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THE HORNS OF A DILEMMA: THE MARKET FOR RHINO HORN IN TAIWAN

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TRAFFIC International

This report was published with the kind support of

WWF

Published by TRAFFIC International,
Cambridge, United Kingdom.
With financial support from
WWF UK (World Wide Fund for Nature).

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ISBN 0 947613 57 9

Cover drawing by Brian Poole.

Printed on recycled paper.

THE HORNS OF A DILEMMA: THE MARKET FOR RHINO HORN IN TAIWAN

FINAL REPORT FOR WWF PROJECT II3637.03

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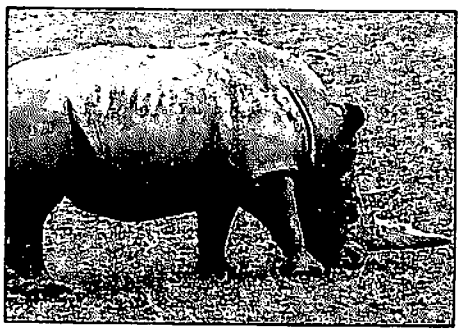
ACKNOWLEDGEMENTS

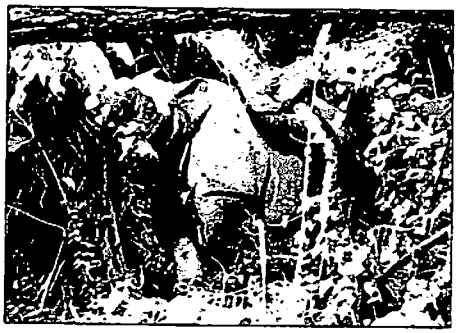
This study would not have been possible without the cooperation of many people. We wish to thank the investigators who carried out our surveys, including students from the ChungHsing University Environmental Protection Club, students from National Taiwan University's Wildlife Ecology Laboratory and from National Pingtung Polytechnic Institute, members of the Taiwan Wild Bird Society and other interested individuals. The doctor's survey was carried out with the kind help of Dr. Wei Kai-Yu, Chairman of the Chinese Medical Doctors' Society, Dr. Lin Liang-Fen, Executive Secretary of the Taipei branch, and Dr. Huang Dao-Yuan, Executive Secretary of the Kaohsiung branch. Students from Taipei Medical College helped translate the doctors' surveys. In addition, we interviewed a number of officials who generously gave of their time, including people from the Council of Agriculture, the Provincial Bureau of Agriculture and Forestry, the National Health Administration, the Provincial Bureau of Health, and the Taipei Municipal Department of Reconstruction. In Taipei, particularly helpful interviews on the use of rhino horn in Chinese medicine were held with Drs. Yang Ling-Ling and Chen Jing-Hwei. At the University of California — Berkeley's Department of Biology, Dr. Mary Power kindly assisted us with statistical testing of our survey results. Finally, the first draft of this report was widely circulated and reviewed. We wish to thank the following people for their valuable comments: Jaques Berney, Martin Brooks, Anthony Hall-Martin, John Hanks, Chris Huxley, Nigel Leader-Williams, Ling-Ling Lee, Simon Lyster, Esmond Bradley Martin, Tom Milliken, Simon Stuart, Jorgen Thomsen, and Torng-Chung Wu (for the Council of Agriculture).

I. INTRODUCTION: THE PLIGHT OF THE RHINOS

The international trade in rhinoceros horn has been well documented as the leading factor driving the world's five species of rhinoceros towards extinction (Martin 1980, Hanks 1987, Vigne and Martin 1987, Song and Milliken 1989, Western 1989, Cumming *et al.* 1990, WWF 1991). Close to 85 percent of the world's rhinos have been killed since 1970; no other animal family has been so rapidly depleted by the pressures of commerce (Fitzgerald 1989). In recent time, the African Black Rhino *Diceros bicornis* has been hardest hit. In 1970, it was the most abundant species of rhino, conservatively estimated to number at least 65,000 across Africa (Western 1989). The most recent estimate of its total population is only around 3,500 (African Rhino Specialist Group unpubl.); it has lost more than 95 percent of its population in only twenty years. It now numbers fewer than the African White Rhino *Ceratotherium simum*, of which there are approximately 5,000 of the southern sub-species living in the better protected parks of southern Africa (African Rhino Specialist Group unpubl.). The three species of Asian rhino are even more rare: there are perhaps 70 Javan Rhinos *Rhinoceros sondaicus*, 500-900 Sumatran Rhinos *Dicerorhinus sumatrensis*, which have largely disappeared from many Asian countries including Thailand, and 1,950 Great One-horned Rhinos *Rhinoceros unicornis* inhabiting protected areas of India and Nepal (Khan 1989). The number of rhinos worldwide at present thus numbers less than 12,000. This severe decline has not taken place against a background of international apathy. Millions of dollars have been spent by concerned governments and private organizations to try to protect the rhinos from well-armed and organized poachers. Hundreds of rhinos have been translocated at great expense to safer areas (Walker 1989). In Namibia and Zimbabwe, some wild rhinos have been de-horned by the wildlife officials in an attempt to forestall poaching, a difficult procedure which has sparked much controversy (van der Merwe 1989). In Kenya and Zimbabwe, game rangers shoot poachers on sight, and many men, both guards and poachers, have died by gunfire (Vollers 1987). Over 130 Zambian poachers have been killed in Zimbabwe attempting to kill rhinos (E.B. Martin *in litt.*, 1991). Thousands of poachers, smugglers and corrupt officials have been arrested in recent years in connection with illegal trade in both rhino horn

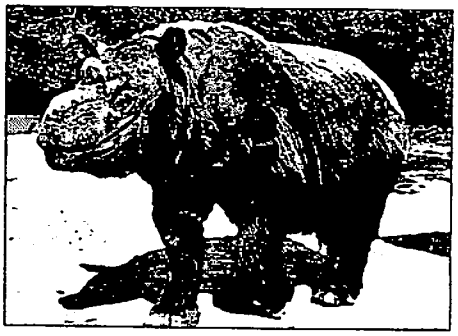


Square-tipped or Southern White Rhinoceros *(Ceratotherium simum simum)* Photo: David Lawson / WWF UK.

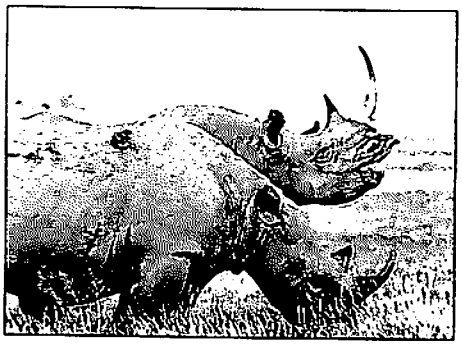


Javan Rhinoceros *(Rhinoceros sondaicus)* Photo: Dieter & Mary Plage / Survival Anglia

Greater One-horned or Indian Rhinoceros *(Rhinoceros unicornis)*. Photo: WWF / E. Hanumantha Rao



Sumatran Rhinoceros *(Didermocerus sumatrensis)* Photo: WWF / Fritz Vollmar



Black Rhinoceros *(Diceros bicornis)* Photo: WWF / Mark Boulton / ICCE

and ivory, 2,500 during the last two years in Tanzania alone (Anon. 1990). However, protection of the rhino on the ground is only half of the conservationist's job — and a Sisyphean task at that — in the face of continued international demand for rhino products at premium prices.

