

AGAINST THE GRAIN:

TRADE IN MUSK DEER PRODUCTS IN SINGAPORE AND MALAYSIA

DEBBY NG

ELIZABETH A. BURGESS

A TRAFFIC SOUTHEAST ASIA REPORT



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Layout by Noorainie Awang Anak, TRAFFIC Southeast Asia

Suggested citation: Debbie Ng and Elizabeth A. Burgess (2004): *Against The Grain: Trade in Musk Deer Products In Singapore And Malaysia*

TRAFFIC Southeast Asia

ISBN 983-3393-01-2

Front cover photograph: Musk deer in captivity

Photograph credit: Xu Hongfa/
TRAFFIC East Asia.

AGAINST THE GRAIN: TRADE IN MUSK DEER PRODUCTS IN SINGAPORE AND MALAYSIA

by

Debby Ng
Elizabeth A. Burgess

Credit: © WWF-Canon/Gerald S. Cubitt



**Musk deer *Moschus moschiferus*, Garhwal Himal region,
Uttar Pradesh, India**

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LIST OF ABBREVIATIONS

| | |
|-------------------|---|
| AVA | Agri-Food and Veterinary Authority, Singapore |
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| CoP | Conference of Parties to CITES |
| CPM | Chinese Proprietary Medicine |
| IUCN | World Conservation Union |
| PERHILITAN | Department of Wildlife and National Parks, Peninsular Malaysia |
| TCM | Traditional Chinese Medicine |
| TRAFFIC | The wildlife trade monitoring network |
| UNEP-WCMC | United Nations Environment Programme-World Conservation Monitoring Centre |

ACKNOWLEDGEMENTS

The authors thank the following staff from TRAFFIC Southeast Asia for lending their information and various expertise to the research for this report: James Compton, Noorainie Awang Anak and Chen Hin Keong. Special thanks go to Chris R. Shepherd, who without his mentorship and incessant support, this report would not have been possible.

Roland Melisch (WWF-Germany) and Volker Homes (TRAFFIC Europe) supplied valuable feedback through their reviews. The completion of this report also dues appreciation to Vadivu Govind of AnimalWatch, Singapore, whose creative and insightful ideas helped make this report more exhaustive. The volunteers Hilary Chiew and Julia Ng Su-Chen are thanked for their assistance in the field.

TRAFFIC is grateful to the World Conservation Monitoring Centre (UNEP-WCMC), Lye Fong Keng (Agri-Food and Veterinary Authority, Singapore) and the Department of Wildlife & National Parks, Peninsular Malaysia (PERHILITAN) for their cooperation and assistance in the provision of data.

This study was made possible by the financial support provided by Umweltstiftung WWF-Deutschland, also known as WWF-Germany.

EXECUTIVE SUMMARY

South-east Asia constitutes one of the largest markets outside China for the trade for use in traditional medicines of musk derived from musk deer. The purpose of this study was to investigate the demand for musk in Singapore and Malaysia, to document the trends in musk consumption, to identify the sources of musk and to understand their role in the international trade of musk. Research methods include literature searches, reviews of trade statistics and interviews with Traditional Chinese Medicine (TCM) dealers.

The established status of musk as a highly prized commodity has ensured that it has long been the subject of international trade. Neither Singapore nor Malaysia has any wild or captive populations of musk deer. Therefore, all specimens of musk present in these countries would have been imported from either a musk deer range state or a re-exporting state. Permits show that musk and musk derivatives were imported into Malaysia mainly from mainland China, while in Singapore raw musk was mainly imported from the Russian Federation and Germany, and derivatives were imported from China. Singapore and Malaysia also satisfy the global demand for musk by continuing to play a role in the re-export of musk.

Market surveys for this report were conducted by TRAFFIC between February and June 2003, throughout Singapore and in selected locations in Peninsular Malaysia. It was apparent that a significant consumer market continues to exist. Surveys showed that vials containing dried and/or powdered musk were consistently available in TCM shops of both Singapore and Malaysia. Raw musk prices in Singapore and Malaysia were on average USD30 per gram, although prices were reported to vary considerably between dealers, with the highest price quoted in Singapore at approximately USD100 per gram. Other forms of musk products recorded in the survey include medicated plasters, ointments and pills/capsules. The products were believed by dealers in Malaysia to have originated from musk deer farms, though according to Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) records, sources of musk derivatives were mainly from wild musk deer.

In terms of international trade, all populations of musk deer are afforded some level of protection by being listed in CITES Appendix I or II. International trade in musk deer and the musk from populations listed under CITES is allowed with proper permits. As Parties to CITES, both Singapore and Malaysia are obliged to monitor and report the international trade in musk deer. However, there is a high occurrence of inconsistencies in the CITES annual reports on which UNEP-WCMC data are based. Despite musk deer being a listed species which should be regulated under the Convention, both Singapore and Malaysia have failed to report any trade in musk deer derivatives in their Annual Reports. China reports the export of large quantities of musk derivatives to both Singapore and Malaysia, predominately in the form of Chinese patent medicines. The trade in parts and derivatives regulated by one Party is not always subject to the regulation in others. CITES stipulates that all goods labelled as containing any CITES species (such as patent traditional medicines), should be treated in law as actually containing them.

Some of the transactions reported by CITES Parties do not allow for the calculation of the actual volumes of musk, and therefore extrapolation to the number of musk pods and in turn, male musk deer individuals affected by trade is impossible. One of the largest challenges faced by authorities in monitoring and regulating the trade in musk is that labels on TCM products do not identify the amount of musk contained

in the product, and much of the trade in musk is recorded as derivative compounds in unknown units. Trade in musk derivatives are reported as boxes, cartons, and specimen counts, providing no standard units of measure for which to reliably quantify the volume of musk. Without an accurate quantification of how much musk is contained in these products, and unless a standard unit is used in the reporting of imports and exports, an accurate understanding of the number of musk deer harvested to supply the global musk trade cannot be determined.

In many range countries, laws to protect musk deer exist yet wild populations are declining because of over-exploitation to meet the high demand for musk in traditional medicines. While international CITES trade records, maintained by UNEP-WCMC, provide an indication of the main trading nations and origin of musk in trade, it is often not possible to ascertain the quantity of musk in trade. Lack of clarity is due to a variety of reasons, inter alia:

- it is not clear whether records of musk in trade refer to musk grains or to whole musk pods;
- often musk deer species are reported only at the genus level;
- no record of country of origin (crucial for establishing the protection of musk deer species, since some populations are prohibited from exploitation and trade); and
- lack of standardised units for recording international trade in musk derivatives.

The report concludes that the use of musk from *Moschus* spp. requires further regulatory scrutiny in order to reduce the likelihood of illegal trade, particularly in products and derivatives. Appropriate and standardised labelling of medicinal products containing natural musk deer in the TCM industry should be considered.

This report also highlights concerns pertaining to the inadequacy of the national legislations of both Singapore and Malaysia as significant consumer countries of musk from musk deer. The Endangered Species Act 1989 of Singapore and the Protection of Wild Life Act 1972 of Malaysia do not allow for the comprehensive management and conservation of musk deer as CITES-listed species. In Singapore and Malaysia, the implementation of CITES is hampered by the lack of clear legal controls on the trade of medicines which contain, or purport to contain musk, as only readily recognisable parts appear to be covered by Singapore's and Malaysia's legislations. At the 11th meeting of the Conference of the Parties to CITES (CoP 11), *Decision 11.83* stated that the Standing Committee should review the actions taken by key musk deer range, transit and consumer States. Both Singapore and Malaysia were highlighted in this Decision and urged to improve enforcement and to implement further trade controls. The ongoing musk trade in Singapore and Malaysia exemplifies the urgent need to comprehensively review and revise legislation regulating trade in traditional oriental medicines containing CITES-listed species. Furthermore, at the 50th meeting of the Standing Committee, the CITES Secretariat brought to the attention of the Conference of the Parties that Malaysia should give priority attention to the development of adequate legislation to implement the Convention (Anon., 2004).

BACKGROUND AND INTRODUCTION

Approximately 80% of the world's population of more than 6 billion people rely on animal and plant-based medicines for primary health care (Anon., 1993). Ingredients sourced from wild animals and plants are not only widely used in traditional medicines, but are also increasingly valued as raw materials in the preparation of modern medicines and herbal preparations. Increased demand and increased human populations are leading to increased and often unsustainable rates of exploitation of wild-sourced ingredients. One of the most frequently listed ingredients in traditional oriental medicines is musk derived from musk deer (Cameron *et al.*, 2004).



Credit: WWF-Canon/Grigori Mazmanjants

**Siberian musk deer *Moschus moschiferus*,
Russian Federation**

Musk, which is taken from the scent gland of male musk deer, *Moschus* spp., is used in some 300 Traditional Chinese Medicine (TCM) prescriptions (Mills, 1998). Musk has been used in Asia since the fourth century, signifying that it has long been an important trading commodity and communities continue to rely on it as a traditional remedy. The demand for musk for its use in medicine poses the biggest threat to musk deer. Musk deer are native to Asia but natural musk and products containing musk are used and traded worldwide, and therefore, the conservation of musk deer is a global concern.

South-east Asia constitutes one of the largest markets for the trade of musk (Homes, 1999). Chinese communities in Singapore and

Malaysia consider TCM practices to be an integral part of their culture, and TCM has been practised by various ethnic groups long before the introduction of modern medical systems (Soepadomo *et al.*, 1989). Furthermore, both Singapore and Malaysia are considered important centres for international trade links. This study aims to describe the use of musk and musk products in traditional medicine practices and to determine the role of Singapore and Malaysia in the global trade of musk.

Musk deer distribution and conservation status

Musk deer, *Moschus* spp., are relatively small deer species from a unique taxonomic family, the Moschidae, with a head to body length of 70-100 cm, a height at the shoulder of 50-61 cm and a weight of 7-17 kg (Nowak, 1991). Musk deer do not have antlers, but both males and females possess clearly elongated upper canine teeth that project far below the lower lip and are visible when the mouth is closed. The word 'musk' derives from the ancient Indian word 'muskah' meaning testicles. A musk gland or *pod* between the naval and genitals of the male (three years of age or older) secretes a brownish wax-like substance known as musk.

