* (D. Frost) and its updates accepted by the Nomenclature Committee as a standard reference for amphibian species, and to replace paragraph ADOPTS i) of Resolution Conf. 11.22 on standard nomenclature accordingly, noting that one species (*Dendrobates claudiae* Jungfer, Lötters and Jorgens, 2000) was added to the online version since the last meeting of the NC.

The consequences of this would be that *Atelopus varius zeteki* listed in Appendix I should be replaced by *Atelopus zeteki*, and that *Allobates* spp. and *Phobobates* spp. (which are now regarded as synonymous with *Epipedobates*) should be removed from the listings in Appendix II.

21. To replace COENOTHECALIA spp. in Appendix II by Helioporidae spp.

Flora

22. To adopt *The Plant-Book*, second edition [D.J. Mabberley 1997, Cambridge University Press (reprinted with corrections 1998)] for the generic names of all plants listed in the Appendices of the Convention, unless they are superseded by standard nomenclature adopted by the Conference of the Parties.
23. To adopt *CITES Orchid Checklist Vol. 3*, (J. A. Roberts *et al.*, 2001, compiled by the Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland) and the updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of the genera *Aerangis*, *Angraecum*, *Ascocentrum*, *Bletilla*, *Brassavola*, *Calanthe*, *Catasetum*, *Miltonia* and *Miltoniopsis*, *Renanthera*, *Rhynchostylis*, *Rossioglossum*, *Vanda* and *Vandopsis*.
24. To adopt *CITES Carnivorous Plant Checklist* (B. von Arx *et al.*, 2001, Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland) and the updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of *Dioneae*, *Nepenthes* and *Sarracenia*.
25. To adopt *CITES Aloe and Pachypodium Checklist* (U. Eggli *et al.* 2001, compiled by Städtische Sukkulenten-Sammlung, Zürich, Switzerland, in collaboration with the Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland) and the updates accepted by the Nomenclature

Committee, as a guideline when making reference to the names of species of the genera *Aloe* and *Pachypodium*.

26. To adopt *World Checklist and Bibliography of Conifers* (A. Farjon, 2001) and the updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of *Taxus*.

Proposed amendment to Resolution Conf. 11.22

27. To insert before 'URGES' of Resolution Conf. 11.22 the following text:

"RECOMMENDS that Parties use the *Checklist of CITES species* (2001 and its updates) published by UNEP-WCMC as an informal overview of the scientific names that were adopted by the Conference of the Parties for the animal species that are listed in the Appendices of the Convention, and as an informal summary of information contained in the standard references that were adopted for CITES nomenclature;"

The Application of the Convention to Fungi

1. At its 10th meeting, the Plants Committee briefly discussed the application of the Convention to Fungi and whether at the time of its negotiation and agreement the term flora was taken to include Fungi.
2. The Chairman of the Plants Committee requested the botanist of the Nomenclature Committee to review the situation and report back at the 11th meeting of the Plants Committee. A paper was produced for this meeting and it was decided that it would be necessary for the Conference of the Parties to decide whether the Convention applies to Fungi. The CITES Secretariat and the botanist of the Nomenclature Committee have prepared this paper for consideration at the 12th meeting of the Conference of the Parties.
3. The split between Fungi and Plantae was first suggested in about 1909, but consensus was reached much later. This occurred somewhere between 1961 and 1971. Ainsworth and Bisby's *Dictionary of the Fungi*, now in its eighth edition, is the nearest to a standard reference used throughout mycology. This standard reference, changed from Plantae in the fifth edition (1961) to Fungi in the sixth edition (1971). The change appears to have been based on the five-kingdom system proposed by Whittaker [in: *New concepts of kingdoms of organisms*. *Science* (New York) 163: 150-160 (1969)]. This proposal was then rapidly adopted (according to Hawksworth, 1991).
4. It therefore appears that at the time of negotiation and agreement of the Convention the formal opinion was that Fungi were separate from Plantae. However, it may have been in the minds of the plant experts present that they were considering a convention which would cover plants in trade in the broadest sense, as in effect the then day-to-day working definition of flora included Fungi. In general usage flora included Fungi. Prof. Grenville Lucas, the botanist of the delegation of the United Kingdom of Great Britain and Northern Ireland present at the early negotiations, recalls that the botanists present did briefly consider Fungi but, at that time, did not consider collection for international trade to be an issue that caused a threat to the species concerned.
5. In the course of the preparation of this document, a consultation letter was circulated to over 60 mycological institutions, organizations and experts worldwide. This was not meant to be a comprehensive survey but rather a brief sample of opinions. It was also a means of informing the mycological community that CITES would be considering this issue at the 12th meeting of the Conference of the Parties. Of the more than 60 institutions and organizations contacted 13 replied within the time-frame, which allowed their comments to be considered in the preparation of this paper. The two following questions were asked:
6. Question 1: *The first area that requires some clarification is whether at the time of its negotiation and agreement, the term flora was taken to include Fungi. The negotiations leading to the Convention were concluded in Washington D.C. in March 1973 and the Convention came into force on 1 July 1975. It is important to know the scientific thinking of that time. What was the widely accepted view concerning the position of Fungi in the early 1970s – were they taken to be included in flora?*
7. Five responses considered that at the time the term flora was generally considered to include Fungi. Two correspondents took a stricter view and considered that Fungi were not included. The remaining correspondents did not express a definite view with one noting that "the term 'flora' in CITES discussions most probably was never intended to be restricted to seed plants (Spermatophyta) only".
8. Question 2: *This concerns the view of your institution or organization with regard to CITES and Fungi. Is it your view that the Convention should be applied to Fungi? Do you see any advantages or disadvantages in applying the Convention to this group?*