Intensive efforts have been made on the international level to curtail the consumption of rhino horn. Not only have all five rhinoceros species been banned from international trade since 1976, following their listing in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), but, with the sole exception of Laos, they are protected throughout their range by national laws as well (Fitzgerald 1989). Rhino parts or products are not legally exported or imported in quantity anywhere in the world. However, it is apparent that, despite these measures, demand from traditionally-oriented Asian consumers remains strong, and trade networks intimately linked to poachers have adapted readily to life underground in order to continue to bring the remains of poached rhinos to these consumers.

In recognition of the fact that import and export bans have largely failed to stem the slaughter of the rhino, CITES Resolution Conf. 6.10 was approved at the sixth meeting of the Conference of the Parties in 1987. This exceptional document called on consumer nations party to CITES to ban domestic trade in rhino horn, an area normally outside the Convention's purview, international trade. The development and promotion of substitutes for rhino horn and the destruction of all extant rhino horn stocks were also urged. To date, Hong Kong, Macao and Japan have taken decisive action to eliminate domestic trade (WWF 1991, Milliken *et al.* 1991), especially among the traditional pharmacies.

The four major markets worldwide are China, South Korea, Thailand and Taiwan (WWF 1991). Of these four, only China and Taiwan have recently taken any steps toward restriction of their domestic markets (Milliken *et al.* 1991).

This study of Taiwan's domestic market for rhino horn is a component of the comprehensive WWF/IUCN[1] rhino conservation strategy. This project was carried out under contract to the World Wide Fund for Nature-International and supervised by TRAFFIC International[2]. The purpose of the current survey was to ascertain the availability and use of rhino horn throughout Taiwan through consumer market surveys and interviews with government, academic and industry figures, as well as members of the traditional Chinese medical community. This report describes the current status of the domestic market for rhino horn in Taiwan and presents recommendations for a strategy to bring consumption of rhino horn under control.

II. BACKGROUND

Taiwan, which due to lack of United Nations recognition is ineligible to join CITES, has long been identified as a major consumer of rhino horn (Martin 1980). According to Customs statistics, 7,281 kg were legally imported between January 1972 and August 1985. It is likely that over the same period additional quantities of rhino horn were brought in undeclared, in order to avoid Customs duties (Vigne and Martin 1989). A ban on the import of rhino horn

[1]WWF — World Wide Fund for Nature; IUCN — the World Conservation Union

[2]TRAFFIC — Trade Records Analysis of Flora and Fauna in Commerce

was urged by Taiwan's Society for Wildlife and Nature (SWAN), and was implemented by the government in August 1985. The domestic market should have been prohibited entirely under the provisions of the Wildlife Conservation Law of 1989 (discussed in detail in Section IV.G.), which bans trade in the parts and products of protected species, including rhinos. The trade ban, however, has never been enforced. The government called for registration of all domestic stocks of rhino horn, and has been developing a management strategy to oversee the consumption of stocks which has not yet, at the time of writing (January 1992), been finalized. Meanwhile, conservationists have documented continued availability of rhino horn in major metropolitan pharmacies (Martin and Martin 1991). Moreover, Taiwanese consumers have been paying the highest retail prices in the world for the privilege (Vigne and Martin 1989, Martin and Martin 1991).

A. Traditional and Modern Pharmacology of Rhino Horn in Chinese Medicine

The history of the use of rhino horn and other animal parts as medicine in China can be traced back to as early as 2600 B.C., according to the *Shen Nong Ben Cao Jing*, the *Divine Peasant's Herbal*, which was itself written sometime in the first century B.C. In order to understand the pharmacology of rhino horn, it is useful to first understand how rhino horn is viewed in the framework of Chinese medicine. Chinese medicine is based upon the principle of homeostasis. Any disturbance of the well-balanced forces in the human body expresses itself as a syndrome which can be interpreted as being the result of either a deficiency or surplus located somewhere in the body's systems. The classification of the body's systems in Chinese medicine does not correspond to the classification used in Western medicine, and in many cases recognizes a non-corporeal element. A series of opposing conceptual points is used as a sort of triangulation system to specify or circumscribe the location of an illness within the matrix of body systems, its nature and possibly its cause. Once the problem has been described to the physician's satisfaction, treatment with natural materials is given to reverse the body's imbalance back towards equilibrium.

Rhino horn is classified as a "cold" drug, with a heat-draining function. This apparent anti-pyretic property is complicated by the fact that Chinese medicine recognizes a patient's subjective feeling of heat within the body as fever, whether or not such a condition is indicated by an actual elevated body temperature. While it is the anti-pyretic function of rhino horn which is most commonly emphasized, the conceptual definition of rhino horn goes beyond the simple reduction of fever. Heat "trapped" in different areas of the body can produce a variety of symptoms.

According to the *Divine Peasant's Herbal*, rhino horn is "of bitter taste, sour, salty, chilling, non-poisonous, and can dominate over hundreds of toxic substances. It can detoxify the poison of an insect sting, toxic feather or snake bite, and can keep away evil. If taken for a long period of time, the patient will feel relaxed and light". It should be noted that this latter health tonic property is still subscribed to today (Dr. C.H. Chen, pers. comm.). This description was subsequently elaborated upon, so that one reads in the *Ben Cao Zong Shin* (*New Compilation of Materia Medica*) that "rhino horn can cool down the heart, release waste from the liver, clean the stomach, reduce fever, remove the cold, clear the windpipe, keep away evil, detoxify poisons, cure typhoid and epidemic diseases, as well as cure symptoms

such as jaundice, rashes, vomiting blood, excreting blood, delirium, abscesses, and lumps, etc. It can also soothe the patient's nerves and improve his eyesight" (Wu 1757).

Modern textbooks used in medical universities today contain both old and new applications for rhino horn. Students are taught that rhino horn is used for dispelling heat, cooling blood, relieving convulsion and counteracting toxins, and is employed to treat febrile diseases, influenza, high fever, poisoning, convulsion, epilepsy, restlessness, delirium, macular eruptions, erysipelas, haemoptysis, epistaxis, carbuncle, malignant swelling, abscesses and possibly AIDS (Anon. 1976, But *et al.* 1990). Likewise, the doctors and pharmacists surveyed indicated a bewildering array of ailments for which they would prescribe rhino horn. While prolonged fever and "hot blood" syndromes were most frequently mentioned, so too were hepatitis, leukaemia, haemorrhage, rhinitis, meningitis, cerebrovascular diseases, gastrorrhagia and severe external burns. This is indicative of the extensive modification to the Chinese medical pharmacopoeia that has taken place over time. While the discipline defends its traditions — the two-thousand-year-old *Divine Peasant's Herbal* is still taught in medical schools — it has also embraced change.

B. "Water" Horn and "Fire" Horn

The Chinese medical community in Taiwan recognizes two types of rhino horn: "Water" horn and "Fire" horn. This distinctive terminology was not mentioned in previous surveys of Taiwan's rhino horn market (see Martin 1980, Vigne and Martin 1989, Martin and Martin 1991). Only after a number of interviews with doctors and dealers, correlated with examination of horns in the marketplace, were we able to determine to our satisfaction that the term "Water" horn refers to African horn, and "Fire" horn to Asian horn. Considering that the traditional medical community tends to emphasize the ancient traditions of using rhino horn, it is unusual that a review of the ancient and modern literature on rhino horn yielded no basis for this system of classification. We could find no mention of the term "Fire" horn.