There is no consensus on the classification of musk deer. However, it is broadly agreed that there are four species occurring in at least 13 countries in South Asia, East Asia, South-east Asia and the eastern part of the Russian Federation (see **Table 1**). Musk deer are distributed from the Arctic Circle in Russia to north Mongolia and the Korean peninsula, around the Gobi desert to China, the Himalayan region, Afghanistan, Pakistan, Nepal, Bhutan and south to India, Myanmar and Viet Nam. The population status of musk deer is largely incomplete and there is a paucity of reliable survey data. Musk deer are distributed sporadically throughout the region in forested mountainous parts, and present a challenge in assessing population numbers. Recent population surveys in the Russian Federation predicted populations in the Russian Far East to be estimated at about 140 000 musk deer (Homes, 2004), and the most recent estimate for China is 200 000-300 000 musk deer (ESSC, 1998 in Anon., 2000a). Populations of musk deer are declining significantly throughout their distribution (Wemmer, 1998). All species of musk deer have been listed as 'Vulnerable' or 'Lower Risk-Near Threatened' on the IUCN Red List of Threatened Species (Anon., 2003a; **Table 1**).

There are primarily two reasons for the depletion of musk deer populations - loss of habitat and the hunting of musk deer to obtain musk (Wemmer, 1998). Though laws to protect musk deer and their habitat exist throughout their range, wild populations in all range countries in Asia and the Russian Federation continue to decline, due mainly to the high demand for musk (Homes, 1999). The indiscriminate methods employed to kill male musk deer, such as snares, mean that at least three to five animals may have to be killed in order to secure one male with a sufficiently large musk gland (Green, 1986, in Homes, 1999).

With the purpose of improving control of international trade, all species of *Moschus* spp. were included in the Appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1979. The musk deer populations of Afghanistan, Bhutan, India, Myanmar, Nepal and Pakistan were included in Appendix I with the effect that international commercial trade in musk deer or parts of musk deer from specimens of wild origin from these populations is prohibited. All other musk deer species are listed in Appendix II and, as such international trade is allowed but strictly monitored, according to the provisions of the Convention (**Table 1**, Anon., 2000). The Himalayan Musk Deer and the Black Musk Deer are split-listed under CITES, with some populations under Appendix I and others in Appendix II. There are no musk deer species listed under Appendix III which covers species for which a country requests the assistance of other Parties to protect.



Credit: Xu Hongfa/TRAFFIC East Asia

Musk deer at a captive breeding centre

Musk harvesting and extraction – wild versus captive-bred

The gland of the musk deer used in trade is about 4-6 cm long and 3.5-4.5 cm wide and 4-5 cm deep, and is situated between the abdomen and the genitals of the male animal. When removed from the animal, the gland is dried, whereupon the secretion contained within the gland becomes granular and powdery (Mukerji, 1953, in Homes, 1999). Musk may enter trade either as whole

Table I
Distribution, status and CITES-listing of *Moschus* spp.

| Scientific name | English common name | IUCN Red List status | CITES Appendix | Range State |
|------------------------|---------------------|----------------------|----------------|--|
| <i>M. berezovskii</i> | Forest Musk Deer | LR/nt | II | China and Viet Nam |
| <i>M. chrysogaster</i> | Himalayan Musk Deer | LR/nt | I II | Afghanistan, India, Nepal and Pakistan China |
| <i>M. fuscus</i> | Black Musk Deer | LR/nt | I II | Bhutan, India, Myanmar and Nepal China |
| <i>M. moschiferus</i> | Siberian Musk Deer | VU | II | Russia, Kazakhstan, Kyrgyzstan, China, the Korean Peninsula and Mongolia |

Sources: Wemmer, 1998; Anon., 2003a; IUCN, 2004.

VU – Vulnerable identifies a species which is not endangered but is facing a high risk of extinction in the wild in the medium-term.

LR/nt - Lower Risk-Near Threatened signifies that the species, upon evaluation, does not satisfy the criteria for the Vulnerable category, but is close to qualifying as Vulnerable.

CITES Appendix I – includes species threatened with extinction that are, or may be, affected by trade. International commercial trade is prohibited.

CITES Appendix II – includes species that may become threatened if trade in them is not controlled. These species listed can be traded with the relevant permits and provisions.

Pods or as granular contents of the pod. On the market, the genuine pod of a musk deer is walnut-sized, covered in fur and after drying will contain red-brown to black granules and powder of musk (Cameron *et al.*, 2004). Because of the small quantity of musk obtained per animal, a high price is paid for this product, and musk is reputed to be the most expensive animal products in the world.

Musk is traditionally harvested by killing the deer, but it is possible to obtain musk from a live deer and farming of the deer for musk is in experimental stages. Since the inception of musk deer farming in the 1950s, farming has inadequately served the demands for musk, with the captive population of musk deer being hit with disease, high mortality and low reproduction rates (Parry-Jones and Wu, 2001).

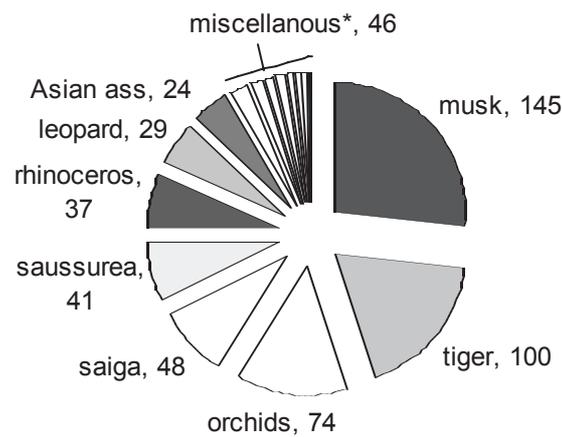
The weight of a musk pod and the amount of musk that can be obtained from one pod varies between species, seasons and individuals. Wild musk deer are reported to produce on average 25 g of musk from a single animal (Green, 1989, in Parry-Jones and Wu, 2001). Whereas, captive males only produce 7-17 g of musk, annually per individual. It appears that musk deer farming by far cannot satisfy consumer demand (Parry-Jones and Wu, 2001), and ultimately wild populations continue to be pressured by hunting and poaching. Furthermore, the musk extracted from wild musk deer contains more soluble crystals [the prized compound extracted for use in TCM (Anon, 1997)] than that of captive musk deer, and thus drives the continued hunting and poaching of wild musk deer.

Uses of musk

For over 5000 years, musk has been used in the production of medicines and perfumes. Today, the demand for musk to be used in traditional medicine is much higher than that of the perfume industry (Homes,

1999). It is reported that musk is contained in more than 300 traditional East Asian medicine preparations, being prescribed both as a sedative and a stimulant (Mills, 1998; Homes, 1999). In an identification guide for traditional Asian medicines in trade, musk deer was the most frequently listed ingredient of the medicines documented (Figure 1, adapted from Cameron *et al.*, 2002).

Figure 1
Proportion of CITES-listed animal and plant species listed in the ingredients of 544 traditional Asian medicines



Source: Cameron *et al.*, 2002

Scientific names for species are: Asian Wild Ass *Equus hemionus*, Leopard *Panthera pardus*, Saiga Antelope *Saiga tatarica*, Tiger *Panthera tigris*, and Musk Deer *Moschus* spp.

* Miscellaneous species are monkey (13), ginseng (8), seahorse (6), snake (5), pangolin (5), elephant (4), crocodile (3), and turtle (2).

In South-east Asia, musk continues to be a popular Traditional Chinese Medicine (TCM) for the effective treatment of improving blood circulation and relieving ailments of the heart, nerves and breathing system. It is allegedly a cardiac, circulatory, respiratory, and sexual stimulant, as well as a sedative for nervous disorders. It occurs in three dominant forms, as oils or sprays, medicated plasters and raw musk powder (which may be applied externally or consumed).

MUSK AND TRADITIONAL CHINESE MEDICINE IN SINGAPORE

Singapore has an estimated 800 Chinese medicine shops located within the country's public housing estates. Media reports have referred to a survey conducted by Singapore's Ministry of Health in 2001, which notes that approximately 10 000 Singaporeans visit TCM physicians everyday (Anon., 2001). TCM is seen as a complement to the Western-based healthcare system (Govind and Ho, 2001), and is regarded as part of Singapore's heritage and Chinese culture (Anon., 1995).

Singapore's regulatory framework

Singapore became a party to CITES in 1986. As a CITES-listed species, musk deer fall within the scope of Singapore's national legislation for the implementation of CITES - the *Endangered Species (Import and Export) Act 1989*. This Act is the national legislation that gives effect to CITES controls on the import and export of wildlife and their products. Musk deer are protected under the Act by being listed in both Schedule One as a protected animal, and under Schedule Two which protects animal parts and derivatives. Thus, any international trade in specimens, animal parts and derivatives of musk deer must be accompanied by the relevant permits. The Act applies to any import or export transactions undertaken by commercial organisations, scientific institutions, zoos, tourists, migrants and the general public.

Possession, display, or sale of any illegally imported wildlife product is an offence. Contravention of these regulations is punishable by a fine of up to SGD5000 (USD2800) or imprisonment for up to 12 months, or both, in the case of recidivism. The implementation and enforcement of CITES in Singapore is carried out by the CITES Department of the Agri-Food and Veterinary Authority (AVA) of Singapore. The Customs and Excise Department works with the AVA to enforce CITES at all of Singapore's entry and exit points.

On analysis, the *Endangered Species (Import and Export) Act* does prohibit the trade of musk deer specimens and derivative parts, such as musk, musk grains, musk pods and musk glands through Singapore. However, the implementation of CITES is hampered by the lack of a clear legal prohibition on the trade of medicines which contain or purport to contain musk, as only readily recognisable parts and derivatives appear to be covered by the Act; the schedules specifically list musk, musk grain, musk pod and musk gland. There is a need to clarify that manufactured and processed medicines containing protected species should also be covered by the law.

Medicines containing musk are regulated under Singapore's *Medicines Act 1975*, *Medicines (Labelling of Chinese Proprietary Medicine) Regulations 1998* which imposes provisions on the labelling of all Chinese Proprietary Medicines (CPM). All traditional medicine products are required to have full labelling in English with information such as the brand name, the appropriate non-proprietary name of the CPM, the batch reference number and the expiry date. A CPM Advisory Committee is established under the *Medicines Act* to advise the Ministry of Health on the evaluation and granting approval on CPM products, manufacturers and importers/wholesalers. These regulations are enforced by Singapore's Health Sciences Authority, though enforcement activities currently carried out are targeted more towards safeguarding the

public for toxic substances, prevention of adulteration and exaggerated claims (Anon., 2004a). Dealers registering Chinese medicines containing substances listed under the *Endangered Species (Import and Export) Act*, such as musk deer are advised to further contact AVA as the CITES Management Authority.