9. Here correspondents were concerned with the general lack of data to make decisions on any species potentially proposed for listing. Concern was also expressed about the possible negative impact of listing. Concern was also expressed about how such listings could be implemented and it was noted that the best means of conservation was habitat protection. Correspondents were unsure with regard to what the benefits would be. All were concerned that available mycological expertise be fully utilized by CITES in any decision-making process.
10. From the available information, the Secretariat and the botanist of the Nomenclature Committee conclude that it is likely that the Fungi were included in the popular understanding of the term 'flora' at the time that the Convention and its Appendices were drafted. The Secretariat and the Nomenclature Committee therefore recommend that the Conference of the Parties consider that the Convention can apply to Fungi.

DRAFT RESOLUTION OF THE CONFERENCE OF THE PARTIES

1. This draft resolution on standard nomenclature, based on Resolution Conf. 11.22, was prepared by the Secretariat on the basis of information contained in Annex 1 to the present document.
2. New text has been included in **bold**.

Standard Nomenclature

RECALLING Resolution Conf. **11.22**, adopted by the Conference of the Parties at its **11th** meeting (**Gigiri, 2000**);

NOTING that biological nomenclature is dynamic;

AWARE that the names of the genera and species of several families are in need of standardization and that the current lack of a standard reference with adequate information decreases the effectiveness of the implementation of CITES in conserving the many species that are listed in the Appendices;

RECOGNIZING that the taxonomy used in the Appendices to the Convention will be most useful to the Parties if standardized by nomenclatural references;

AWARE that the Nomenclature Committee has identified names of taxa used in the Appendices to the Convention that should be changed to reflect accepted use in biology;

NOTING that these changes should be adopted by the Conference of the Parties to the Convention;

RECOGNIZING that there are several taxa included in the Appendices of which domesticated forms exist, and that in several cases the Parties have chosen to discriminate between the wild form and the domesticated form by applying a name that differs from the name cited in the standard nomenclature for the protected form;

RECOGNIZING that, in the case of new proposals for listing in the Appendices, the Parties should use adopted standard references whenever available;

CONSIDERING the great practical difficulties involved in recognizing many of the subspecies at present listed in the Appendices when they appear in trade; and the need to weigh ease of subspecies identification against reliability of information on geographic source, for enforcement purposes;

THE CONFERENCE OF THE PARTIES TO THE CONVENTION

RECOMMENDS that:

- a) a subspecies be proposed for inclusion in the Appendices only if it is generally recognized as a valid taxon, and easily identifiable in the traded form;
- b) where there are identification difficulties, the problem be approached by either including the entire species in Appendix I or Appendix II or by circumscribing the range of the subspecies warranting protection and listing the populations within this area on a country basis;
- c) where there are domesticated forms of listed taxa, the Nomenclature Committee recommend names for the wild and domestic forms;