"Water" horn was, however, mentioned in the *Ben Cao Gang Mu* (*Compendium of Materia Medica*): "Tao Hon-Jing [a scholar] said: water horn came out of water. Water rhinos move in and out of water, and have pearl-like armour" (Li @1570). In ancient times, the "Water" rhino could have been either the Great One-horned Rhino, whose horn was brought to China from India and Nepal, or rhinos native to China. It is written in the *Ben Cao Gang Mu* that in China, the rhino could be found north of Baoshan in Yunnan province, in Yugan county in Jiangxi, or Miaoling province of Guizhou. However, it is difficult to say whether any of the authors of ancient Chinese medical literature had actually seen a rhino themselves, because all the drawings of the animals in the *Ben Cao Gang Mu*, the *Ben Cao Zong Shin* and the *Ben Cao Bei Yao* (*Essentials of Materia Medica*) (Wang 1694) show what appears to be a Water Buffalo with horns at the front, rather than the sides, of its head. It is also difficult to tell, based on this literature, whether both the Sumatran and Javan Rhinos existed in China at this time. The *Ben Cao Gang Mu* cites descriptions of rhinos from various sources: "*Shuo Wen* [*The Origin of Chinese Characters*, a classic Han Dynasty (925 — 220 AD) treatise] states: The rhino, which has one horn on the nose and another on the forehead, looks like a pig. Kuo Pu [a scholar] said: The rhino, which looks like a Water Buffalo, has a pig head, big belly, heavy legs with 3 digits on each foot, and is black with 3 horns, one on top of the head, another on the nose, and a third on the forehead. The horn on the nose is the food horn. It is small and not of oval shape. Some rhinos have only one horn".

On the other hand, the possibility that the term "Water" horn originally referred to African horn cannot be ruled out. African horn may have been brought to China via the Silk Road, the two thousand year-old trade route connecting the Middle Kingdom to the Middle East.

It is most likely, however, that the classification of rhino horn in Taiwan into "Fire" and "Water" horn has been established by commercial dealers in recent time, as there are no references to these terms in the medical literature. Many of those who use and trade in rhino horn seem unaware that the two terms typically denote Asian and African rhinos. The majority of dealers interviewed claimed that the different types of horn are distinguished by "quality" rather than geographical origin; only two mentioned to our investigators that "Fire" horn comes from Thailand or Java. In mainland China as well, the classification of rhino horn also seems to have been established by commercial dealers rather than doctors (see Appendix 1). The Siam type of horn is named for obvious reasons, and "Guang" horn refers to African horn, which was imported mainly — and may still be, illegally — through Guangdong province, where Canton is a centre of the traditional medicine trade (But *et al.* 1988).

III. METHODOLOGY

In order to gather information on the domestic market for rhino horn in Taiwan, as well as to gauge the degree of compliance with government regulations requiring registration of all rhino horn, both covert and overt interview techniques were used.

Covert interviews were conducted by 27 investigators, who were assigned to survey every county and municipality in Taiwan. All 23 counties and municipalities were covered; the larger population centres were assigned several investigators. The investigators were mainly college students who conducted the surveys during the Lunar New Year holiday, from 20 January to 20 February 1991. Several members of the Wild Bird Society (one of the most active conservation groups in Taiwan), participated as well. Each investigator was assigned an area of responsibility, which varied from half a city to an entire county, and was instructed to visit 50 traditional pharmacies in the central area, and to make telephone queries to an additional 50 in the outlying areas. Some investigators surveyed more pharmacies, some less, and 60 interviews were discarded as inconclusive. A total of 1,162 visits and 1,291 phone enquiries were carried out. Examples of investigator visits and phone data recording sheets are included in Appendix 2.

Investigators conducting covert interviews were provided with an informally written prescription (a common practice in traditional medicine) containing rhino horn. They posed as potential customers interested in purchasing the medicine for a sick relative. While the investigators were encouraged to note down all pharmacists' comments pertinent to the domestic rhino horn trade in Taiwan, and to attempt to ascertain each pharmacy's total stock of horn during visits, they were required only to obtain data on possession (or claimed possession) of horn, type of horn ("fire" or "water" — see Section II.B) and price per *chien* (a traditional measure of 3.75 grams). They were advised not to initiate any discussion of the legality of the trade on their own.

Retail pharmacists were also interviewed openly and in detail by students from the National Pingtung Polytechnic Institute's Department of Forest Resources Management

and Technology. These students, whose families typically worked in the traditional medicine business, set up the interviews themselves and fully explained the purpose of the survey to the pharmacists they interviewed. Interviews were conducted in mid-April 1991. A total of 125 overt interviews were conducted by 16 investigators. The questions posed were those employed by the second type of overt interview, which investigated use of rhino horn by traditional doctors. (In China, traditional doctors not only prescribe medicines, but may sell them as well.) A survey questionnaire was mailed out with a cover letter to 700 licensed traditional doctors residing in Taipei or Kaohsiung, the two largest cities. The survey was reviewed and endorsed by Dr. Wei Kai-Yu, Chairman of the Society for Chinese Medicine, and the list of members was kindly provided by Dr. Lin Liang-Fen, Executive Secretary of the Taipei branch, and Dr. Huang Dao-Yuan, Executive Secretary of the Kaohsiung branch. Return postage was provided, and respondents were invited to remain anonymous. In spite of all of these preparations, only 41 surveys, six percent of the sample, were returned. A sample of the cover letter and a typical translated response are included in Appendix 3. The responses were translated by a team of Taiwanese and foreign students at the Taipei Medical College.

Wholesale dealers in rhino horn were not comprehensively investigated during this phase of the study. Spot checks were carried out in the island's principal medical wholesale district, Taipei's Di Hwa Street, by Nowell in September 1990, and by another investigator in March 1991.

In addition, all three authors held a number of interviews with traditional doctors and pharmacists, people who have taken rhino horn medicine, conservationists, and government officials on the national, provincial and local levels responsible for management of either the medical community or protected wildlife. Both ancient and modern Chinese medical literature on rhino horn were reviewed extensively.

IV. RESULTS AND DISCUSSION

A. Availability of Rhino Horn

While a grand total of 2,578 interviews were held with retail pharmacists, the methodologies employed were different. The results obtained on possession of rhino horn were found to differ significantly when subjected to a 2 x 3 Chi square statistical test ($x2=16.188$, $df=2$, $p<0.001$). They are presented separately in Table 1. Throughout the rest of the paper, only the results obtained for possession of rhino horn by the covert visit method will be used in discussion unless otherwise stated.

The lower overall results for possession of rhino horn obtained by the telephone enquiry method may be attributed to two factors. Firstly, pharmacy owners were generally reluctant to talk about rhino horn over the telephone; such reticence is common among Chinese businessmen in general, and may be attributed as well to uncertainty about the legality of trading in rhino horn. Secondly, most telephone queries were made to more rural, outlying areas, which would have been more difficult for the investigators to visit comprehensively.