MUSK AND TRADITIONAL CHINESE MEDICINE IN MALAYSIA

Malaysia's traditional medicine market was estimated to be worth about MYR5.4 billion (USD1.4 billion) in 2002, with a growth rate of 15-20% annually (Pereira *et al.*, 2002). Within Malaysia's overall traditional medicine profile, the users of TCM are predominantly of Chinese ethnicity, which amount to approximately 26% of Malaysia's population (Pereira *et al.*, 2002). Despite the growth of modern medicine, TCM continues to be used extensively.



Credit: Xu Hongfa/TRAFFIC East Asia

Young musk deer

Malaysia's regulatory framework

Malaysia became a Party to CITES in 1978. Responsibility for implementation of CITES in Malaysia is divided between the Federal Government (for the States of Peninsular Malaysia), and the State governments of Sabah and Sarawak on the island of Borneo. Each is responsible for the implementation within its jurisdiction. Since this report deals only with musk traded in Peninsular Malaysia, the following legislative review will be relevant to Peninsular Malaysia only, excluding Sabah and Sarawak.

In Peninsular Malaysia, the implementation of CITES regulations is the responsibility of the Department of Wildlife and National Parks (PERHILITAN), as the CITES Management Authority. Peninsular Malaysia does not have any specific laws for the implementation of CITES, but most species protected under CITES are covered in the *Protection of Wild Life Act 1972* which was amended in 1991 to include CITES Appendix I, II and III species in the Act's schedules of protected animals. Musk deer are protected under the Act by being listed under Schedule Two as a 'protected wild animal'.

The provisions of the *Protection of Wild Life Act* stipulate that all musk deer species are protected, and no person shall import into or export from Peninsular Malaysia; or trade in any protected wild animal or part thereof, without a granted licence or permit. Violation of this regulation can result in a fine of up to MYR5000 (USD1319) or imprisonment for up to two years, or both, for each missing licence. The law further states that any dealer in musk deer parts must keep records of his purchases and sales with the fine for non-compliance reaching up to MYR2000 (USD528) or imprisonment of up to one year, or both.

However, because of the difficulties involved in identifying the presence of musk deer compounds in pharmaceutical preparations, such prosecutions rarely, if ever, take place. This is significant since the *Protection of Wild Life Act* does not cover derivatives of protected animals, and hence, dealers do not

require a licence to trade in musk derivatives (Loo Kean Song, CITES Management Authority of (Peninsular) Malaysia *in litt.* to TRAFFIC, May 2004). Peninsular Malaysia does not have a ‘purports to contain’ clause in its legislation. The *Protection of Wild Life Act* refers to ‘parts’ of protected animals that cannot be traded, and therefore there is a need to clarify that manufactured and processed medicines containing protected species should also be covered by the law.

While the Department of Wildlife regulations largely overlooks the sale of musk deer derivatives, such processed medicines are afforded some attention by the Ministry of Health in Malaysia. It is compulsory under the *Control of Drugs and Cosmetics Regulation 1984* for all pharmaceutical medicines and traditional products in Malaysia to be registered with the Ministry of Health. This legislation extends to any foreign company wishing to distribute pharmaceutical or medicinal products in Malaysia. The Drug Control Authority is the executive body established under this Regulation, whose main task is to ensure the safety, quality and efficacy of pharmaceuticals that are marketed in Malaysia. The Drug Control Authority also ensures that all registered products are labelled according to stipulated labelling requirements.

Every registered product is given a registration number, which must be printed on its label or package. These numbers start with ‘MAL’ or ‘PBKD’, followed by 6 or 8 digits, and ending with the letter ‘T’ for traditional medicine products (Pereira *et al.*, 2002). The registration procedure involves samples of the product being requested for screening, laboratory analysis and full evaluation. A product will be registered only if it satisfies all the requirements of the Drug Control Authority, especially with respect to safety, efficacy and quality of the product. Criteria taken into consideration include aspects like the potential of abuse, and different dosage levels. After a product is registered, the applicant can apply for a license to manufacture, import or wholesale.

The Ministry of Health defines a traditional medicine as ‘any product employed in the practice of indigenous medicine, whereby the drugs used consist of one or more naturally occurring substances of animal, plant or mineral or part thereof, or in extract form or non-extracted form, and any homeopathic medicine’. Thus, any product containing musk deer derivatives imported into or sold in Malaysia is required to be registered with the government health authorities.

METHODS

Information regarding Singapore and Malaysia’s role in the international trade of musk deer was sourced from trade statistics as reported by CITES Parties in annual reports between 1990 and 2001. These annual reports are compiled by the UNEP-World Conservation Monitoring Centre (WCMC). Inconsistencies are inherent in the CITES annual reports of which UNEP-WCMC data are based (Anon., 2003b), and this should be taken into account when considering the trade information presented. In analysing the records on musk deer trade, it should be highlighted that a standardised system for reporting musk quantities in trade appears to have not been used by monitoring authorities. Therefore, analyses in this report are centred on those figures where metric quantities were recorded. Quantities expressed in ‘boxes’ and ‘cartons’ are considered non-standard units (following Wijnstekers, 2001).

To review the domestic trade and uses of musk in Singapore and Malaysia, 106 vendors of Traditional Chinese Medicine (TCM) (of which six were actual TCM physicians) were informally interviewed between February and May 2003. Surveys were conducted in TCM stores throughout Singapore and in the greater city environs of the Klang Valley in Malaysia which encompasses the urban areas of Kuala Lumpur, Klang, Port Klang, Petaling Jaya, Ampang and Puchong. The locations chosen and surveyed for this study were based on findings during other studies on the trade of animals in TCM practices (Govind and Ho, 2001). Fifty-three stores were surveyed in Singapore, which comprises approximately 10% of all listed TCM establishments in the country. In Malaysia, 55 shops were surveyed in the Klang Valley environs.

Each store was visited once during the survey. Retail assistants or shop owners were questioned by researchers to ascertain (i) availability of musk; (ii) type of musk products available; (iii) prices of musk products; (iv) recommended prescriptions; (v) consumer demographics; and the (vi) source of musk (Annex 1; Alchin, 1994). Attention was paid to the labels or packaging of musk products, noting the ingredients list, country of manufacture and any other significant information, including if there was a unique reference number present.

In this report, the word ‘musk’ refers to the unprocessed, raw form of musk extracted from musk deer *Moschus* spp., unless otherwise stated. ‘Derivatives’ as reported by UNEP-WCMC is taken to mean musk as an ingredient in patent medicines and manufactured products. Musk derivatives can be contained in plasters, capsules/pills, medicine balls, powders, resin blocks, liquids and other miscellaneous forms (Cameron *et al.*, 2004). The term ‘patent medicine’ is used to refer to medicine compounds which have been manufactured by an organisation or individual establishment according to a fixed proportion of varying compounds into a conveniently applicable or consumed form. **Table 2** lists the different naming systems for musk deer products documenting the common (English) name, Chinese characters, Chinese pinyin and Roman text. Pinyin is the phonetic translation of Chinese characters, and Roman text is the traditional pharmaceutical name given to the ingredients. Both pinyin and Roman are often used on traditional medicinal packaging in addition to Chinese characters.

All prices in this report are quoted in the local currency of Singapore dollars (SGD) and Malaysian ringgit (MYR) and converted into US dollars (USD). The currency exchange rate used for this report was that at the time of the research SGD1 = USD0.56 and MYR1 = USD0.26 (April, 2003).

Table 2
Common inscriptions used to describe musk deer on the packaging of Traditional Chinese Medicine products

| COMMON NAME | CHINESE CHARACTER | PINYIN | ROMAN |
|-------------|-------------------|-----------|------------------|
| MUSK DEER | 麝 鹿 | SHE | MOSCHUS CERVI |
| MUSK | 麝香 | SHE XIANG | MOSCHUS |

Source: Cameron *et al.*, 2002

RESULTS

Uses of musk and musk products

Musk is described medicinally as a cardio-tonic stimulant, with an effective dosage of 0.2-0.38 g (Keys, 1976). Musk purchased in vials of one *fen*, a traditional measure weighing 0.38 g, is said to be good for up to two servings, though some physicians claim it can meet four servings. The musk powder can be dissolved into water then used as a salve on parts of the body that suffer rheumatic pains. Musk powder can also be dissolved into wine or ginseng tea and consumed to improve the body's blood circulation. Preparations of musk can be used for both external and internal applications.

Musk oils can be bought 'off the shelf' or blended with snake bile or various plant herbs. These are used to obtain immediate and short-term relief of rheumatic and muscular pains caused by blood stasis. The website, www.tcm-treatment.com, suggests that blending musk with eight other herbs can promote blood circulation, which in turn can wake a patient from unconsciousness and arrest epilepsy.

Musk plasters are used primarily to soothe rheumatic pains in the limbs, like rheumatic balms. They are said to be able to dispel wind in the joints, clear the capillaries, invigorate *qi* ('life force') and blood circulation, thereby stopping rheumatic pains in the joints, lower back or limbs (Fratkin, 1997). Because musk generally promotes the flow of blood, most ailments which it is said to be able to treat are related to poor circulation.

Physicians strongly suggest that only a person certain of the procedures and dosages should engage in the preparation and use of musk. During this survey, all dealers with the exception of one, claimed there were several herbal alternatives to musk. They explained that a range of herbs mixed together could provide the same treatment as musk products, such as *Chin Koo Tieh Shang Wan* rheumatic pills. Two dealers advised that proper medical treatment be sought from a doctor instead of insisting on the use of musk.

International trade and Singapore

Neither Singapore nor Malaysia has any wild or captive populations of musk deer. Therefore, all specimens of musk present in these countries would have been imported from either a musk deer range State or a re-exporting State that deals with the musk in its raw form or deals in the packaging of musk products. Both countries also have a significant role in the re-export trade of musk to the international market. With all musk deer being listed on at least Appendix II of CITES, specimens originating from musk deer require export permits in order to be exported legally, these permits must then also be received and approved by the importing country. Trade of a CITES-listed specimen between two CITES Parties is required, according to the Convention, to be reported by both the country of export (or re-export) and country of import in an annual report of trade to the CITES Secretariat.