- d) when submitting a proposal to amend the Appendices to the Convention, the proponent identify the reference used to describe the entity being proposed;
- e) upon receiving proposals to amend the Appendices to the Convention, the Secretariat seek, where appropriate, the advice of the Nomenclature Committee on the correct names to use for the species or other taxa in question;
- f) the Secretariat may make orthographic changes in the lists of species included in the Appendices to the Convention, without consulting the Conference of the Parties;
- g) the Secretariat inform the Parties whenever the name of a taxon to be used in the Appendices to the Convention changes, provided that:
 - i) the change has been recommended or agreed to by the Nomenclature Committee; and
 - ii) the change will not alter the scope of protection for fauna or flora under the Convention;
- h) whenever the scope of a taxon is redefined as a result of a taxonomic revision, the Nomenclature Committee advise the Secretariat on the name to be listed in the Appendices or on alternative actions, including amendments to the Appendices, required to ensure that the original intent of the listing is retained;
- i) if there is conflict regarding the choice of taxonomic authority for taxa for which no standard references have been adopted by the Conference of the Parties, countries authorizing export of animals or plants (or parts or derivatives thereof) of such taxa inform the CITES Secretariat and prospective importing countries of their preferred published taxonomic authority. 'Taxonomic authority' means a recent published paper or monograph that reviews the nomenclature of the taxon being exported and that has been reviewed by professionals in the pertinent discipline. In cases where specimens of the taxon are exported from several countries and the exporting countries do not agree, or the exporting and importing countries do not agree, on the taxonomic authority, the zoologist and the botanist of the Nomenclature Committee should determine the most appropriate taxonomic authority; and
- j) the Secretariat be provided the citations (and ordering information) of checklists that will be nominated for standard references at least six months before the meeting of the Conference of the Parties at which such checklists will be considered. The Secretariat shall include such information in a Notification to the Parties so that Parties can obtain copies to review if they wish before the meeting;

ADOPTS the following standard references:

- a) *Mammal Species of the World: A Taxonomic and Geographic Reference*, 2nd edition (edited by D.E. Wilson and D.M. Reeder, 1993, Smithsonian Institution Press) for mammalian nomenclature except for the section on the genus *Balaenoptera*, which is replaced by that on the genus *Balaenoptera* in Rice, D.W., 1998: *Marine mammals of the World. Systematics and distribution*. Special Publication Number 4: i-ix, 1-231; The Society for Marine Mammals; **and the following additional species names in the order Monotremata, Tachyglossidae: *Zaglossus attenboroughi* Flannery and Groves, 1998 (Mammalia 62: 367-396); in the order Chiroptera: Pteropodidae: *Pteropus banakrisi* Richards and Hall, 2002 (Austr. Zool. 32: 69-75); in the order Primates, Cheirogaleidae: *Cheirogaleus minusculus* Groves, 2000 and *Cheirogaleus ravus* Groves, 2000 (Int. J. Primatology 21: 943-962); *Microcebus berthae* Rasoloarison, Goodman and Ganzhorn, 2000, *Microcebus sambiranensis* Rasoloarison, Goodman and Ganzhorn, 2000 and *Microcebus tavaratra* Rasoloarison, Goodman and Ganzhorn, 2000 (Int. J. Prim 21: 963-1019); *Microcebus ravelobensis* Zimmermann, Cepok, Rakotoarison, Zieteman and Radespiel, 1998 (Folia Primat. 69: 106-114); Indridae: *Avahi unicolor* Thalmann and Geissmann, 2000 (Int. J. Prim. 21: 915-941); Loridae: *Pseudopotto martini* Schwartz, 1996 (Anthrop. Pap. Am. Mus. Nat. Hist. 78: 1-14); Galagonidae: *Galagoides rondoensis* and *Galagoides udzungwensis* Honess and Bearder, 1997 (Afr. Prim. 2: 75-79); Callitrichidae: *Callithrix acariensis* v. Roosmalen, v. Roosmalen, Mittermeier and Rylands,**

2000 and *Callithrix manicorensis* v. Roosmalen, v. Roosmalen, Mittermeier and Rylands, 2000 (Neotrop. Prim. 8: 2-18); *Callithrix humilis* v. Roosmalen, v. Roosmalen, Mittermeier and Fonseca, 1998 (Goeldiana Zool. 22: 1-27); *Callithrix marcai* Alperin, 1993 (Bol. Mus. Para. E. Goeldi Ser. Zool 9: 317-328); *Callithrix mauesi* Mittermeier, Schwartz and Ayres, 1992 (Goeldiana Zool. 14:1-17); *Callithrix nigriceps* Ferrari and Lopes, 1992 (Goeldiana Zool. 12: 1-13); *Callithrix saterei* Silva and Noronha, 1998 (Goeldiana Zool. 21: 128); Cebidae: *Callicebus coimbrai* Kobayashi and Langguth, 1999 (Rev. Bras. Zool. 16: 531-551); *Callicebus bernhardi* v. Roosmalen, v. Roosmalen and Mittermeier, 2002 and *Callicebus stephennashi* v. Roosmalen, v. Roosmalen and Mittermeier, 2002 (Neotrop. Prim, 10 (suppl.): 1-52); in the order Cetacea: Ziphiidae: *Mesoplodon perrini* Dalebout, Mead, C. Baker, A. Baker and Van Helden, 2002 (Marine Mammal Science 18: 577-608); *Mesoplodon traversii* (Gray, 1874) with *Mesoplodon bahamondi* Reyes, Van Waerebeek, Cardenas and Yáñez, 1995 as a synonym;