Table 1

Comparison of results obtained on possession of rhino horn by retail pharmacies using three different methodologies

Jurisdiction*	Number of pharmacies surveyed			Percent (n) in possession		
County	Visit	Phone	Inv	Visit	Phone	Inv**
Changhua	100	99	03	60% (60)	51% (50)	67% (02)
Chiayi	—	133	01	—	83% (110)	100% (01)
Hsinchu	08	46	—	88% (07)	57% (26)	—
Hualien	26	13	13	88% (23)	77% (10)	69% (09)
Kaohsiung	50	53	05	76% (38)	74% (39)	40% (02)
Miaoli	50	50	—	72% (36)	78% (39)	—
Nantou	50	50	—	88% (44)	86% (43)	—
Penghu (Pescadores)	22	—	—	100% (22)	—	—
Pingtung	100	70	21	65% (65)	67% (47)	90% (19)
Taichung	121	96	—	73% (88)	60% (58)	—
Tainan	86	100	—	81% (70)	66% (66)	—
Taipei	71	71	10	85% (60)	68% (48)	100% (10)
Taitung	20	—	—	30% (06)	—	—
Taoyuan	05	26	05	100% (05)	62% (16)	0% (0)
Yilan	—	50	04	—	68% (34)	100% (04)
Yunlin	76	05	28	92% (70)	80% (04)	96% (27)
Total	785	862	90	76% (594)	68% (590)	82% (74)
Municipality						
Chiayi	60	72	—	68% (41)	76% (55)	—
Hsinchu	42	—	—	83% (35)	—	—
Kaohsiung	100	97	11	88% (88)	79% (77)	82% (09)
Keelung	50	30	08	88% (44)	83% (25)	50% (04)
Taichung	29	49	05	90% (26)	76% (37)	80% (04)
Tainan	64	46	—	75% (48)	70% (32)	—
Taipei	32	135	11	72% (23)	71% (96)	73% (08)
Total	372	429	35	82% (305)	75% (322)	71% (25)
Grand total	1162	1291	125	77% (899)	71% (912)	79% (99)

* The seven municipalities are equivalent to counties under Taiwanese administration; cities and counties of the same name are both administratively and geographically distinct.

** Visit: covert visit. Phone: covert telephone enquiry. Inv: overt interview.

It seems likely that rhino horn would be more available in urban rather than rural areas. Future investigation of the domestic market for rhino horn in Taiwan, with a focus on the consumer, will examine this more quantitatively. As a preliminary assessment, the results for possession of rhino horn by traditional pharmacies in seven major metropolitan areas may be compared against those for the rest of the island (Table 1). Subjecting the results to a Chi square test in a 2 x 2 table, the results obtained for the covert visit and telephone query

methods prove to be significantly higher than those obtained for pharmacies elsewhere around the island (Visit: $x2=6.669$, $df=1$, $p<0.01$; Telephone query: $x2=5.327$, $df=1$, $p<0.05$). The reversed results obtained by the overt interview method may be attributed to an anomaly due to smaller sample size.

A.1. Retail pharmacies

Out of 1,162 traditional pharmacies surveyed by covert visit, 899, or 77 percent, were in possession of rhino horn (Table 1). The Fourth Division of the Taiwan Provincial Health Department reports that there are currently 5,663 licensed sellers of traditional medicine in Taiwan, including wholesalers (S. Lii pers. comm.). However, there are many sellers of traditional medicines in Taiwan who, for a variety of reasons, have not registered as such with the government. The Chinese Medicine Commercial Society, which is currently studying the problem of legitimizing unlicensed pharmacies, estimates there to be around 8,000 of them in Taiwan (CMSC unpubl. data). If Taiwan's total number of traditional pharmacies is approximately 13,663, then the survey results suggest that 77 percent, or 10,521 stores, deal in rhino horn. The proportion of dealers is likely to be even higher than this: many stores which were recorded as negative for possession nevertheless indicated to the investigators that they were sold out, or that they would re-stock or order rhino horn should a customer desire. Very few pharmacists indicated that they never carried rhino horn.

The results of past surveys conducted in Taiwan by Esmond Bradley Martin, a WWF researcher on the international trade in rhino horn, are presented along with the results for Taipei and Kaohsiung municipalities (as distinct from Taipei and Kaohsiung counties) in Table 2. Dr. Martin's most recent visit to Taiwan was in April 1990, accompanied by his wife. Based on interviews conducted with traders at that time, Martin and Martin (1991) concluded that "demand for African rhino horn in Taiwan has now considerably declined. There is under half as much available in the medicine shops as there was in 1988...". Results from this survey, however, indicate that the availability of rhino horn in both cities remains similar to the higher levels recorded by Dr. Martin for previous years (see Martin and Martin 1991).

Table 2

Availability of rhino horn in Taiwan over the past decade

Year	City	Percent in possession (no. surveyed)
1979	Taipei	100% (09)
1985	Taipei	76% (34)
	Kaohsiung	90% (20)
1988	Taipei	73% (60)
	Kaohsiung	87% (15)
1990	Taipei	51% (79)
	Kaohsiung	50% (50)
1991	Taipei	72% (32)
	Kaohsiung	88% (100)

Source: 1991 data from present survey; all other years from Martin and Martin (1991).

The survey found that rhino horn is available in several forms: whole horns or pieces of horn, pre-ground powder, and manufactured medicines from the Chinese mainland. Horn or pieces of horn are ground to powder on the spot for customers, although some pharmacists claim that their whole horns, handed down from past generations, are for display only. Data on the form of rhino horn possessed was gathered for a total of 503 pharmacies out of the 899 establishments visited (not telephoned) which were selling rhino horn. It was found that 67 percent of these pharmacies were selling powder (n=335), 24 percent were selling pieces of horn (n=122) and 29 percent selling whole horns (n=146). (One hundred pharmacies, or 20 percent of the sample, carried rhino horn in more than one form.) Many pharmacists, even those actually selling it, cautioned investigators that pre-packaged powder was often heavily diluted with substitutes such as Water Buffalo horn, and sometimes did not actually contain any rhino horn at all. Pieces of horn and, less frequently, whole horns, can be faked as well, and stocks of fake rhino horn, which were included in this survey but not in any previous surveys conducted by Dr. Martin, may help to explain the discrepancy between the results obtained by the Martins (1991) for 1990 and the results obtained in this survey. Investigators were encouraged to note down any substance sold by pharmacies labelled as rhino horn, rather than attempt to differentiate between actual and artificial rhino horn which, in the case of pre-ground powder, requires laboratory testing for positive identification (W. Rainey pers. comm.).

Vigne and Martin (1989) found hide from African White Rhinos available in 40 percent of the 57 pharmacies surveyed in Taipei and Kaohsiung in 1988. Availability of rhino hide was not specifically investigated in this survey. Investigators were encouraged to note down other rare animal products available in the shops they visited, and while they recorded numerous instances of tiger bone, Saiga Antelope *Saiga tatarica* horn, bear gall, and pangolin scales, not once was the presence of rhino hide indicated. Dr. Martin has not documented the availability of rhinoceros toenails in Taiwan, but it is likely that other rhino parts are sold here in similarly small volume as throughout the Chinese medical markets of Asia (see Martin 1989).

A.2. Private clinics and hospitals

The total number of holders of rhino horn in Taiwan is further increased when traditional doctors are taken into consideration. In Taiwan, licensed traditional practitioners are lawfully permitted to engage in the sale of medicines. Indeed, it is well known that sale of medicines is a major source of income for these doctors, whose consultancy fees tend to be much lower than their Western counterparts. Out of the 41 licensed doctors who responded to our survey, 70 percent (n=29) currently hold or prescribe rhino horn for their patients. The Medical Policy Division of the National Health Administration reports that there are 5,694 licensed practitioners of Chinese medicine in Taiwan (MPD unpubl. data). Some are engaged in research and do not see patients: the First Division of the Taiwan Provincial Health Department indicates that there are only 1,700 licensed clinics in Taiwan (unpubl. data).