All CITES-reported trade in *Moschus* spp. involving Singapore and Malaysia were recorded as being for commercial purposes. There are significant differences in the *Moschus* spp. trade reported by Singapore

and that reported by importing countries which makes it difficult to assess actual trade volumes, therefore both records were summarised. CITES annual trade data for trade in *Moschus* spp. involving Singapore and Malaysia are summarized in **Tables 3 -6**.

Imports into Singapore

From previous TRAFFIC reports, Singapore was highlighted as being one of six major importing countries of musk worldwide, with total import volumes of more than 100 kg between 1978 and 1996 (Homes, 1999). CITES Annual reports 1990-2001, show that Singapore continues to import high volumes with a total of 86 kg of raw musk reportedly imported over the 11 year period analysed (**Table 3**). While Singapore's CITES annual reports record receiving raw musk imports, no imports of musk derivative products were reported (despite exports of musk derivatives to Singapore being reported by China). China is considered the world's major exporter of musk deer derivatives (Homes, 1999), which are traded as traditional Chinese medicines (Parry-Jones and Wu, 2001).

This unreported trade of musk derivatives into Singapore appears to be significant. CITES trade reports from China record that Singapore was the export destination for over 1 million specimens of musk derivatives (recorded in units of boxes, cartons and specimens), between 1990 and 2001 (**Table 3**). It is unclear exactly how much musk is contained within the derivative products as figures are reported without standardised units.

Musk products imported into Singapore are most commonly attributed to *M. moschiferus* (Appendix II) (**Table 3**). Where recorded, all sources of musk were taken from the wild, except for one reported consignment of 5 cartons of derivatives exported from China in 1994 which were sourced from *M. moschiferus* bred in captivity.

Table 3
Summary of all musk imports into Singapore (SG) from 1990 to 2001, according to CITES annual report data (SG reported no trade in musk derivatives)

| Country of export/re-export | Year | TOTAL MUSK | | | TOTAL MUSK DERIVATIVES** | | |
|-------------------------------------|------|--|-------------------------------------|---|---|--|--|
| | | Quantity as reported by country of export/re-export (kg) | Quantity imported as reported by SG | Quantity as reported by country of export/re-export (boxes) | Quantity as reported by country of export/re-export (cartons) | Quantity as reported by country of export/re-export (units unknown*) | |
| China | 1990 | | | 45 800 | 1649 | 50 | |
| | 1991 | | | 10 | 2107 | 150 000 | |
| | 1992 | | | 151 000 | 901 | | |
| | 1993 | | | | 113 | 2000 | |
| | 1994 | | | 2500 | 30 | 116 040 | |
| | 1995 | | | 2000 | | 90 000 | |
| | 1996 | | | | 20 | 270 000 | |
| | 1997 | | | 7500 | | 45 000 | |
| | 1998 | | | | | 61 000 | |
| | 1999 | | | | | 66 000 | |
| | 2000 | | | 2000 | | 119 000 | |
| 2001 | | | 500 | | 82 000 | | |
| Germany (origin Russian Federation) | 1995 | 10 | 10 | | | | |
| | 1996 | 16 | | | | | |
| | 1998 | 5 | 5 | | | | |
| Hong Kong (origin USSR) | 1990 | 1 | 1 | | | | |
| | 1994 | 16.991 | 17 | | | | |
| Russian Federation | 1995 | 2 | | | | | |
| | 1996 | | 1 | | | | |
| | 1999 | 13.27 | | | | | |
| USSR | 2000 | | 13 | | | | |
| | 1991 | 21 | | | | | |
| Total | | 85.261 | 47 | 211 310 | 4820 | 1 001 090 | |

Source: UNEP-WCMC CITES Trade Database

* No units were recorded in the CITES trade reports, and the figure is assumed to represent the total number of packages of musk derivatives (e.g. pills, plasters) (Anon., 2003b).

** No trade in musk derivatives were reported by Singapore as the importing country.

Re-export from Singapore

Based on CITES annual report data, Singapore re-exported musk to six destination countries between 1990 and 2001 (**Table 4**). According to the import records of destination countries, South Korea and Hong Kong were the main importers of raw musk re-exported from Singapore, reporting 59 and 29 kg respectively.

For the period analysed, Singapore reported re-exporting 82 kg of raw musk and has no CITES trade records for the re-export of derivatives, though both New Zealand and the United States report importing musk derivatives from Singapore. These derivative shipments were reported under source codes indicating confiscated or seized specimens entering New Zealand and the United States. Since derivative shipments re-exported from Singapore were not reported by the country's CITES Management Authority, it is possible that Singapore's share of the re-export trade of musk derivatives could be larger than indicated by the CITES data, and therefore it may play a more significant role in the global trade of musk.

Since mid-1990, it appears as though Singapore's re-export of raw musk has declined, while the re-export of musk derivative products has been on the increase (**Table 4**). However, since all records of musk derivative shipments out of Singapore are from confiscated or seized specimens it is unclear whether market demand has increased or if enforcement of illegal trade has improved.

In the global trade of musk, Singapore is considered to be a major re-exporter of its musk imports (Homes, 1999). To investigate the dynamics of the import and export trade in Singapore, only trade of raw musk is examined in detail, since it is traded in standardised units and quantities which can be compared. **Figure 2** compares the records for the quantity of raw musk per kilogram imported to, and re-exported from, Singapore between 1990 and 2001, which shows that Singapore continues to act as an entrepot for the international trade of raw musk. The largest reported re-export of raw musk was one shipment of 29 kg in the year 1993. This quantity of musk recorded was higher than any other consignment entering or exiting the country. Since the previous years recorded no imports of musk, it could be inferred that this re-export of musk from Singapore was either from stockpiled musk or could potentially have been musk illegally imported into the country.

Table 4

Summary of all musk re-exported from Singapore (SG) from 1990 to 2001, according to CITES annual report data

| Country of import | Country of origin | Year | TOTAL MUSK (kg) | | TOTAL MUSK DERIVATIVES*** (units unknown*) |
|-------------------|-------------------|------|---|--|--|
| | | | Quantity re-exported as reported by SG | Quantity as reported by country of import | Quantity as reported by country of import |
| France | SU | 1990 | 1 | 1 | |
| Hong Kong | SU | 1990 | 8 | 8 | |
| | SU | 1992 | 5 | 5 | |
| | RU | 1996 | 20 | 10 | |
| | RU | 1997 | | 6 | |
| Japan | SU | 1991 | 4 | | |
| | SU | 1992 | 2 | | |
| | RU | 1994 | 2 | 2 | |
| | RU | 1996 | | 1 | |
| South Korea | CN | 1993 | | 29 | |
| | RU | 1994 | 15 | 15 | |
| | RU | 1995 | | 10 | |
| | RU | 1996 | 10 | | |
| | RU | 1998 | 5 | 5 | |
| New Zealand | RU | 2000 | 10 | | |
| | ? | 1996 | | | 10** |
| | ? | 1997 | | | 2** |
| | ? | 1998 | | | 8** |
| | ? | 1999 | | | 13** |
| United States | ? | 2001 | | | 46** |
| | ? | 1990 | | | 2** |
| | ? | 1993 | | | 1** |
| | ? | 1996 | | | 4**, 1 |
| Total | | | 82 | 92 | 87 |

Source: UNEP-WCMC CITES Trade Database

* No units were recorded in the reports, and the figure is assumed to represent the total number of specimens (Anon., 2003b).

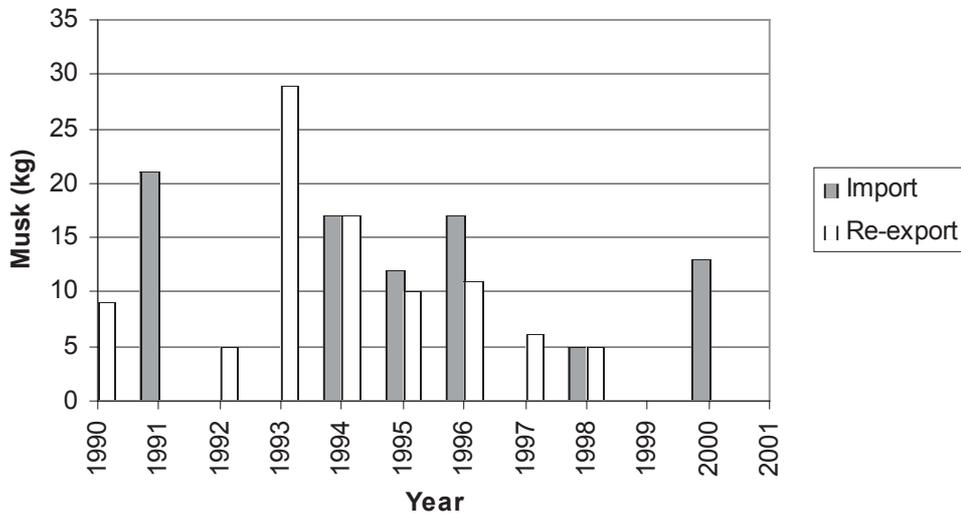
** Specimens were reported as confiscated or seized specimens by importing country.

*** No trade in musk derivatives were reported by Singapore as the re-exporting country

Note: CN = China; SU = USSR; RU = the Russian Federation

Figure 2

Net trade of raw musk (kg) in Singapore from 1990 to 2001, according to CITES trade data



Source: UNEP-WCMC CITES Trade Database

International trade and Malaysia

The CITES Annual Reports for Malaysia between 1990 and 2001 record no imports or re-exports of *Moschus* spp. It is important to emphasise that Malaysia does not adequately regulate international trade in patent medicines containing musk (see section on *Malaysia's regulatory framework*), and derivative specimens are neglected in CITES reports by Malaysia. The following analyses are based upon trade reports from other source and destination countries which are Parties to CITES that have recorded musk trade with Malaysia. It should be highlighted that 12 out of 16 (75%) reports of musk re-exports from Malaysia were recorded from confiscated or seized specimens in the destination country (**Table 4**).

Imports into Malaysia

An analysis of CITES trade reports involving Malaysia between 1990 and 2001, showed China as the only source of export to Malaysia. China has banned the export of musk from wild deer, but allows the export of derivatives containing musk in the form of traditional medicines. For the years 1990-2001, China's export records show that Malaysia as the destination for 800 kg of derivatives and hundreds of thousands of packages of musk derivatives (**Table 5**). Malaysia reported no imports of musk or musk derivatives during this period.

