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

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REPORT OF A SHORT STUDY OF TILLANDSIA XEROGRAPHICA IN GUATEMALA, 17-24 JANUARY 2004

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This is a report to the 14th meeting of the CITES Plants Committee, in pursuance of recommendation 27.2 of PC13.

Background

Of the about 800 Tillandsias, seven species were included in Appendix II at CoP8 (1992).

The Netherlands import several thousands Tillandsias annually, initially all from the wild, more recently as artificially propagated (A). In 1999 several shipments of *Tillandsia xerographica* with wild characteristics were seized in the Netherlands.

Tillandsia xerographica is a slow growing species; plants take 12 to 18 years to mature and produce seeds. After flowering plants produce one or two shoots, which grow on the mother plant within 1 or 2 years, feeding on the mother plant that consequently dies. These shoots are exported as artificially propagated plants. When only one shoot is exported for one plant taken from the wild, the export can not be considered non-detrimental for the species in the wild, as required in Resolution Conf. 11.11.

Imports of 2750 artificially propagated plants into the Netherlands were refused in 2003, because trade in this species was considered to be detrimental for the wild populations.

This issue was discussed in the Scientific Review Group (SRG27) of the European Union, which decided to suspend imports of *Tillandsia xerographica* from Guatemala. The issue was also raised at the 13th meeting of the CITES Plants Committee in August 2003 (document PC13 Inf. 5).

PC13 and SRG27 asked the Netherlands Scientific Authority to organise a study visit to Guatemala: 1) to observe the sustainability of the production and export of *Tillandsia xerographica*, 2) to observe what the status of the species is in the wild, 3) to observe what training is needed, and 4) to make recommendations for a sustainable export in conformity with the provisions of CITES and the relevant resolutions.

A study visit was carried out on 17-24 January 2004 by a small group:
Chris Schürmann, Secretary of the Netherlands Scientific Authority, Eric Gouda, Curator of the Utrecht University Botanical Gardens, Bromeliads expert and Lieselotte Hromadnik, Austria, Bromeliads expert.

Status in the wild

Tillandsia xerographica was and is collected from the wild in Guatemala in huge numbers. The populations in Guatemala and El Salvador are totally depleted by Guatemalan commercial collectors. Many plants are collected from forest reserves. Tillandsia harvest causes substantial damage to tropical and sub-arid forests. The very attractive, slow growing form of *Tillandsia xerographica* from Guatemala is the most popular example for extreme threat by trade. It is offered in trade in large quantities, frequently

in quite big, flowering size specimens. The Mexican form of *Tillandsia xerographica* is not as attractive as the Guatemalan one. As a consequence in southern Mexico some populations still exist (Proposal to CoP8, 1992).

Tillandsia xerographica occurs in the wild in sub-arid area of Guatemala, Mexico and El Salvador at an altitude of 220-600 meter (CITES Identification Manual 1993).

Tillandsia xerographica is classified as Endangered (IUCN, 1997).

On our first day in Guatemala, 18 January 2004, we visited the dry forest area in El Progreso. The richest relict population we found in one large tree (Bombacacea) in the tiny central park of the town San Agustin Acasaguastlan, which had some 80 to 100 mature plants. The park was under reconstruction with an option to cut the tree. We signed a petition for the Chief of the Park, Antonio Sanchez Ayala to protect and maintain the tree.

We counted the plants of *Tillandsia xerographica* we observed from a road (slowly driving) in dry forest area from Los Aristonda to Mora (an area known to have a dominant *Tillandsia xerographica* population in the recent past). We observed 16 plants over a distance of 8 km. at an altitude between 300 and 800 meter. We estimated an average observation distance of 30 to 50 meter and an underscore of 50 to 70 %.

This results in a density of 32 to 125 plants per km2.

At the San Carlos University, Dr. Mario Veliz, Director of the herbarium told us that 5 transects were counted 9 times in 2003 on Monte Spinoso, El Progreso, altitude 200-400 meter. They calculated a population density of less than one plant per km2.

If these data are representative for the whole range, the species is critically endangered in Guatemala.

We visited a private owned (and guarded) area of 1.5 km2, claimed to have some 500.000 *Tillandsia xerographica*. Near the road, where plants had been collected, we saw trees with 2 to 5 plants. Some distance away from the road we observed a apparently almost undisturbed population with 15 to 20 plants per tree. With an estimated 1 to 10 plants per 250 m2, the density could be 4,000 to 40,000 plants / km2.