However, as with pharmacies, there are many unlicensed doctors in Taiwan. For the most part, they are people who may have apprenticed in traditional medicine, but never attained formal schooling or passed an examination. Some of these doctors achieve a good deal of

local fame and obtain new patients entirely through word-of-mouth, without the benefit of advertising. According to both the NHA and the Chinese Medical Society, no data exists on the total number of *mi-yi* ("secret doctors"), as they are commonly referred to, currently practising in Taiwan. One official at the NHA's Medical Policy Division guessed there to be at least 10,000 unlicensed doctors in Taiwan (MPD pers. comm.) The majority of licensed doctors reside in Taipei and Kaohsiung; outside of these cities, many practitioners are unlicensed (L. Lin pers. comm.). If the results obtained for the small sample of licensed doctors are applicable, it would indicate that there are up to 7,000 medical practitioners in Taiwan — unaccounted for in official statistics — who currently prescribe or actually sell rhino horn. Moreover, 82 percent of the licensed doctors thought that the unlicensed doctors would be more likely to use a greater than average amount of rhino horn. One doctor wrote, "These more 'famous' doctors see more patients with more serious problems, and therefore would be more likely to use rhino horn, which is mainly indicated for serious illness. Also, the patients who choose an unlicensed doctor are often of a lower educational level, and can be more easily persuaded to spend money on medicine".

Larger hospitals for traditional medicine also use rhino horn. The hospital run by the Chinese Medical University in Taichung city kindly provided records on their annual dispensation of "Water", or African, rhino horn, shown in Table 3. The President of the University reports that the hospital has been using up old stocks of rhino horn, and that they are phasing out usage of endangered species (pers. comm.).

Table 3

Annual dispensation of "Water" horn at the Chinese Medical University Hospital in Taichung

Year	1983	1984	1985	1986	1987	1988	1989-90
Quantity in *liang* (kg)	6.85 (.26)	6.56 (.25)	41.68 (1.56)	30.32 (1.14)	47.94 (1.8)	41.55 (1.56)	2.07 (.08)

A.3. Manufactured medicines

The availability of manufactured medicines which contain or purport to contain rhino horn was not well covered by this survey. Although the manufacture of such medicines in Taiwan has been prohibited since 1986 (see Section IV.G.), there may still be ongoing production. One investigator purchased a small vial of powder manufactured in the southern city of Tainan labelled "Rhino Horn Powder" in Chinese, but "Kanghsianglan Antelope Horn Powder" in English. Its label boasts a wide variety of ingredients including, in addition to rhino horn, Saiga Antelope horn, Korean ginseng, sea horse, auk nest, bear gall bladder, cow bezoar, musk and crushed pearls — all for the very low price of US$2 per gram. The manufacturer, a company called Hong Kong Lan, was brought to the attention of the National Health Administration's Bureau of Drug Control (BDC). A BDC official stated that the address listed on the packaging was the company's pre-1986 address. It is possible, however, as the BDC official admitted, that this could be a ruse employed to disguise continuing manufacture of the medicine.

There is also the problem of availability of medicines manufactured on the Chinese mainland which include rhino horn as an ingredient. Mainland-manufactured medicines and medical materials are smuggled across the Taiwan Strait in such volume that they are now rather commonplace (Low 1991). One of the more profitable components of the booming cross-Strait smuggling trade, such medicines carry a stamp of authenticity valued by Taiwanese consumers. Trade with mainland China is an issue which daily grows more complex, with new ties among private and quasi-governmental groups continually being forged. Taiwan is certainly a major market for mainland-manufactured medicines, but further analysis of the trade requires an exclusive focus.

A.4. African and Asian Horn

Martin and Martin (1991) found a decreasing demand for African rhino horn in Taiwan, but the results of this survey show that 93 percent of traders holding rhino horn identified their horn as "Water", or African. Much of the horn sold in the pharmacies, however, is pre-ground and sometimes pre-packaged. Purchased from wholesalers or factories, the powder may be mixed with other, cheaper substitutes, such as Water Buffalo horn, although it would not be so labelled. Pre-packaged powder sells at a reduced price, and pharmacists cautioned the investigators that such products are probably not pure. Given that such a high percentage of traders claim their horn to be African, it may be more accurate to state that **perhaps** the supply of African horn has fallen off due to interdiction measures both in South Africa and Taiwan, but not the demand.

Martin and Martin (1991) also concluded from trader interviews in April 1990 that demand for Asian horn has continued to rise since 1988. While they did not state the percentage of pharmacies surveyed in 1990 which were holding horn identified as Asian, the proportion of shops selling Asian horn was described as "one quarter" in 1988 (Vigne and Martin 1989). The present study found that a similar proportion, 31 percent, of the shops selling rhino horn in Taipei and Kaohsiung cities identified their horn as "Fire", or Asian. Whether or not this indicates a rise in availability of Asian horn is not clear. Throughout Taiwan, the percentage of shops selling "Fire" horn is lower by nearly half, at 18 percent. It may be expected that wealthier urban customers are more likely to purchase the more expensive of the two types. Additionally, the supply of Asian horn is more limited.

Pharmacists often informed the covert interviewers posing as interested customers that "Fire" horn was more powerful and more effective than "Water" horn. Others, however, confided that they personally felt there was no actual difference between the two, other than cost. The majority of licensed traditional doctors, responding to the survey question on which type of horn they preferred to use, chose "Fire" horn (11 out of 20, with four preferring "Water" horn and five expressing no preference). Few commented coherently on their expressed preference; only one doctor pointed out that a generally perceived higher effectiveness of "Fire" horn meant that it was more likely to be used for serious illnesses or emergencies.

B. The Price of Rhino Horn

Rhino horn is one of the most expensive ingredients used in Chinese medicine. In the current survey, the price for rhino horn ranged widely between NT$14 to NT$17,000 (US$.50 to $627) per *chien* (3.75 g) (Tables 4 and 5). For "Water" horn, data from 1,659

covert interviews (visit and telephone enquiries) yield a mean retail price per *chien* is NT$583 (US$22), with the range from NT$14 to $8,000 (US$.50 to $295). Data from 91 overt interviews, however, yield a higher average retail price of NT$942 per *chien* (US$34) (Table 4). The latter is probably more representative of the price of real rhino horn, whereas the former incorporates the availability of pre-packaged powder labelled "Water" horn, which may be diluted with, or wholly consist of, another substance altogether. According to data from 335 covert visits, "Water" horn in the pre-ground or pre-packaged form sells for an average price of NT$498 (US$18) per *chien*, or 18 percent less than solid pieces of horn which are ground to powder on the spot.