China reported that its musk exports to Malaysia were largely sourced from wild musk deer populations (71.0%, n = 22), with two reports of musk consignments from captive-bred sources (6.4%; 800 kg derivatives & 7000 boxes of derivatives in 1998) and the remaining records with the source of musk unidentified (22.6%, n = 7).

By comparison of Chinese export data to Malaysia, with reported re-exports from Malaysia (by country of import – see **Table 6**) it would suggest that there is significant demand from the Malaysian domestic market. As with Singapore’s data, the figures are reported as ‘boxes’, ‘cartons’ and units unknown, which does not allow confirmation of how much musk is contained in each shipment.

Table 5
Summary of all musk imports into Malaysia (MY) from 1990 to 2001, according to CITES annual report data

| Country of export/re-export | Year | TOTAL MUSK DERIVATIVES* | | | |
|-----------------------------|------|---|--|--|--|
| | | (kg) Quantity as reported by country of export/re-export | (boxes) Quantity as reported by country of export/re-export | (cartons) Quantity as reported by country of export/re-export | (units unknown**) Quantity as reported by country of export/re-export |
| China | 1990 | | | 3874 | 125 180 |
| | 1991 | | 11 913 | 819 | 150 000 |
| | 1992 | | 4000 | 1003 | 151 200 |
| | 1993 | | | 25 | 2500 |
| | 1994 | | | 20 | 27 500 |
| | 1995 | | | 150 | 18 000 |
| | 1996 | | | 20 | 48 000 |
| | 1997 | | | 300 | 8000 |
| | 1998 | 800 | 12 000 | | 23 000 |
| | 1999 | | | | 22 000 |
| | 2000 | | 7500 | | 48 000 |
| | 2001 | | | | 50 000 |
| Total | | 800 | 38 413 | 6211 | 673 380 |

Source: UNEP-WCMC CITES Trade Database

* Malaysia reported no imports of musk derivatives in the period 1990-2001.

** No units were recorded in the records, and the figure is assumed to represent the total number of packages of musk derivatives (e.g. pills, plasters) (Anon., 2003b).

Table 6

Summary of all musk re-exported from Malaysia (MY) from 1990 to 2001, according to CITES annual report data from countries of import (AU, GB, NZ, US). No re-export of musk or musk derivatives was reported by Malaysia.

| Country of import | Country of origin | Year | TOTAL MUSK (units unknown*) Quantity as reported by country of import | TOTAL MUSK DERIVATIVES (bags) Quantity as reported by country of import | TOTAL MUSK DERIVATIVES (units unknown*) Quantity as reported by country of import | TOTAL MUSK EXTRACT (units unknown*) Quantity as reported by country of import |
|-------------------|-------------------|------|---|---|---|---|
| Australia | ? | 1999 | | | | 100 |
| | ? | 2001 | | | 70 | |
| UK | ? | 1997 | 41** | | | |
| New Zealand | ? | 1994 | | 5** | | |
| | ? | 1995 | | 1** | | |
| | ? | 1997 | | | 40** | |
| | ? | 1998 | | | 2** | |
| | ? | 1999 | | | 5** | |
| | ? | 2000 | | | 11** | |
| | ? | 2001 | | | 7** | |
| United States | ? | 1993 | | | 6** | |
| | ? | 1997 | | | 58 | |
| | CN | 2000 | | | 15** | |
| | ? | 2000 | | | 2**, 1 | |
| | ? | 2001 | | | 3** | |
| Total | | | 41 | 6 | 220 | 100 |

Source: UNEP-WCMC CITES Trade Database

* No units were recorded in the records, and the figure is assumed to represent the total number of specimens (Anon., 2003b).

** Specimens were reported as confiscated or seized specimens by importing country

Note: CN = China

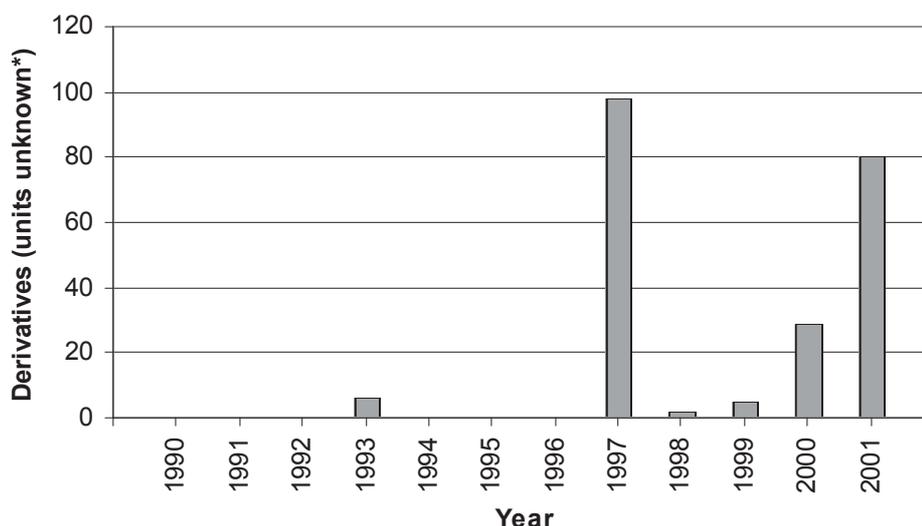
Re-export from Malaysia

From 1990 to 2001, Malaysia reported no re-export of musk or musk products and derivatives in its annual CITES reports. However, CITES trade reports from importing countries show a significant export trade in musk derivatives from Malaysia (Table 6). Since Malaysia was a reported destination of exports from China during this period, it was potentially operating as a re-exporter of musk derivatives from the Chinese market.

For the period analysed, 1993 was the first year re-exports of musk products from Malaysia were recorded by country of import (Australia, USA, New Zealand, UK), and in 1997 import data records showed a sudden increase in musk re-exports (**Figure 3**). Since the majority (75%, n = 16) of the derivative products leaving Malaysia are reported as confiscations or seizures, it is uncertain whether the re-export trade of musk from Malaysia has increased or whether law enforcement efficiency has improved.

Re-exports from Malaysia appear to supply a demand for musk derivatives in Australia, USA, New Zealand and UK (**Table 6**), but meet no market demands in Asia. However, records are also ambiguous as to whether these countries are the main markets or if it is an artefact of where law enforcement has been most successful in stopping illegal trade.

Figure 3
Gross re-export of musk derivatives from Malaysia from 1990 to 2001, according to CITES trade data, reported by country of import



Domestic trade in Singapore and Malaysia

Musk and musk products were observed for sale in TCM stores in both Singapore and in the Klang Valley environs of Malaysia. In Singapore, 29 of the 53 stores surveyed were found to have musk products available (54.7%), while 49 of the 55 TCM shops surveyed (89.1%) in Malaysia’s Klang Valley sold specimens containing musk.

Trade in raw musk

This study has found evidence of continued demand for musk in both Singapore and the surveyed areas of Malaysia. The trade in TCM includes large volumes of raw ingredients, and unprocessed musk was

readily available in both Singapore and Malaysia being sold in a dry, powdered form. In general, musk was promoted by TCM retailers for consumption. Though it is reported to be effective as an external (topical) application, its effect is considered better when consumed and diffused into the blood. Raw musk can be blended with other herbs to treat epilepsy, improve blood circulation, fever and faintness. In TCM, musk is believed to be very effective in combating blood stasis. Because of this, dealers explained that it is used in conjunction with various herbs to improve blood circulation in order to better facilitate the distribution and absorption of the beneficial compounds within the herbs. Dealers warned several times during the survey that it cannot be casually consumed or may lead to complications. A Malaysian dealer explained that “even a whiff of the scent of musk by an expectant mother might lead to a miscarriage”.

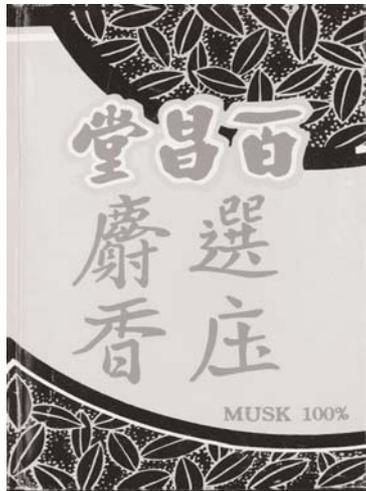
In Singapore, 29 stores were found to trade in musk and of these retailers, 23 (79.3%) sold raw musk in its unprocessed form. Specimens of raw musk were found with a stick-on label declaring in English, ‘For sale as proprietary medicine’, on another ‘Approved for sale in Singapore’. This is thought to be in accordance with the Singapore *Medicines Act*. However, it is not known if the label found during the study was issued by the Health Sciences Authority, though dealers referred to the label to show that the product was not illicit.

In Singapore stores, all specimens of unprocessed musk were not on open display but were stored either in refrigerators at the back of the shop or under the counter, and revealed only upon request. All specimens seen were labelled as products of Hong Kong. Brands of musk powder found in Singapore were *Bai Yang Tang* (**Figure 4a**), *Bao An Long* (**Figure 4b**) and *Quan Wan Xie*. The *Bai Yang Tang* product was labelled ‘100% musk’ i.e. purporting to be contain unprocessed musk, and was the most commonly observed brand for sale in Singapore.

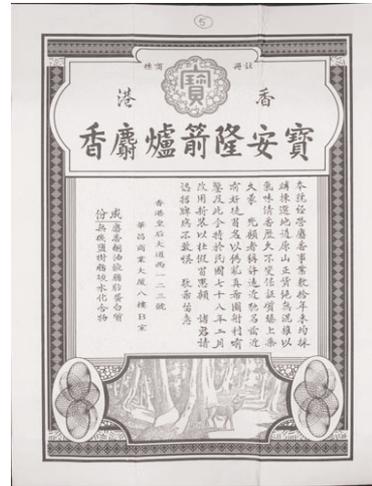
Dealers expressed certain interest when an enquiry for musk was made, especially in the raw form. They asked about the intended use of the product and how its use had been learnt. On one occasion, the researcher was complimented for knowing how to use musk. Surveys in Singapore found merchants confirming that musk products remained popular, though most said they seldom get customers asking specifically for musk, especially in its unprocessed form. They informed the researcher that users must be educated in its use, and they are usually experienced users or elder people. While there may not be many users educated in the consumption of unprocessed musk, there still exists a significant market for TCM dealers to keep stock of such products. The high retail value of musk may still make it worthwhile for retailers to supply and sell musk.