A normal healthy population of *Tillandsia xerographica* is estimated to be:
> 2000 / km2 (Veliz), > 5000 / km2 (Gouda), > 30.000 / km2 (grower Feldhoff),
or even > 300.000 / km2 (grower Badalamenti).

With a population of less than 5000 / km2, pollination by humming birds may become difficult or impossible (Gouda). Pollination also seems to occur by butterflies or bees, according to others. It is also observed that bees and wasps are robbing nectar by opening the flower at the base, without pollination.

If this assumption is correct a population of 125 plants / km2 can be considered biologically extinct. The remaining plants in a depleted area are still under threat of commercial collection, seen the high price of 1 to 2 USD offered per plant.

More field data over a wider area are required to gain a reasonable idea of the biological status of *Tillandsia xerographica* in Guatemala.

The director of the herbarium, Dr. Mario Veliz, and Ing. Danilo Rodrigues of CONAP (Consejo Nacional de Areas Protegidas), the Nature department of the Government, produced, on our request, two proposals for a survey of *Tillandsia xerographica* in the approximately 2000 km2 potential range in central Guatemala and in an area near El Chico on the Pacific Coast. The two proposals will be integrated and we look now for funding of USD 10.000.

There is currently no protected area of dry forest in Guatemala. The survey could possibly advice on an area that is valuable enough to protect on a legal basis.

Nurseries

We visited 6 nurseries where *Tillandsia xerographica* were produced and exported.

There are 12 registered nurseries for *Tillandsia xerographica* in Guatemala. Only 7 of these have *Tillandsia xerographica* in production now. Another firm buys plants from these nurseries and exports the plants, but does not have any production itself.

On top of that there are several unregistered and thus illegal nurseries/traders, which are not allowed to export, but they probably sell plants to exporting nurseries.

We found the following production systems:

A. Traditional production

80% of the nurseries in Guatemala have traditional production: Plants from the wild get a shoot after flowering. This shoot grows on the mother plant till it is big enough for export. Often the mother plant is then thrown away and new mother plants are bought. Some growers wait for a second and even third shoot to grow. These are less profitable because they grow slower and are smaller than the first shoot.

B1. Advanced production 1

Break off shoots early. The mother plant will then live longer, produce faster and more new shoots, which are of a better quality.

Increases production with 20%.

For this system you need twice as much room as for traditional production, you need infrastructure, better controlled conditions, a relative large mother stock and sufficient labour.

B2. Advanced production 2

Induce early flowering with chemicals.

Increases production with 200%.

B3. Advanced production 3

Stop flowering (top dominance) and induce and increase the forming of new shoots in time and number with chemicals.

Increases production with 100%.

System A cannot produce artificially propagated plants in conformity with CITES Resolution Conf. 11.11. For system B1 this is doubtful. Only system B2 or better B3 seem to provide enough production capacity to be maintained without adding new plants from the wild.

Combinations of these production systems, and different phases of progress were found in some nurseries.

Production indications

After flowering a *Tillandsia xerographica* plant will produce one shoot (sometimes more) that can be harvested at most half a year after flowering. The first shoot is the best and better to be used as replacement for the old mother stock. After removing it from the mother plant it will take at least a year and a half to flower that (shoot) plant and start the next cycle. From flower induction it will take about a year to produce a shoot that can be harvested (from mother plant to mother plant will take about 3 years).

The old mother plant can produce a new shoot (after a few months) that can be ready for selling within a year in small size. A second one will take even longer. If a mother plant can live and produce shoots for

3-4 years (which will be the maximum and each next shoot will grow slower and take longer before it can be taken from the mother plant) it can produce up to 3 small or 2 regular plants in 4 years.

In good conditions it probably is possible to produce one plant per mother stock plant per year and maybe two in small size; under advanced production systems B2 and B3, where mother plants are kept in conditions that foster a healthy and long living mother plant (4-5 years), where chemical flower induction and hormonally induced increased shoot production are implemented, the quantity of shoots produced per mother plant can be improved significantly.

This is an estimation based on the impression we got, but if we look to the amount of produced plants grown from shoots against the number of mother plants (from the wild) on the nurseries using traditional production methods such as A and B1 it must be less than this.