Table 4

Retail price of "Water" horn in pharmacies around Taiwan, 1991

Jurisdiction	Overt interviews			Covert interviews (visit + phone)		
	Mean price (n) per *chien*	SD	Range	Mean price (n) per *chien*	SD	Range
County						
Changhua	700 (03)	300.0	400-1000	438 (104)	187.4	120-1500
Chiayi	400 (01)	—	—	563 (87)	628.6	50-4500
Hsinchu	—	—	—	479 (25)	267.6	50-1000
Hualien	580 (05)	572.7	100-1500	548 (23)	413.0	50-2000
Kaohsiung	1000 (02)	707.1	500-1500	455 (73)	346.2	100-2250
Miaoli	—	—	—	287 (75)	24.6	250-400
Nantou	—	—	—	678 (84)	442.8	100-2500
Penghu	—	—	—	416 (22)	159.8	200-900
Pingtung	681 (18)	440.6	300-2000	396 (113)	238.8	100-2000
Taichung	—	—	—	621 (138)	510.4	100-4500
Tainan	—	—	—	632 (130)	624.1	100-6000
Taipei	800 (07)	455.5	300-1500	762 (98)	807.4	80-4000
Taitung	—	—	—	344 (04)	249.0	75-750
Taoyuan	2250 (02)	353.6	2000-2500	753 (15)	318.1	300-1500
Yilan	350 (02)	70.7	300-400	585 (33)	193.6	200-1000
Yunlin	443 (27)	144.6	300-900	478 (65)	196.1	14-1000
Mean	631 (67)	463.5	100-2500	538 (1089)	547.5	14-6000
Municipality						
Chiayi	—	—	—	562 (72)	494.9	100-3500
Hsinchu	—	—	—	507 (29)	221.2	200-1000
Kaohsiung	3489 (09)	4426.2	100-10000	517 (156)	468.9	90-3000
Keelung	1375 (06)	1303.7	450-4000	1066 (68)	1060.6	100-8000
Taichung	525 (04)	206.2	300- 800	468 (50)	238.2	100-1500
Tainan	—	—	—	615 (77)	300.7	150-1200
Taipei	331 (05)	134.3	200- 550	876 (118)	776.8	60-4500
Mean	1809 (24)	3017.8	100-10000	668 (570)	636.8	60-8000
Overall mean	942 (91)	1660.4	100-10000	583 (1659)	580.8	14-8000

Note: the exchange rate used throughout this report is US$1=NT$27.1, rounded to the nearest dollar.

Data from 417 covert interviews (visits and telephone enquiries) yield a mean retail price for "Fire" horn of NT$5,277 (US$194) per *chien*, ranging from an impossibly low NT$250 (US$9) to a high of NT$17,000 (US$627) per *chien*. Data from 81 overt interviews yield a slightly lower average price of NT$4,760 (US$176) per *chien* (Table 5). Pre-ground and pre-packaged "Fire" horn powder is also available, although this form is predictably not as common. According to covert interview data, pre-ground powder sells for an average retail price of NT$3,940 (US$145) per *chien*, with the price ranging from NT$700 to $6,500 (US$26 to $240). Most dealers emphasized that, given the expense and difficulty ascertaining the purity of the powder, most consumers prefer to purchase horn ground on the spot.

Table 5

Retail price of "Fire" horn in pharmacies around Taiwan, 1991

Jurisdiction	Overt interviews			Covert interviews (visit + phone)		
	Mean price (n) per *chien*	SD	Range	Mean price (n) per *chien*	SD	Range
County						
Changhua	3,000 (03)	1,322.9	1,500- 4,000	5,282 (51)	1,815.5	400-10,000
Chiayi	5,000 (01)	—	—	3,972 (36)	2,345.1	500-10,000
Hsinchu	—	—	—	2,400 (03)	1,608.3	200- 4,000
Hualien	2,500 (03)	2,179.4	1,000- 5,000	3,250 (06)	1,436.1	1,500- 6,000
Kaohsiung	4,000 (02)	707.1	3,500- 4,000	6,400 (10)	2,059.1	4,000-10,000
Miaoli	—	—	—	700 (01)	—	—
Nantou	—	—	—	5,344 (08)	3,313.7	1,050-11,000
Penghu	—	—	—	6,250 (04)	1,299.0	4,000- 7,000
Pingtung	3,515 (17)	1,673.5	1,500- 7,500	2,814 (07)	944.8	1,200- 4,000
Taichung	—	—	—	3,927 (35)	2,506.3	250- 8,000
Tainan	—	—	—	6,521 (34)	2,058.5	1,200-12,000
Taipei	6,667 (06)	2,409.5	4,000-10,000	5,800 (05)	1,860.1	3,000- 8,500
Taitung	—	—	—	2,250 (02)	1,250.0	1,000- 3,500
Taoyuan	—	—	—	—	—	—
Yilan	3,000 (01)	—	—	4,111 (09)	1,577.2	1,000- 6,000
Yunlin	5,033 (27)	1,286.3	2,000- 7,000	5,156 (45)	1,440.6	1,200- 9,000
Mean	4,469 (60)	1,887.5	1,000-10,000	4,894 (256)	2,280.7	250-12,000
Municipality						
Chiayi	—	—	—	6,168 (25)	2,654.3	700-17,000
Hsinchu	—	—	—	5,667 (03)	3,091.2	3,000-10,000
Kaohsiung	5,750 (08)	5,644.2	500-15,000	4,349 (36)	2,587.4	250-10,000
Keelung	6,083 (06)	7,066.9	1,500-20,000	6,385 (13)	1,788.4	3,000-10,000
Taichung	6,000 (04)	1,414.2	5,000- 8,000	5,758 (26)	2,567.3	200-10,000
Tainan	—	—	—	7,472 (18)	1,727.8	4,000-10,000
Taipei	3,833 (03)	2,367.1	900- 5,000	6,320 (40)	2,271.8	800-12,000
Mean	5,590 (21)	5,018.7	500-20,000	5,887 (161)	2,569.1	250-17,000
Overall mean	4,760 (81)	3,028.0	500-20,000	5,277 (417)	2,444.4	250-17,000

Retail prices were higher, on average, in urban areas as compared to the rest of the island. Covert interview data for seven major cities yield an average price of "Water" horn that is 24 percent higher elsewhere on the island; the urban price of "Fire" horn is 20 percent higher. In general, prices tended to be higher in the capital city of Taipei, the southern city of Tainan, and the eastern port city of Keelung. Tainan is famous as a city which has preserved its traditional Taiwanese culture, and is an important centre of the medical industry. Keelung, on the other hand, is a major port; several dealers reported that sailors off-loading freighters sell smuggled rhino horn there. Keelung is only 25 km east of Taipei.

One investigator was dispatched to the island's main wholesale district for natural medical materials, Di Hwa Street in Taipei. Posing as the son of a retail pharmacist from another city, he visited seven shops selling rhino horn, and found the wholesale price of "Water" horn to average NT$50,000 per *jin* (600 grams), or US$3,075 per kg. This would be the index used to calculate the price of a whole horn. For the customer who wanted to purchase only part of the horn, spot checks conducted by Nowell at the same district in September 1990 found one trader using an index of US$3,704 per kg when half a horn was considered for purchase, and US$ 4,938 per kg for the tip cut, widely believed to be the most effective part. One whole horn was offered at US$2,519 per kg; however, it had suffered some decomposition and presented a rather sorry appearance. Overall, in September 1990 over 15 traders with rhino horn in their shop windows identified them as objects for display only.

The wholesale price for "Fire" horn averaged US$60,025 per kg in Taipei in March 1991. In September 1990, Nowell found one Di Hwa Street trader offering Asian horn at an even higher price of US$67,555 per kg, but that can be considered typical price inflation for a foreigner. In March 1991, three out of the seven stores visited claimed to be selling "Fire" horn; this is similar to the proportion found in September 1990, when six out of 15 shops were selling Asian horn. In March 1991, two of the three stores holding Asian horn sold it by the *chien*, rather than the more typical *liang* (37.5 grams), indicating the relative scarcity of Asian horn.