Figure 4

Product images of packaged raw musk *Bai Yang Tang* (a) and *Bao An Long* (b), which appeared to be popular brands sold in both Singapore and Malaysia



(a)



(b)

In Malaysia, of the 49 stores in the Klang Valley dealing in musk products, 94% sold musk powder, which is believed to be the purest form of musk available on the market. Musk powder is generally sold in vials of one *fen* (or 0.38 g), which can be used for 1-4 dosages depending on the condition being treated. Retailers were found to also sell a portion of musk from the contents of one vial, possibly being more economical for patients seeking one-time treatment. A single vial can sell for up to MYR55 (USD14.47). Therefore, one gram of natural musk in Malaysia can fetch a price up to about USD38 per gram (see *Prices for musk*).

Figure 5

Product information sheet from civet musk specimen in Malaysia



According to the details on product packaging, all specimens found during the survey originated from Hong Kong, except for one product which was labelled from Taiwan. There were two main brands of musk powder observed for sale in Malaysia and Singapore - *Bai Yang Tang* and *Bao An Long* (**Figure 4**). Both these brands were labelled as products of Hong Kong. *Bai Yang Tang* was explained by some dealers as being the more popular brand and of superior quality. The quality of musk is evident in the scent of the musk with different grades of musk having distinct smells. Accordingly, the pungency of a 'superior' brand will be much stronger than an inferior product.

In a survey conducted in 1991-1998, Hong Kong was considered to be the second largest global importer of musk (Parry-Jones and Wu, 2001). During this study, there was a predominance of musk products in the stores labelled as packaged in Hong Kong, however neither Singapore (except for 1 kg of musk in 1990) nor Malaysia recorded any imports of musk from Hong Kong in the analysed CITES Annual Reports 1990-2001 (see *Imports into Malaysia*). If these products were imported directly from Hong Kong then packaged specimens appear to have evaded detection by Authorities of both the exporting country of Hong Kong and the importing countries of Singapore and Malaysia. An alternative explanation is that these products may have been imported before 1990 which was prior to the records analysed in this study. Or the availability of Hong Kong products in stores may also indicate a trade dynamic whereby raw musk is imported into Hong Kong, where it is packaged and then re-exported to another destination before being imported by Singapore and Malaysia.

Musk in Malaysia can be found openly displayed on glass shelves or within glass counters which was a different situation to Singapore where raw musk products were not exhibited. Retailers claimed that the raw musk originated from musk deer farms, though the country of origin was unknown. Retailers of musk seemed ignorant or showed disregard for the status of the musk deer and the law that governs the sale of musk. As the exception, one TCM dealer in Malaysia encountered during this survey said that musk from musk deer, "like bear bile, could not be sold". He also speculated it was likely that the musk powder available was from farmed musk deer, as the animals are hard to come by and generally have small population sizes.

Also found in a Malaysian TCM store was a specimen of civet musk *Pao Tao Shang Li Ing* (**Figure 5**) produced in Taiwan. Civet musk is prescribed in the same manner as musk from *Moschus* spp. in combating blood stasis. On the enclosed leaflet from the civet musk package, the authenticity of the product is emphasised three times, along with its purity and potency. Every species of civet has a gland that secretes civet musk, but only the civet musk of 5 species can be used to make medicine (Liu, 1991 in Parry-Jones and Wu, 2001).

Trade in derivatives and patent medicines containing musk

Traditional Chinese Medicine relies on animal and plant substances as raw ingredients for prescription medicine and manufactured patent pharmaceuticals. Musk is considered one of the most frequently used animal products in traditional medicine practices (Cameron *et al.*, 2002). The raw ingredients may be used directly after some preparation (grinding, washing, boiling, drying etc.) or may be made into factory-processed forms such as plasters, pills or tablets and packaged in mass quantities for national or worldwide distribution. This survey found musk in patent medicines, in the form of medicated plasters, capsules or pills, oil-based rubs and water-based sprays.

In Singapore, musk was noted as a listed ingredient in medicated plasters (17% of shops surveyed) and rheumatic ointments (41%). Musk rheumatic plasters occurred in 10% of TCM shops surveyed in Singapore. Rheumatic plasters are one of the cheapest products of musk with a price range of SGD1-10 (USD0.56 – 5.61) depending on its size and quality. The quantity of musk contained within the product is not defined on the packaging of musk derivative products. Some retailers commented that it is not known how much musk is contained with the product, and possibly may only be in trace amounts. Their suspicion was based on the extremely low cost of the product; even in very small amounts, musk is expensive, with one hundredth of a gram costing up to SGD0.53 (USD0.31).

In Malaysia, rheumatic ointments containing musk occurred in 61% of shops found selling alleged musk products, along with plasters (14%) and pills (18%). These originated mostly from mainland China (and this is in agreement with China's annual CITES report export records to Malaysia – see *Imports into Malaysia*), but some products were also produced in Taiwan. One specimen was labelled to be manufactured in Malaysia. Interestingly, this particular specimen had 'musk' on its packaging but not in its ingredients list. It was observed that more recently imported stocks of musk rheumatic ointments do not list musk as an ingredient. However, TCM retailers will insist that the product does contain authentic musk.

The majority of patent medicines alleging to contain musk did possess what appeared to be authentic prints of the MAL code, in accordance with the requirements of the Ministry of Health. This is in contrast to specimens of unprocessed musk, which were never found with a MAL code during this survey. Though, on four occasions, TCM retailers in Malaysia mentioned that *Tieh Da Hong Dan You* musk oil does not list musk in its ingredients because it is "not allowed". In other cases, products that have musk listed on the packaging have it labelled as 'moschus', 'musk', 'natural musk' or 'ser xiang' or 'ser siang' (see **Figure 6**). Such inconsistencies may suggest that some traders may be avoiding listing musk as an ingredient in order to either gain approval from the Health Ministry for sale in Malaysia or avoid detection by CITES Authorities.

Musk rheumatic plasters also showed discrepancies on their labelling. For example, *Sinma Musk Plasters* lists 'musk' as an ingredient in the product on the box cover but then also states that '[the] product does not contain animal parts'. While it is likely that the specimen does not contain animal 'parts', as such, it may contain animal derivatives. It could be due to such technicalities that specimens remain in the market and may even receive a MAL code because the officials responsible for authenticating the product misinterpret such clauses. CITES *Resolution Conf. 9.6* from the Ninth Conference of the Parties to CITES in 1994 (revised at the Eleventh Conference of the Parties to CITES in 2000), regarding *Trade in Readily Recognisable Parts and Derivatives* stated that any product which names a CITES-listed species as an ingredient on its packaging should be treated as containing that species. It then becomes the responsibility of the manufacturer and traders to ensure that a product neither contains any endangered species, nor is labelled as containing them.

Figure 6

Many different naming systems are used to identify musk deer in Traditional Chinese Medicine. The Chinese medicine *Ser Siang Yi Pau Tan* lists in its formula 15% 'ser siang' or musk deer

(NEW IMPROVED)
SER SIANG YI PAU TAN

The use of SER SIANG and CHING CHAU for curing diseases has been recorded in Chinese medical classics as far as by Tang Dynasty (616-907AD) which also certify that they have good therapeutic effect in treating muscular, Osseous and fatulent pains and relevant ailments, the Pan Tsao Kang Mu (treatise on herbal material medical) the master-work of Li Shih Chen of the Ming Dynasty (1596) again asserts that they are efficacious for expelling flatulence, relieving pains and strengthening bones. From the above it shows the fact that they possess the therapeutic, effect for muscular and osseous pains has long been recognized by Chinese medical circles.

SER SIANG YI PAU TAN is prepared on the basis of therapeutical efficacy Ser Siang Ching Chau, medicated with cornus oerivi, parvum, angelica polymorpha and some twenty kinds of rare drugs by means of traditional technology refining, it is specially for lumbar and leg pains, rheumatoid arthritis muscular and osseous atony and limb numbness, it will relax the muscles, invigorate blood circulation expel flatulence and relieve pains, besides reinforcing the thews.

SER SIANG YI PAU TAN untuk menghilangkan penyakit sengal-sengal tulang, bengkak sendi, sakit tulang belakang, sakit urat, sakit tangan dan kaki.

PERATURAN: 3 biji sekali, 3 kali sehari dengan air panas selepas makan.

| | | | | |
|-----------------|------------|-----|----------------|-----|
| FORMULA: | SER SIANG | 15% | KUAN KEAN TANG | 5% |
| | CHING CHAU | 15% | PAPAYA | 5% |
| | TONG KWAI | 5% | CHOON KONG | 5% |
| | LOK YONG | 10% | MAH TAI | 5% |
| | TIGER BONE | 10% | TIENCHI | 10% |

Dealers suggested that the external use of musk, such as in plasters and ointments is not effective, and at most can only provide temporary relief. They added that the best way to absorb musk effectively is to consume it orally. Pills and capsules containing musk were also found in 18% of shops surveyed in Malaysia. Some *Tien Chi* capsules were claimed by dealers to have been manufactured in-house. Otherwise, pills such as *An Gong Niu Huang Wan* (MAL2002923T) and *Da Huo Luo Dan* (MAL19988249T) (Figure 7) were found, purporting to contain as much as 42 mg and 25 mg of musk respectively, and costing between MYR47 (USD12.37) and MYR170 (USD44.74) per pill. Both were manufactured in Beijing, China.