1. **Nursery 1 visited on 21 January 2004.**

Registered with CONAP in 1996.
Obtained last plants from the wild in 1988.
Stock in 2003: 31,000 mother plants and 38,000 plants produced of which 13,000 available for sale.
Plans to produce 47,000 plants in 2004 of which 14,000 will be added to the mother stock and 33,000 (small) plants will be available for sale.
Production system: vegetative propagation through shoots, which are broken from the mother plant by hand when the shoot is still small. Of the shoots produced 30% is added to the mother stock, 70% is available for sale.
Chemicals are used to stimulate early flowering and increase production.
Is experimenting with chemicals (concentrations) to stop flowering (top dominance) and induce and increase the number of shoots.
Is experimenting with propagation from seed which are put on beds. Several hundreds of seed plants in different ages are present. After 1 year plants are 10 mm diameter, after 2 years 60 mm diameter and after 5 years 150 mm diameter. For sale a plant should be 200 mm diameter.
Has controlled conditions: artificial shade, watering, fungi-treatment, different phases on different beds, well organised.
Plants produce on average 6 to 8 shoots over the lifetime of the mother plant of 4 years. Conservative production assessment is 1.5 plant per mother plant per year.
Observers: Data provided seem in conformity with the observed situation. The old mother plants are already many years at the nursery. From counting plants on horizontal tables we estimate that 20% to 40% of the plants is grown from shoots (pups). All other plants are cleaned plants that probably originate from the wild. Beside this there are vertical fences with plants hanging on their inflorescence for producing shoots.
The given production numbers seem realistic. Is capable to produce artificially propagated plants in conformity with CITES Resolution Conf. 11.11.

2. **Nursery 2 visited on 21 January 2004.**

Registered with CONAP in 1999.
Obtained 67,000 plants from the wild in 1999.
Stock in 2003: 120,000 mother plants. Sold 1000 plants to another nursery in 2003.
No plants are available for sale now. Has not yet had any export. Plans to export 20,000 plants in 2004, 150,000 in 2005, 500,000 in 2006 and 1,000,000 plants in 2008. Is expanding the nursery from 3 hectares to 25 hectares in 2008.
Production system: vegetative propagation through shoots, which are cut off from the mother plant with a knife when the shoot is 3 months old. Of the shoots produced 30% is added to the mother stock, 70% is available for sale.
Chemicals are used to stimulate early flowering and increase production.
Does not use chemicals to increase the number of shoots.
Is experimenting with propagation from seed on a small scale, by taking very young plants (5 mm) from the mother plant and putting them on beds. Several hundreds of young seed plants are present.
Has controlled conditions: artificial shade, watering, fungi-treatment, different phases on different beds.
Claims that plants produce 4 shoots in the first year, and 12 to 16 shoots over the lifetime of the mother plant of 4 years.

Has a private area of 1500 hectares with dry forest, where he claims to have 500.000 wild *Tillandsia xerographica.* He is not allowed to collect these plants and add to mother stock.
Observers: Data provided are not completely in conformity with the observed situation. Of all the plants seen, about 90% is from the wild, but already some years at the nursery. All plants are cleaned very thoroughly, so it is more difficult to see whether they are of wild origin. Propagated plants are not necessarily cleaned.
From counting plants on horizontal tables a small amount (some 10%) of the plants is grown from shoots (pups). All the other plants are cleaned plants that probably originate from the wild. Besides there are many vertical fences with plants hanging on their inflorescence for producing shoots, all collected from the wild.
Production of 8-10 shoots seems more realistic than 12-16.
Plants on the front of a row showed 4 or 5 shoots, but further down the row we saw only 1 or 2 shoots. If there were only a few shoots, mostly the first shoot(s) was (were) already cut off. The mother plants were still in very good condition. All plants are cultivated well.
It is not sure whether production of artificially propagated plants is in conformity with CITES Resolution Conf. 11.11, but seems capable to adapt to the right conditions.

3. Nursery 3 visited on 21 January 2004.

Registered with CONAP in 1989.
Obtained last plants from the wild in 1988.
Stock in 2003: some 60.000 mother plants and some 3,000 young plants.
Production system: vegetative propagation through shoots, which are broken from the mother plant by hand when the shoot is still small. Of the shoots produced 30% is added to the mother stock, 70% is available for sale.
Chemicals are used to stimulate early flowering and increase production.
Has developed the most advanced system with chemicals (in low concentrations) to stop flowering (top dominance) and induce and increase the number of shoots.
Has controlled conditions: artificial shade, watering, fungi-treatment. Less organised. Several plants show damage of sun-burn, rotting as result of high humidity and fungus. Plants are rather close together on beds.
Observers: Data provided seem in conformity with the observed situation. The old mother plants are already many years at the nursery.
Is able to produce artificially propagated plants in conformity with CITES Resolution Conf. 11.11.