Gathering data on the wholesale market for rhino horn is more difficult than obtaining data on the retail market. Wholesalers are more closely involved with smugglers, and are much more aware, especially in Taipei, of the illegality of their trade, than are retailers. First-time customers in the wholesale district are likely to be treated with suspicion, and may be charged higher prices. The above information is not comprehensive and will be expanded upon in Phase II of this study.

At present, the average retail price in Taiwan per *chien* of "Water" horn is 73 percent higher than the average wholesale price per *chien* in Taipei, which is not surprising. It is interesting, however, that the average retail price per *chien* of "Fire" horn obtained by this survey is 16 percent lower than the average wholesale price per *chien*. One possible explanation is that, since the more expensive "Fire" horn is sold less frequently than "Water" horn, pharmacists around the island who may have purchased their stock of "Fire" horn some years ago are not aware of the recent increases in wholesale price in Taipei. This would tend to support the Martins' (1991) conclusion that new supplies of Asian horn continue to come in for purchase as investments, rather than as medicine. In addition, another factor is likely to be that many pharmacists try to pass off cheaper "Water" horn as the more expensive "Fire", while not

quite daring to charge the full price for goods which they secretly understand to be inferior.

Licensed traditional practitioners, according to the survey results, charge a higher price on average for "Water" horn, NT$812 (US$30) (n=12) per *chien*, than do pharmacists. However, their average price for "Fire" horn, the type preferred by 52 percent of doctors surveyed (n=11), is much lower than the average retail price for "Fire" horn at a pharmacy: NT$3,240 (US$120) (n=5) per *chien*. This could be because licensed doctors are no more expert than pharmacists at distinguishing between "Water" and "Fire" horn: not one of the doctors surveyed identified the difference between the two as anything but one of cost and effectiveness. One doctor in fact asserted that "the difference has nothing whatsoever to do with the geographic origin of the rhino" without indicating just what he believes the actual difference to be.

Doctors and pharmacists interviewed overtly were asked to estimate the price of "Water" and "Fire" horn five years ago (@ 1985). Eight doctors reported that they sold "Water" horn for an average price of NT$381 in the mid-1980s, 53 percent less than the current selling price (not adjusted for inflation). Four doctors reported that they sold "Fire" horn for an average price of NT$1375, 58 percent less than today's price. Pharmacists reported selling "Water" horn at a mean retail price of NT$397 (n=62) five years ago, 59 percent less than the price they report currently (overt interviews only). Pharmacists reported selling "Fire" horn at a mean retail price of NT$2,716 (n=57) in the mid-1980s, only 43 percent less than today's reported price. Martin and Martin (1991) present price data gathered in Taipei and Kaohsiung cities over the past decade, which may be compared with the findings of this study (Table 6). We have converted our prices into US$/kg to match Martin and Martin (1991); our 1985 estimated prices have not been adjusted for inflation, and it is unclear whether the Martins have done so.

Table 6

Mean retail price of rhino horn in Taipei and Kaohsiung over time

Year	City	African/"Water" (US$/kg)	Asian/"Fire" (US$/kg)	Source
1979	Taipei	1,596	17,090	Martin (1991)
1985	Taipei	1,532	23,929	Martin (1991)
	Kaohsiung	2,007	21,365	Martin (1991)
		5,346 (n=9)	14,945 (n=8)	overt interview*
1988	Taipei	4,660	40,558	Martin (1991)
	Kaohsiung	3,347	42,880	"
1990	Taipei	4,221	54,040	"
	Kaohsiung	3,737	40,404	"
1991	Taipei	3,257 (n=5)	37,717 (n=3)	overt interview
		8,610 (n=118)	62,189 (n=40)	covert interview
	Kaohsiung	34,332 (n=9)	56,581 (n=8)	overt interview
		5,087 (n=156)	42,795 (n=36)	covert interview

*estimated by pharmacists interviewed by this study

The price of rhino horn in Taipei has nearly quadrupled over the past decade. Because of both the perceived imminent extinction of the rhino and the fact that rhino horn may be stored for a long time without much risk of decomposition, traders see it as a solid investment value. The Martins (1991) and other interviewees indicated that some Taiwanese are in fact stockpiling rhino horn as a commodity rather than as a medicine. One source reported that Taipei wholesalers have been selling whole horns to wealthy customers for carving into fortune-bringing heirloom objects, such as statues of the goddess Kuan-Yin, or incense bowls shaped like a dragon or phoenix. Antique rhino horn carvings such as those described by Martin (1990) are being smuggled in, primarily from the Chinese mainland, but also from Thailand as well. Taiwanese purchase these carvings as art treasures (not as raw material for the manufacture of medicines, as they are currently being used in China) at prices per kg far higher than those described above. One source identified Di Hwa Street in Taipei as the major supply centre for the art market, which helps explain the escalating price of rhino horn at a nominally medical wholesale district.

C. Consumption of Rhino Horn

The overt interviews (both interviews with pharmacists and the survey questionnaire mailed to licensed doctors) were a first attempt to gather data on the average amount of rhino horn sold annually to consumers in Taiwan. Twenty doctors reported that the average prescription, typically re-filled two to three times over the course of an illness, was .5 *chien* (1.88 grams) per adult patient. Thirteen doctors reported an average annual sale/prescription volume of 11.5 *chien* (43 grams), indicating that perhaps only ten customers per doctor per year purchase rhino horn. The small sample size does not permit much confidence in this extrapolation.

Retail pharmacists also reported an average prescription of .5 *chien* (n=86). Their reported annual sale volume was also similar, averaging 12.75 *chien* (47.8 grams) (n=43). Excluding an anomalous annual retail sale volume of 100 *chien* (375 grams) reported by one pharmacist in Hualien county, the average is lowered considerably to 10.67 *chien* per year (n=42). We have included the 100 *chien* as the results in general are difficult to interpret (Table 7).

Table 7

Average dosage and annual sale volume reported by retail pharmacists

Jurisdiction	Average dosage in *chien* (n)	Average annual sale volume in *chien* (n)
Changhua county	0.12 (2)	17.75 (2)
Chiayi county	0.15 (1)	10.00 (1)
Hualien county*	0.26 (8)	19.70 (7)
Kaohsiung county	0.15 (1)	2.00 (1)
Pingtung county	1.05 (16)	11.10 (12)
Taipei county	0.47 (6)	1.00 (1)
Yilan county	0.59 (3)	7.75 (2)
Yunlin county	0.28 (27)	18.60 (11)
Mean	0.49 (64)	14.60 (37)
Kaohsiung city	0.48 (8)	1.52 (5)
Keelung city	0.44 (5)	—
Taichung city	0.72 (5)	—
Taipei city	0.33 (4)	1.00 (1)
Mean	0.49 (22)	1.43 (6)
Overall mean	0.50 (86)	12.75 (43)

The annual sale volume reported for Kaohsiung and Taipei cities are strikingly lower than those reported for the rest of the island. It is possible that traditional medicines are more popular in less urbanized (and thus less Westernized) areas, but we are reluctant to draw such a conclusion at this stage. The lower reported annual sale volume for pharmacies in urban areas would not seem to correlate with the higher availability and price of rhino horn in the cities. One licensed traditional doctor we interviewed in Taipei showed us an African horn which, she said, she had purchased ten years ago. She had ground off only a small part of the tip, and she informed us reliably that she seldom prescribed rhino horn. While she may be typical of licensed doctors, who report that rhino horn is generally prescribed only for serious illnesses, this would not seem to be the case for retail pharmacies, which do more business than a doctor's office. A doctor's prescription is not always necessary to purchase medicine from a traditional retail pharmacy, and we have gathered some colloquial evidence which indicates that rhino horn is sold from pharmacies to people who are not seriously ill. For example Chyi, a veterinarian, examined a lap dog with distemper whose owner had been attempting to treat it with rhino horn powder — on the recommendation of her pharmacist. We attribute the minuscule annual reported sale volume in Kaohsiung and Taipei cities to small sample size and under-reporting. Interviewers reported considerable reluctance among pharmacists to answer the question: less than half of the 99 pharmacists in possession of rhino horn reported annual sale volume. Pharmacists in major cities are likely to be more aware of the illegality of trading in rhino horn.