- b) *A Reference List of the Birds of the World* (J.J. Morony, W.J. Bock and J. Farrand Jr, 1975, American Museum of Natural History) for order and family level names for birds;
- c) *Distribution and Taxonomy of Birds of the World* (C.G. Sibley and B.L. Monroe Jr, 1990, Yale University Press) and *A supplement to Distribution and Taxonomy of the Birds of the World* (Sibley and Monroe, 1993, Yale University Press) for the genus and species names of birds, **except for the sections on Psittaciformes and Trochilidae, which are replaced by the section on Psittaciformes in *Handbook of the Birds of the World* (1997) 4: 246 - 477 and on Trochilidae in *Handbook of the Birds of the World* (1999) 5: 468-680; and the following additional species names in the family Strigidae: *Glaucidium nubicola* Robbins and Stiles, 1999 (Auk 116: 305-315); *Glaucidium parkeri* Robbins and Howell, 1995 (Wilson Bull. 107: 7-25; *Ninox ios* Rasmussen, 1999 (Wilson Bull. 111: 457-464); *Otus alius* Rasmussen, 1998 (Bull. Br. Ornith. Club 118: 141-153); *Otus collari* Lambert and Rasmussen, 1998 (Bull. Br. Ornith. Club 118: 204-217); *Otus moheliensis* Lafontaine and Moolaert, 1998 (*J. Afr. Zool.* 112: 163-169);**
- d) *Schildkröte, Krokodile, Brückenechsen* [Wermuth, H. and R. Mertens, 1996 (reprint), ix-xvi, 1-506, Gustav Fischer Verlag, Jena, ISBN 3-437-35048-X] for the names of crocodiles, turtles, tortoises and tuataras, *A revised checklist with distribution maps of the turtles of the world* (Iverson, J.B., 1992: i-xiii, 1-363, privately printed, J.B. Iverson, Dept of Biology, Earlham College, Richmond, Indiana 47374, United States of America, ISBN 0-9617431-0-5) for the distribution of tortoises and turtles; **A new species of *Testudo* (*Testudinidae*) from the Middle East, with implications for Conservation** (J. Perälä, 2001. *J. Herpet.* 35 (4): 567-582) for *Testudo wernerii*; [and **A new genus of *Geoemyd* turtle from Asia** (McCord, W.P., J.B. Iverson, P.Q. Spinks and H.B. Shaffer, 2000. (*Hamadryad* 25(2): 86-90); if Proposal 25 is accepted]
- e) *Herpetology* (Pough, F.H., R.M. Andrews, J.E. Cadle, M.L. Crump, A.H. Savitzky and K.D. Wells, 1998, i-xi, 1-577) for the delimitation of families within the Sauria;
- f) *Chamaeleonidae* (C.J.J. Klaver and W. Böhme, 1997. *Das Tierreich* 112: i-xv, 1-85; Walter de Gruyter, Berlin, New York, ISBN 3-11-015187-1), ***Eine neue Chamäleon Art aus der Calumma gastrotaenia Verwandtschaft Ost-Madagaskars*** (W. Böhme, 1997. *Herpetofauna* (Weinstadt) 19 (107): 510), ***Two new chameleons (Sauria: Chamaeleonidae) from isolated Afromontane forests in Sudan and Ethiopia*** (C. Tilbury, 1998. *Bonn. Zool. Beitr.* 47: 293-299), ***On the discovery of a new large chameleon inhabiting the limestone outcrops of western Madagascar: *Furcifer nicosiai* sp.nov. (Reptilia, Chamaeleonidae)*** (Jesu, R., F. Mattioli and G. Schimenti, 1999. *Doriana* 7 (311): 1-14) and ***Two new chameleons of the genus Calumma from north-east Madagascar, with observations on hemipenial morphology in the Calumma furcifer group*** (Reptilia, Squamata, Chamaeleonidae) (Andreone, F., F. Mattioli, R. Jesu and J.E. Randrianirina, 2001. *Herpetological Journal* 11: 53-68) for the species names of chameleons;
- g) ***Checklist of *Cordylus* spp.*** (2002, D.G. Broadley) and its future updates accepted by the Nomenclature Committee, as a standard reference for species names of the genus *Cordylus*;
- h) *Reptiles del noroeste, nordeste y este de la Argentina – Herpetofauna de las selvas subtropicales, puna y pampa*, 1993 (Ceí, José M. In Monografía XIV, Museo Regionale di Scienze Naturali); *Lizards of*