4. Nursery 4 visited on 22 January 2004.

Registered with CONAP in 1989.
Obtained last plants from the wild in 1995, and bought 2,000 wild plants from other nurseries in 2003.
Stock in 2003: 26,000 mother plants and 52,000 plants growing on the mother plants.
Plans to produce 12,200 plants in 2004 of which 4,500 (20%) will be added to the mother stock and 7,700 plants (80%) will be available for sale and export. Exports small size plants to Japan and regular size plants to the Netherlands.
Production system: vegetative propagation through shoots, which are broken from the mother plant by hand when the shoot is rather big (after 4 to 6 months).
Chemicals are used to stimulate early flowering and increase production.
Is experimenting with chemicals to increase the number of shoots.
Is experimenting with propagation from seed which are put on beds as seeds, but also as very young plants, taken from the mother plant. Some seed beds are present with only a very small amount and small size of *Tillandsia xerographica*. There are some tables with plants grown from shoots, but this is only a small percentage of the whole stock. Most plants are badly cleaned and show all wild characteristics.
Has controlled conditions: artificial shade, watering, fungi-treatment, but different phases are mixed on the same beds.
Plants produce on average 6 to 7 shoots over the lifetime of the mother plant of 4 years.
Observers: Data provided are not in conformity with the observed situation.
Of all the plants seen 80-90% is of wild origin. Some 10% of the plants are shoots, taken from wild plants. At least 1,000 plants were collected from the wild less than a year ago. Plants at this nursery cannot be considered as artificially propagated.

Does not produce artificially propagated plants in conformity with CITES Resolution Conf. 11.11. The grower would have to improve the controlled conditions for the plants substantially. Most of the mother plants - except a stock of newcomers- are in a very bad condition and surely will not propagate enough shoots to keep the stock of mother plants.

5. Nursery 5 visited on 22 January 2004.

Registered with CONAP in 1999.
Bought the nursery in 1999 and obtained no plants since then.
Stock in 2003: 3,000 mother plants and 1, 500 young plants.
Plans to move all plants to nursery 3 in March 2004.
Has not sold any plants and has not exported any plants.
Production system was traditional until now, but will be the same in 2004 as in nursery 3, vegetative propagation through shoots, which are broken from the mother plant by hand when the shoot is still small. Chemicals will be used to stimulate early flowering and chemicals will be used to increase the number of shoots.
Has controlled conditions: artificial shade, watering, fungi-treatment, different phases on different beds, well organised.
Observers: Data provided seem in conformity with the observed situation. The old mother plants are already many years at the nursery. Small beds with some *Tillandsia xerographica* seedlings of 2.5 and 3.5 years old are present.
Does not produce artificially propagated plants in conformity with CITES Resolution Conf. 11.11, but will adapt to the right conditions.

6. Nursery 6 visited on 23 January 2004.

Registered with CONAP in 1999.
Started in 1998 and obtained last plants from the wild in 1999.
Stock in 2003: 6.000 old mother plants, 3.000 new mother plants and 14 young plants from shoots ready for export.
Exports only 500 plants per year in two shipments to Germany.
Production system is 100% traditional. Shoots are left on the mother plant to grow to exportable size. After breaking off the shoot these are directly exported or stored for a short time before export. He obtains 1 or 2 shoots from the mother plant per year. One shoot is added to the stock as new mother plant. Production is 2 or 3 shoots from one wild plant over a period of 2 to 3 years. After 2 or 3 years the mother plants are thrown away.
Observers: Data provided are not in conformity with the observed situation.
Most plants are of wild origin, some have been collected recently in 2003. Some 1000 plants are grown from shoots and more than one year old. Nursery conditions at that altitude (1800 m) is too humid and do not seem right for *Tillandsia xerographica.*
Does not produce artificially propagated plants in conformity with CITES Resolution Conf. 11.11. Even when the grower improves the controlled conditions for the plants substantially, it will be difficult or next to impossible to propagate at this location.

Distinguishing wild and artificially propagated *Tillandsia xerographica*

Artificially propagated plants can be distinguished from wild plants by a range of some 35 biological characteristics. These should be described in an Identification Manual with pictures to assist customs and wildlife inspectors. The characteristics of wild plants found by the group are not exclusive and not decisive for one characteristic and not on basis of one plant. A combination of certain characteristics found in a shipment of more than 100 specimens can provide a strong indication that a plant is wild or propagated from shoots or from seeds.