Figure 7

Da Huo Luo Dan medicated pills claiming to contain musk show the MAL code MAL19988249T, indicating registration with the Ministry of Health in Malaysia

大活络丹
MAL19988249T

批 註：本品为金黄色蜜丸，除去金箔黑棕色；气香，味甜甘，辛。
主要成分：麻黄根、蜂蜜、白术、茯苓、乌梢蛇、木香、人参、天麻、
制首乌、鹿角、肉桂、羌活、牛膝、甘草、地黄、茯苓、
熟地、当归。
传统上用于：祛风除湿，活血通脉，风寒湿痹引起：肢体疼痛，手足麻木，
筋骨不利，行动不便。
用法用量：每次1丸，每日2次，以温开茶送服。
规 格：每盒装10丸，每丸重3.0克。
注 意：孕妇忌服。
贮 藏：密闭，置于室内阴凉干燥处。
京京药准字(B3)第312号

北京同仁堂制药厂
DA HUO LUO DAN (Medicated Pill)

| | | | | | |
|--------------|----------------------------|--------------------------|-------|---------------------|-------|
| Ingredients: | Each pill (2.5g) contains: | Radix Paeoniae Rubra | 100mg | Musk | 25mg |
| | | Ligustrum sinense | 100mg | Radix Scutellariae | 100mg |
| | | Radix Astragalus | 100mg | Radix Ginseng | 100mg |
| | | Radix Sophorae | 100mg | Radix Citrullus | 100mg |
| | | Radix Angelicae Sinensis | 100mg | Radix Trichosanthis | 100mg |
| | | Herba Acori | 100mg | Prunellae Cortex | 100mg |
| | | Calcium Borax | 100mg | Radix Linderae | 100mg |
| | | Pila Caryophylli | 100mg | Radix Paeoniae | 100mg |
| | | Radix Glycyrrhizae | 100mg | Radix | 100mg |

Indication:
Traditionally used for backache, joint pain and helps to promote blood circulation.

Usage:
For adults: 1 pill each time, twice a day.
To be taken with lukewarm water.

Warning:
Each box contains 10 pills.

This is a traditional medicine.
If symptoms persist, please consult doctor.
Keep out of reach of children.
This product contains animal part.
Safe use of growing, pregnant women and children has not been established.
Do not exceed the stated dose.
Continued use exceeding three months is not advised.
Keep in cool, dry place.
Contraindicated in pregnant women.

Imported by:
BEIJING TONG REN TANG (SI) SDN. BHD.
01-01, Changkat Tuanku Chikri, Felda, 50100 Kuala Lumpur

Manufactured by:
BEIJING TONG REN TANG CHINESE MEDICINE MANUFACTORY

Consumers of musk

TCM dealers in Singapore explained during this survey that few people have a deep knowledge of musk and its uses, and recommended that preparation of musk for consumption should be done by someone with substantial knowledge and experience. TCM physicians advise that consumption should not be practised too often, as an inappropriately large dose may disrupt the body's proper functions due to the concoction's potency.

Typically, the profile of musk consumers in both countries was similar: musk is sought mainly by older generations for consumption. Based on information from dealers interviewed, routine users of musk tend to be aged 60 and above. The use of raw musk appears to be restricted to people who have used it before or who, most likely through an older person, gained knowledge of musk, its usefulness and its preparation. Dealers in Singapore claimed few people have any knowledge of the uses of musk nowadays, while dealers in Malaysia alleged they continued to receive customers, though the number has definitely declined compared to 10 years ago. One physician interviewed in Malaysia said he continues to prescribe musk.

Before musk is purchased, physicians will often enquire about its intended use and warn that it cannot be used casually. On occasions, physicians will try to offer herbal or milder alternatives to the use of musk. As explained by dealers and physicians, routine users of musk are being replaced by a new generation of individuals which are not experienced in the use of musk, and often prefer modern western medicines to TCM.

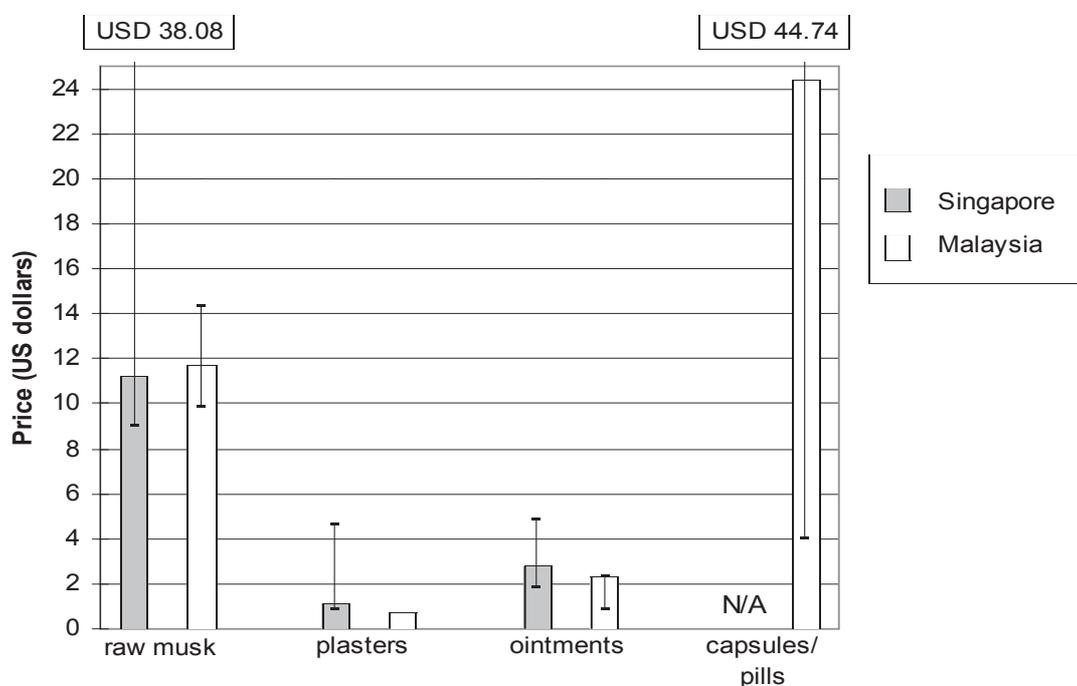
Prices for musk

Musk remains one of the most expensive natural products in the world today per kg. This survey found that the price of musk varied according to the location of the place of sale. For example, musk products on sale in city centres, such as the 'Chinatown' districts of both Singapore and Kuala Lumpur were priced higher than similar products found on sale in suburban or residential areas. Supply and demand usually determines the prices of natural products and therefore, the price of musk is expected to vary a great deal. Furthermore, this range in prices may be an indication of the authenticity of the musk, distinguishing natural and synthetic musk or evidence of raw musk being adulterated with other substances, i.e., the price may reflect the purity of the musk.

Figure 8 presents a summary of the highest, lowest and average price of various musk products available in Singapore and Malaysia. While the highest prices for musk deer products were found to be in Singapore, the average price in both Malaysia and Singapore were competitive. The highest quoted price in Singapore for a vial containing 0.38 g of musk was SGD68 (USD38.08), which equates to be approximately USD100 per gram. While in Malaysia, the highest price for a vial of musk was quoted to be MYR55 (USD14.30), approximately USD37 per gram. However, on average, dealers in both Singapore and Malaysia sold vials of musk for USD11, approximately USD30 per gram. Dealers explained that the high price of musk could be one of the reasons it is losing its popularity, as cheaper, more cost effective and progressive medicines move into the market.

Figure 8

Comparison of retail prices of various musk products in Singapore and Malaysia, showing lowest, highest and average prices quoted. All prices converted into US dollars from local currencies. Column heights indicate the average price for each product, with the overlaid bars indicating the maximum and minimum price.



N/A = information on the prices of capsules or pills containing musk could not be found Singapore

Awareness of trade regulations

This investigation identified a problem particularly amongst prepared medicines rather than raw products. The labels on patent medicines containing musk as an ingredient do not provide adequate information for the consumer; and fail to quantify the amount of musk contained in the product, the authenticity of the musk, or whether the musk had been adulterated. Most TCM practitioners and retailers are aware that claims on labels can be rather extravagant stating ‘100% musk’ when in fact synthetic or adulterated substances are used. Alternatively, one dealer in Singapore said, in reference to patent medicines, that ‘musk’ cannot be declared on the product’s packaging or it may not be approved for sale.

Four TCM dealers in Singapore explained that musk products were no longer found on sale as musk had been disallowed for reasons they were unsure of. Another went so far as to explain that ‘the animal from which musk is derived from is protected because their numbers are low’. In Malaysia, one dealer said musk can no longer be sold. However, dealers from three stores said they would be able to ship musk overseas upon demand, while 14 offered to cater to orders which would require anywhere between 2-3 days to 2 weeks wait for procurement. The majority seemed relatively aware of the animal origin of musk, though unaware of its status as a protected animal and the laws that govern its use. ‘Such information is relevant to those who harvest and manufacture the musk, we are only in charge of its sale,’ remarked one dealer.

Overall, few dealers seemed to fully understand the legal status of musk derived from *Moschus* spp., as most dealers were unable to maintain their stand on the issue under further questioning by the researcher. Initial statements claiming the product was entirely legal quickly turned to suggestions that products of this nature should be kept out of Customs' inspections. The following is a range of suggestions from dealers on how to move musk products through Customs to evade detection:

1. Posting the products in a parcel wrapped plainly and declared as a gift;
2. Removing the vials from their boxes and keeping them within luggage;
3. Moving the products in small quantities at a time to avoid attracting attention;
4. Explaining to Customs officers that product is a personal item for personal consumption;
5. Explaining to Customs officers that musk products are herbal TCM, and upon questioning insist that it is not derived from an animal;
6. For products with picture of musk deer on label: To remove the label so identification of product cannot be discerned visually;
7. Making false customs declarations.

The suggestions shared by dealers often take advantage of the lack of capacity of Customs officers in conducting their inspections. As explained by one dealer in Malaysia, "there are ways to bypass the law... supply has to meet demand".

DISCUSSION

Musk and Traditional Chinese Medicine

Musk from *Moschus* spp. continues to be a trusted medicine for treating ailments related to blood circulation and rheumatism. A variety of musk deer products were found in both Singapore and Malaysia from pure, unprocessed musk to patented TCM products purporting to contain trace amounts of musk. There is a persistent demand for musk, and TCM physicians in Singapore and Malaysia continue to prescribe musk to patients. While retailers report that raw musk is seldom requested by consumers, with patrons being of elder generations and experienced in using musk remedies, the high retail price of raw musk still makes occasional sales economical and provides an incentive for the continued trade. However, the TCM market for patent musk products is significant. Musk from musk deer is the targeted ingredient in medical ointments, external plasters, oral capsules and pills.