Brazilian Amazonia (Avila Pires, T.C.S., 1995, Zool. Verh. 299: 1-706, Nationaal Natuurhistorisch Museum, Leiden, ISBN 90-73239-40-0); *A new species of Tupinambis (Squamata: Teiidae) from Central Brazil, with an analysis of morphological and genetic variation in the genus* [Colli, G.R., A.K. Péres and H.J. da Cunha, 1998, Herpetologica 54 (4): 477-492]; and *A new species of Tupinambis Daudin, 1802 (Squamata, Teiidae) from Central Brazil* (Manzani, P.R. and A.S. Abe, 1997, Boletim do Museu Nacional. Nov. Ser. Zool. 382: 1-10) for the species names of the genus *Tupinambis*;

- i) **Checklist of Varanidae spp. (2002, W. Böhme) and its future updates accepted by the Nomenclature Committee, as a standard reference for species names of the Varanidae;**
- j) *Snake Species of the World: A Taxonomic and Geographic Reference: Volume 1* (Campbell, McDiarmid and Touré, 1999) published under the auspices of the Herpetologists' League, for the nomenclature of snakes, except for the following cases: the following names for Malagasy boid snakes should continue to be used: *Acrantophis dumerilii* Jan, 1860, *Acrantophis madagascariensis* (Duméril & Bibron, 1844) and *Sanzinia madagascariensis* (Duméril & Bibron, 1844); in the genera, *Calabaria*, *Charina* and *Lichanura*, the following names shall continue to be used: *Calabaria reinhardtii* (Schlegel, 1848), *Charina bottae* (Blainville, 1935) and *Lichanura trivirgata* (Cope, 1861); in the case of subspecies of *Python molurus*, two subspecies are recognized, viz. *P. m. molurus* (Linnaeus, 1758) and *P. m. bivittatus* Kuhl, 1820; **Heavily exploited but poorly known: systematics and biogeography of commercially harvested pythons (Python curtus group) in Southeast Asia** (Keogh, J.S., D.G. Barker and R. Shine, 2001. Biol. J. Linn. Soc. 73(1): 113-129) for *Python brongersmai* and *Python breitensteini*; **Anakondas** (L. Dirksen, 2002, NTV Wissenschaft); **Systematics of pythons of the Morelia amethystina complex (Serpentes: Boidae) with the description of three new species** (Harvey, M.B., D.G. Barker, L.K. Ammerman, and P.T. Chippindale, 2000. Herpetological Monographs 14: 139- 185) for *Morelia clastolepis*, *Morelia nauta*, *Morelia tracyae* and *Morelia kinghorni*; **New snake (Tropidophis) from western Cuba** (Hedges, B.S., A.R. Estrada and L.M. Diaz, 1999. Copeia 1999 (2): 376-381), **A new snake of the genus Tropidophis (Tropidopiidae) from central Cuba** (Hedges, B.S., and O. Garrido, 1999. J. Herpet. 33: 436-441) and **A new banded snake of the genus Tropidophis (Tropidophiidae) from north-central Cuba** (Hedges, B.S, O. Garrido and L.M. Diaz, 2001. Journal of Herpetology. 35: 615-617) for *Tropidophis celiae*, *Tropidophis morenoi* and *Tropidophis. spiritus*; and **Taxonomic change and toxinology: Systematic revisions of the Asiatic Cobras Naja naja species complex** (Wüster, W., 1996, Toxicon 34(4): 339-406) and **A new cobra (Elapidae: Naja) for Myanmar** (Slowinski, J.B. and W. Wüster, 2000, Herpetologica 56: 257-270) as the combined standard reference for the genus *Naja*;
- k) **Amphibian Species of the World: a taxonomic and Geographic reference (2002, D. Frost) and its future updates accepted by the Nomenclature Committee, for species names of amphibians;**
- l) *Catalog of Fishes*. (Eschmeier, W. N., 1998, Vol. 1. Introductory materials. Species of Fishes AL: 1-958. Vol. 2. Species of Fishes M-Z: 959-1820. Vol. 3. Genera of Fishes. Species and genera in a classification. Literature cited. Appendices: 1821-2905. California Academy of Sciences, ISBN 0-940228-47-5) for the taxonomy and the names of all fishes;
- m) **The Plant-Book, second edition [D.J. Mabberley 1997, Cambridge University Press (reprinted with corrections 1998)] for the generic names of all plants listed in the Appendices of the Convention, unless they are superseded by standard nomenclature adopted by the Conference of the Parties;**
- n) *A Dictionary of Flowering Plants and Ferns*, 8th edition (J.C. Willis, revised by H.K. Airy Shaw, 1973, Cambridge University Press) for generic synonyms not mentioned in The Plant-Book, unless they are superseded by standard checklists adopted by the Conference of the Parties as referenced below in paragraphs o) to w);
- o) *A World List of Cycads* (D.W. Stevenson, R. Osborne and K.D. Hill, 1995; In: P. Vorster (Ed.), Proceedings of the Third International Conference on Cycad Biology, pp. 55-64, Cycad Society of South Africa, Stellenbosch) and its updates accepted by the Nomenclature Committee, as a guideline when making reference to names of species of Cycadaceae, Stangeriaceae and Zamiaceae;