On the import side some 10 non-biological characteristics can also be used as indicator of a irregular shipment.

Examples of some characteristics:

1. Insect damage
2. Physical damage as result of collecting from wild
3. Irregular form of the plant / uniformity of form

4. Colour of the leaves
5. Stress factors (ringed or striped leaves)
6. Changes in growth pattern, leaf density
7. Form of the leaves (prophylles) at he basis.
8. Size and differences in size
9. Thick trunk.
10. Trunk more lateral than central.
11. Differentiated roots (in the form of a branch) / undifferentiated roots
12. Natural substrate (bark)
13. Many leaves and/or trunk removed / no leaves and/or trunk removed.

Illegal trade

The fact that we found wild plants in some nurseries, which were taken recently from the wild, means either that there must be some areas in Guatemala where the species still occurs in the wild in some numbers, or that there is illegal trade from El Salvador and Mexico. In some nurseries we found Tillandsia species that are only known to occur in Mexico, indicating illegal trade from Mexico. We also found wild Tillandsia species from Brazil. Several people confirmed illegal trade in *Tillandsia xerographica* from El Salvador, Mexico and also Honduras. One grower claims that *Tillandsia xerographica* occurs in Honduras on Monte Cristo, near the border Guatemala, Salvador, Honduras.

Export

Ornamental plants from Guatemala are mainly exported to the Netherlands (43%), USA (32 %) and Japan (5 %). Total export to the European Union is 56%.

Tillandsia xerographica is exported to the Netherlands, Germany, Italy, France and Denmark.

CONREFI

CONREFI is a recently formed NGO for the Conservation, Protection and Investigation of Phytogenetic Resources. One of CONREFI's first objectives is to work with Bromeliad (mainly Tillandsia) and Orchid species, with an emphasis on those in danger of extinction. Some of the specific working plans include to study the situation and number of the species in the wild, to establish a "guideline book" to be implemented by willing Tillandsia producers and regulated and controlled by CONAP to assure the appropriate growing conditions and artificial propagation of Tillandsias in order to control their commercial exports fulfilling requirements of CITES Resolution Conf. 11.11, and to establish a seed-bank and a Tillandsia Garden for investigation and conservation purposes. CONREFI was recently founded by the owners of nurseries 1, 3 and 5 in conjunction with scientific experts with specializations and doctoral degrees in biotechnology, horticultural production and production of renewable natural resources and agronomy. In addition to these founding members CONREFI also includes the support of members with specialties in management, accounting and law. Two of the members, the owners of nurseries 1 and 5, are also members and board members of an important separate organization, the Ornamental Plants Commission of AGEXPRONT, which is the Asociacion Gremial de Exportadores de Productos no Tradicionales (Association of Exporters of Non-Traditional Products). That is a big agricultural export organisation in Guatemala. CONREFI will only allow their members to export when plants are artificially propagated sustainably in conformity with Resolution Conf. 11.11. New members will only be admitted when they act fully in conformity with the rules of CONREFI, which will be officially published. CONREFI is ready to co-operate fully with CONAP, CITES and other AGEXPRONT members who are interested in propagating and growing plants in a non-detrimental manner that is sustainable and in accordance with Resolution Conf. 11.11.

CITES Management Authority and Scientific Authority

The CITES Management Authority and Scientific Authority are part of CONAP (Consejo Nacional de Areas Protegidas), the Nature department of the Government, which is placed directly under the President/Vice-president of Guatemala. With the new government which is recently in power it is possible that CONAP will be placed in the Ministry of Environment.

The work of the MA and SA is mainly done by one person. The head of CONAP, who signs the permits, is the Management Authority, but has many other tasks.

An administrative assistant is proposed to be added in 2004. There is also a proposal to extend the SA from one person into a Scientific Committee with members from the University.

Enforcement

Inspections of CITES shipments are also done by the same person.

Local police seems to be more active recently in controlling transports of Tillandsia, for which a transport permit is required.

Assignment of more inspectors and training of these is necessary.

In 1999 a shipment of 100,000 wild *Tillandsia xerographica* was seized. The plants were confiscated and the trader got a fine of 2000 Quetzal (250 USD). The maximum penalty is 20,000 Quetzal (2,500 USD). The wholesale price of *Tillandsia xerographica* is 1.5 to 2 USD. With a value of 150,000 to 200,000 USD for this shipment, a fine of 250 USD will not discourage illegal trade and a potential fine of USD 2,500 can not be considered to have a preventive effect

Other observations

At most nurseries we saw many other non-CITES species of Tillandsia, most from wild origin. We counted for example many wild *Tillandsia streptophyllia*. This species is endangered in the wild in Guatemala, Mexico and Belize. It is very much in trade, also internationally.