With the variety of uses, prescriptions and preparations of musk products, a large challenge for monitoring the musk trade is that the exact quantity of musk contained in products is not clarified, with only the presence of musk being declared. It should be emphasised that much of the data regarding the trade in musk were recorded as derivative compounds in unknown units. Furthermore, TCM retailers claim that derivative compounds of musk deer can be easily concealed with the musk contents not being declared on the packaging. The trade in derivatives appears to operate covertly, since neither Singapore nor Malaysia reported any trade in musk derivatives. Though China's CITES export records and seizure records from destination countries, reveal that Singapore and Malaysia traded in hundreds of thousands of medicinal derivative items purporting to contain musk. Undeniably, a substantial volume of musk is potentially being traded as derivatives, predominately in the form of Chinese patent medicines. However,

this trade is largely unquantified and often overlooked by Authorities, and the significance of derivatives in trade should not be discounted since such trade may represent an impact on musk deer populations.

Implementation of legislation regulating trade in musk deer and musk

Despite national laws in nearly all range States protecting musk deer and international trade regulated by CITES, musk deer products and derivatives are entering and exiting Singapore and Malaysia undetected. Both Singapore and Malaysia fail to explicitly recognise derivatives of protected species in their national legislation. Article I of the Convention defines a ‘specimen’ as including readily recognisable parts and derivatives of animal and plants but does not define the term ‘readily recognisable’, which is therefore subject to differing interpretations by CITES Parties. At the 50th meeting of the Standing Committee, in March 2004, the CITES Secretariat brought to the attention of the Conference of the Parties that Malaysia should give priority attention to the development of adequate legislation to implement the Convention (Anon., 2004b). As Malaysia has high volumes of international trade in specimens of CITES-listed species, it was urged to give priority attention to the implementation of comprehensive national legislation (Anon., 2004b). The CITES Standing Committee is expected to further review the legislative progress of Malaysia, under the ongoing CITES National Legislation Project.

While Malaysia was highlighted as a concern for the need to strengthen its legislation to implement CITES, the trade in musk deer is global and requires more precise monitoring of, and reporting on, trade in derivative specimens if data is to provide meaningful results. *Resolution Conf. 9.6* was adopted in 1994 (and revised at the 11th Conference of the Parties to CITES (CoP 11) in 2000) and recommended that Parties ensure that their national legislation effectively controls trade in all parts and derivatives of species used for healing purposes and trade in medicinal products containing or purporting to contain such species.

This was further strengthened by *Resolution Conf. 10.19*, adopted at CoP 10 in 1997, which urged Parties to work closely with traditional Asian medicine practitioners and consumers to develop awareness of the illegal use of endangered species in traditional medicine. The Resolution aimed to encourage the strengthening and enforcement of legislation, to promote new techniques in the identification of parts and derivatives used and to investigate the potential for substitute ingredients for endangered species. At CoP 11 in 2000, Document 11.56 provided an update on the recommendations made to the Parties in *Resolution Conf. 10.19*. Furthermore in 2000, the Parties adopted *Resolution Conf. 11.7 Conservation of and Trade in Musk Deer* which recommends that consumer States improve enforcement efforts to reduce illegal trade in musk, develop standardised labelling systems for manufactured products, and seek alternatives to raw musk.

When researching this report, TRAFFIC found manufactured products containing musk labelled with an authentic registration on the packaging from government health ministries in Singapore and Malaysia. In both countries, all patented medicinal products, including TCM are required to be registered with the health authorities. The motivation behind registering TCM is to ensure that products sold in Singapore and Malaysia are safe, efficacious and of high quality. While the health authorities in any country are primarily concerned about public safety and not CITES issues, it is important for them to work with CITES Management Authorities when CITES-listed species are a targeted ingredient. Communication between the relevant authorities responsible for wildlife conservation and regulation of wildlife trade, and

the medicinal authorities is severely lacking. Perhaps during the registration process, Health Authorities could play a part in enforcing accurate labelling of medicines and standardised units of measurements for recording musk derivatives, which would assist considerably in determining the legal status of musk used in medicinal preparation and in making an assessment of the trade in musk. Accurate labelling of medicines is also an urgent requirement, as it would enable consumers to make informed choices when purchasing medicines, as well as facilitating regulation of threatened species in trade. Increased linkages between wildlife conservation and traditional health care could greatly assist in monitoring the consumption of musk and the trade quantities needed to supply the demand.

Accurate analysis of trade data is made difficult by unrecorded consignments, contrasting reports, miscellaneous forms of patent medicines and the lack of standardised quantities. Such standardised measures for the amount of musk contained within a product, and enforcement efforts to record all trade in products 'purporting to contain' musk are fundamental to be able to assess the volume of musk in the TCM trade, and ultimately, the impact of the trade on wild musk deer populations.

CONCLUSION

Musk is used in many forms of traditional medicine and uncontrolled trade may jeopardise both the long-term survival of *Moschus* spp. and the maintenance of traditional medicine delivery. Although some information on the use of wildlife for medicinal purposes is available from published pharmacopoeias and ethno-biological studies, in most cases little is known regarding harvest and trade volumes, trade controls, market dynamics and conservation impacts. Singapore and Malaysia continue to be significant destinations for the domestic sale of musk in TCM practices and play a role in the re-export of musk to supply the international trade. The importance of comprehensive national legislation and its effective enforcement cannot be underestimated. A substantial proportion of musk deer trade is overlooked in the authorities neglecting to report derivatives, and the impact of the trade in derivative compounds needs to be acknowledged in more detail. Accurate labelling of patent medicines, noting whether genuine or synthetic musk, and standardised units of measure for recording the trade in musk and its derivatives would greatly facilitate the task of national CITES Authorities in monitoring the legality of the trade and in assessing the impact on musk deer populations.

RECOMMENDATIONS

Strengthening legislation

The primary recommendation of this report is that Singapore and Malaysia strengthen their national legislation to protect all forms of musk deer in trade and to improve trade control of musk derivatives. In Singapore and Malaysia the implementation of CITES is hampered by the lack of clear legal controls on the trade of medicines which contain, or purport to contain musk, as only readily recognisable parts appear to be covered by Singapore and Malaysian legislation.

In accordance with *Resolution Conf. 9.6* (revised at the Eleventh meeting of the Conference of the Parties to CITES in 2000) on the *Trade in Readily Recognisable Parts and Derivatives*, Singapore and Malaysia

are required to ensure that their national legislations effectively controls trade in all parts and derivatives of CITES-listed species in trade and the medicinal products containing or purporting to contain them. At the 50th meeting of the Standing Committee (Geneva, 2004), Malaysia was instructed to give priority attention to the development of adequate legislation to implement CITES under the ongoing *CITES National Legislation Project*. Accordingly, both the *Endangered Species Act 1989* of Singapore and the *Protection of Wild Life Act 1972* of Malaysia need to be amended to clearly cover parts and derivatives of species protected under these Acts.

Units of measurement in Traditional Chinese Medicine trade

Standardised units of measurement for recording musk derivatives in international trade are urgently required. Such actions will facilitate CITES Authorities in the monitoring of international trade in musk deer and to assess the impact of trade in musk derivatives with regard to wild Musk Deer populations.

Labelling of Traditional Chinese Medicine products

Health authorities in Singapore and Malaysia are urged to develop clear labelling systems for manufactured products containing or purporting to contain musk, in accordance with *Resolution Conf. 11.7 on the Conservation of and Trade in Musk Deer*. Accurate labelling of TCM medicines and products is an urgent requirement, as it would enable consumers to make informed choices when purchasing medicines, as well as facilitating regulation of threatened species in trade. Product labels should specify all ingredients contained; the authenticity of the musk (natural / synthetic / adulterated); the quantity of musk contained in the product; the source of the musk (farmed or wild, country of origin) and details of the manufacturer (including date of manufacture).

The Ministry of Health in both Singapore and Malaysia can play a role in enforcing the regulation of labelling systems by insisting on the identification of the musk ingredients before approval is given for sale under the *Medicines Act 1975*, and the *Medicines (Labelling of Chinese Proprietary Medicine) Regulations 1998* in Singapore, and the *Medical Act 1971* and the *Control of Drugs and Cosmetics Regulation 1984* in Malaysia. Health and wildlife authorities in Singapore and Malaysia are encouraged to collaborate on strengthening current policies, improving the registration of TCM products, increasing consumer awareness and enforcing trade controls.

Enforcement efforts in monitoring Traditional Chinese Medicine trade

Relevant authorities should examine long-term options for more strictly supervised import and distribution of restricted medicinal ingredients within a structured and tightly controlled framework. Enforcement officials should make use of identification guides and be supported by appropriate training to assist in recognising the various forms and packaging of musk, and the contents of packages supposedly containing TCM medicines. This is particularly important in Singapore and Malaysia which are multi-ethnic countries and law enforcement officials may need reference materials to assist where the text is in a language with which the inspectors are not familiar. The recently updated *Traditional Asian*

Medicine Identification Guide for Law Enforcers: Version II (Cameron *et. al*, 2004) would be an appropriate tool that is immediately available.

In accordance with *Resolution Conf. 11.7*, Singapore and Malaysia as consumer countries are urged to pursue the development and dissemination of forensic methods to detect natural musk in medicinal and other products or implement a ‘purporting to contain’ clause to overturn the current burden of proof, which currently rests with the law enforcement authorities. Additionally, the governments of both countries should investigate why re-exports of musk derivatives from China are not being picked up by their CITES permit records and monitoring systems.

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APPENDIX I

List of questions asked by researcher to Traditional Chinese Medicine practitioners

(Due to the nature of the survey, questions are not and cannot be listed in any order)

Is there musk for sale?

What other forms of products containing musk, might you have for sale?

What ailments are musk used to treat?

What would you recommended for the treatment of rheumatism?

Where is/are the products from?

What is musk?

How is it extracted from deer?

What was its source? Farmed or wild-caught?

Do you recommend musk as a TCM?

a. Who is musk's clientele? i.e. age, race, nationality

b. How popular is musk as a TCM?

a. Would it be possible to export musk in bulk?

b. Is it illegal? If so, how can Customs be bypassed?

How was the musk imported?

Is/are the products (containing musk) readily available? If so, how often and when do imports come in?

What is the price of musk? Why is it so expensive?

What is the difference between musk of an inferior quality? How is this discerned?

TRAFFIC, the wildlife trade monitoring network, works to ensure that trade in wild plants and animals is not a threat to the conservation of nature. It has offices covering most parts of the world and works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

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