- p) *The Bulb Checklist* (1999, compiled by the Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland) and its updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of *Cyclamen* (Primulaceae) and *Galanthus* and *Sternbergia* (Liliaceae);
- q) *The CITES Checklist of Succulent Euphorbia Taxa* (Euphorbiaceae) (1997, published by the German Federal Agency for Nature Conservation) and its updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of succulent euphorbias;
- r) *CITES Cactaceae Checklist*, second edition, (1999, compiled by D. Hunt, Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland) and its updates accepted by the Nomenclature Committee, as a guideline when making reference to names of species of Cactaceae;
- s) *CITES Orchid Checklist*, (compiled by the Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland) and the updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of *Cattleya*, *Cypripedium*, *Laelia*, *Paphiopedilum*, *Phalaenopsis*, *Phragmipedium*, *Pleione* and *Sophranitis* (Volume 1, 1995) and *Cymbidium*, *Dendrobium*, *Disa*, *Dracula* and *Encyclia* (Volume 2, 1997);
- t) *CITES Orchid Checklist Vol. 3*, (J.A. Roberts *et al.* 2001, compiled by the Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland) and the updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of the genera *Aerangis*, *Angraecum*, *Ascocentrum*, *Bletilla*, *Brassavola*, *Calanthe*, *Catasetum*, *Miltonia* and *Miltoniopsis*, *Renanthera*, *Rhynchostylis*, *Rossioglossum*, *Vanda* and *Vandopsis*;
- u) *CITES Carnivorous Plant Checklist* (B. von Arx *et al.*, 2001, Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland) and the updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of *Dioneae*, *Nepenthes* and *Sarracenia*;
- v) *Aloe and Pachypodium Checklist* (U. Eggli *et al.* 2001, compiled by Städtische Sukkulentensammlung, Zürich, Switzerland, in collaboration with the Royal Botanic Gardens, Kew, United Kingdom of Great Britain and Northern Ireland) and the updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of the genera *Aloe* and *Pachypodium*; and
- w) *World Checklist and Bibliography of Conifers* (A. Farjon, 2001) and the updates accepted by the Nomenclature Committee, as a guideline when making reference to the names of species of *Taxus*;

RECOMMENDS that Parties use the *Checklist of CITES species* (2001 and its updates) published by UNEP-WCMC as an informal overview of the scientific names that were adopted by the Conference of the Parties for the animal species that are listed in the Appendices of the Convention, and as an informal summary of information contained in the standard references that were adopted for CITES nomenclature;

URGES Parties to assign to their Scientific Authorities the principal responsibility for:

- a) interpretation of the listings;
- b) consultation with the CITES Nomenclature Committee as appropriate;
- c) identification of nomenclatural issues that may warrant further review by the appropriate CITES committee and preparation of proposals to amend the Appendices if appropriate; and
- d) supporting and cooperating in the development and maintenance of the checklists; and

REPEALS Resolution Conf. 11.22 (Gigiri, 2000) – Standard nomenclature.