Of the CITES listed species we also observed several thousands of *Tillandsia harrisii*, which seems to be propagated with less difficulties than *Tillandsia xerographica.*

Developments in next months of 2004

The available organisations and infrastructure in Guatemala provide the necessary basis for sustainable production through artificial propagation and export of *Tillandsia xerographica.*

In particular the new NGO CONREFI can assist CONAP and facilitate the work of the Government (inventories, inspections and control) by requiring the necessary conditions from their members.

CONREFI in consultation with CONAP will stipulate the conditions for growing *Tillandsia xerographica* in nurseries in Guatemala. These conditions will be in conformity with national law, CITES and Resolution Conf 11.11. When these conditions are agreed, CONAP will inspect candidate exporting nurseries thoroughly and make a full new inventory of the mother stock, production system and plants produced. Only plants that fulfil all conditions will be allowed for export.

Progress will be reported to the CITES Plants Committee and to the Scientific Review Group of the European Union.

Recommendations

1. A survey is required to determine the distribution area and biological status of *Tillandsia xerographica* in Guatemala.

2. The CITES Management Authority, with the cooperation of CONREFI, needs to formulate the conditions for the sustainable artificial propagation of *Tillandsia xerographica* in nurseries in Guatemala, in conformity with Resolution Conf. 11.11.

   This includes a management plan, minimum requirements for infrastructure, controlled conditions, an advanced system of artificial propagation and a full registration system specifying numbers of mother plants, young plants of different age, shoots produced and plants produced from seed.

3. All nurseries with existing stock of *Tillandsia xerographica* need a renewed registration with CONAP, which should only be given when the conditions as meant in recommendation 2 have been fulfilled.

4. Full new inventories of *Tillandsia xerographica* shall be made of all nurseries, specifying accurate numbers of mother plants of legal origin, young plants from shoots and young plants from seed.

5. Based on existing mother stock and production system, the Scientific Authority shall set a annual quota for every registered nursery. The total of nursery quotas can be communicated as the annual export quota of Guatemala to the CITES Secretariat to be registered in the export quotas notification.

6. The inventory shall be inspected once or twice a year by government inspectors. If the system is designed well, and initial inventories are taken of all nurseries, then less visits will be required in the future for annual quota establishments.

7. Only nurseries with legal mother stock shall be registered.

8. Illegal stocks shall be confiscated and placed under contract between CONAP and CONREFI at a bona fide registered nursery. This could also be done with seized plants and rescued plants.

9. CONAP and CONREFI will search a practical solution for mother stock of unclear origin.

10. A registered nursery is not allowed to buy or sell any plants of *Tillandsia xerographica* without the approval of CONREFI and a permit from CONAP.

11. Several inspectors should be assigned to carry out CITES inspections at nurseries, in the field and to support customs at the borders.

12. Inspectors need to be trained to enforce CITES requirements, in particular to distinguish wild from artificially propagated plants.

13. More capacity is needed in the Management Authority and Scientific Authority of Guatemala.

14. The level of punishment in CITES related national laws of Guatemala should be increased to a level which is relevant in relation to the value of the seized plants.

15. CONAP in cooperation with the scientific community should develop a plan to designate a protected area of sub-arid forest in the distribution range of *Tillandsia xerographica*, if possible where the species still occurs in sufficient numbers, and including a restocking programme.

16. Export will only be allowed for *Tillandsia xerographica* plants, which are artificially propagated in conformity with CITES Resolution Conf. 11.11, from a registered nursery.

17. An identification manual should be produced to assist customs and wildlife inspectors, both in the exporting and in the importing countries for the identification of wild and artificially propagated plants. This could be developed in cooperation with Bromeliads experts, CITES, CONAP and CONREFI.

18. Importing countries are requested to assist Guatemala, as soon as exports will be approved, to control imports of *Tillandsia xerographica* in their country.

19. Range states should investigate and fight potential illegal trade in Tillandsia.

20. Rules and procedures designed and implemented for the cultivation, propagation and export of *Tillandsia xerographica* could be generalized and implemented for all commercial Tillandsia species grown in registered nurseries.

10 February 2004
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