D. The Magnitude of the Problem: the Amount of Rhino Horn in Taiwan

All holders of rhino horn in Taiwan were required by law to register their stocks between August-November 1990, as is described in further detail below. By 30 November, a total of 1,464.5 kg had been registered by 410 companies and individuals. Most knowledgeable people in Taiwan believe that the amount registered represents only the tip of the iceberg. There is a deep-seated distrust of the registration process of allowing the government to record personal possession of an illegal substance. There is no penalty for failure to register and little chance of getting caught. Amounts of horn which were registered were not confirmed by the responsible authorities. The registration data are broken down by area in Table 8, and numbers of registrants are compared with the number of pharmacies selling rhino horn found by covert visits and overt interviews within the same area.

Table 8

Comparison of rhino horn possession by area from covert visit data with stocks registered with the government by 30 November 1990

Area	Survey results: No. of pharmacies in possession (% of sample)	No. of registrants	Volume in kg
Changhua county	60 (60%)	40	86.30
Chiayi county	—	47	110.51
Hsinchu county	08 (88%)	3	120.11
Hualien county	23 (88%)	1	2.20
Kaohsiung county	38 (76%)	13	27.72
Miaoli county	36 (72%)	5	24.01
Nantou county	44 (88%)	3	4.00
Penghu county	22 (100%)	0	—
Pingtung county	65 (65%)	3	(3 horns)
Taichung county	88 (73%)	15	63.20
Tainan county	70 (81%)	6	56.80
Taipei county	60 (85%)	83	125.65
Taitung county	6 (30%)	0	—
Taoyuan county	5 (100%)	4	6.75
Yilan county	—	17	31.34
Yunlin county	70 (92%)	5	20.26
Chiayi city	41 (68%)	14	72.45
Hsinchu city	35 (83%)	1	12.30
Kaohsiung city	88 (88%)	16	195.00
Keelung city	44 (88%)	10	12.20
Taichung city	26 (90%)	24	49.30
Tainan city	48 (75%)	2	5.40
Taipei city	23 (72%)	99	439.00
Total	899 (77%)	410	1,464.50

Source: Department of Forestry, Council of Agriculture; Executive Yuan Taiwan Provincial Bureau of Agriculture and Forestry; Taipei Municipal Department of Reconstruction.

It is immediately apparent that the amount registered does not represent the true size of the rhino horn stocks currently held in Taiwan. Only four of the 2,453 pharmacists interviewed mentioned to the investigators that they had registered their rhino horn, although 90 had expressed awareness of the illegal nature of the trade. Of the doctors responding anonymously to the survey questionnaire who admitted to dispensing rhino horn, 86 percent (26 out of 28) claimed not to have registered their horn. The reasons they gave ranged from ignorance of the procedure involved, to feeling that the amount in their possession was insignificant in quantity or was in powder form - and thus not actually a rhino "horn". Only the overt interviews with pharmacists indicate a higher rate of compliance with government regulations. Of 102 respondents, 36 percent (n=37) claimed to have registered their horn, while 64 percent (n=65) said they had not. It is not possible at the time of this writing to judge the accuracy of this information. According to the Chief of the Natural Resources Conservation Division of the Council of Agriculture, our list of pharmacies in possession of rhino horn will be compared with the list of registrants, and the results made available to the newly opened TRAFFIC Taipei office (H.Y. Tang, pers. comm.).

From the data gathered by this survey, it is possible to obtain a rough estimate of the amount of rhino horn currently held by traditional pharmacies in Taiwan. As previously mentioned, of 899 pharmacies which were visited covertly, 29 percent were selling whole horns, 24 percent were selling pieces of horn, and 67 percent were selling powder. The average number of whole horns per shop was 1.19 (n=146), although to be conservative the figure used for the calculation is 1. Of these horns, 18 percent (n=26) were recorded as "Fire" horns, or Asian. The median weight between the average Sumatran and Indian horns is 476 grams (Martin and Ryan 1990). The average weight of a Black Rhino horn is 2.88 kg (Martin and Ryan 1990). For pieces of horn, 15 percent (n=18) were identified as "Fire" or Asian. An arbitrarily derived estimate of .25 horns was estimated as the average quantity of pieces of rhino horn held by a pharmacy. Pre-packaged powder is sold in bags by the *liang* (37.5 grams), and 1 *liang* was taken as the average amount in possession, with the recorded amounts ranging widely between two grams to two kilos. The results of this calculation are listed in Table 9.

Table 9

Estimated size of rhino horn stocks held by retail pharmacies in March 1991

	Minimum Stocks (Licensed pharmacies)			Maximum Stocks (Estimated total pharmacies)[1]		
Stocks	Number of pharmacies	Horn held (kg) "Water"	"Fire"	Number of pharmacies	Horn held (kg) "Water"	"Fire"
Whole horns[2]	1,264	2,985 kg	109 kg	3,051	7,206 kg	261 kg
Horn pieces[3]	1,046	640 kg	19 kg	2,525	1,545 kg	45 kg
Pre-ground powder[4]	2,921	110 kg		7,048	264 kg	
Total estimated Stocks		3,735 kg + 128 kg (3,863 kg)			9,015 kg + 306 kg (9,321 kg)	

[1] The number of licensed traditional pharmacies in Taiwan is 5,663 (minimum stocks). Including an estimated 8,000 unlicensed pharmacies brings the total number of traditional pharmacies to 13,663 (maximum stocks). Covert visit data indicates that 77 percent of traditional pharmacies are in possession of rhino horn, or between 4,360 - 10,520 dealers.

[2] 29 percent of pharmacies visited covertly were in possession of one whole rhino horn. 82 percent of dealers identified their horn as "Water" (2.88 kg/horn), and 18 percent as "Fire" (.476 kg/horn).

[3] 24 percent of pharmacies visited covertly were in possession of horn pieces (we estimate average quantity as .25 horn). 85 percent of dealers identified their horn pieces as "Water" (720 g), and 15 percent as "Fire" (119 g).

[4] 67 percent of pharmacies visited covertly were in possession of pre-ground rhino horn powder (we estimate average quantity as one *liang*, or 37.5 g). Most dealers identified their pre-ground powder as "Water" horn.

Our estimates are rough, and we have a number of caveats. While wholesalers are included in the estimated total number of pharmacies in Taiwan, average quantities in possession were calculated for retail pharmacies only. The size of the stockpile is underestimated by not including the larger quantities held at any given moment by wholesalers. In addition, the amount of rhino horn held in private clinics or hospitals must be guessed at, as no data has yet been collected. The data from the Chinese Medical University Hospital in Taichung is not representative of the far more numerous smaller private clinics. All things considered, however, there is likely to be at least another 1,000 kg of horn held by the thousands of private clinics and hospitals (licensed and unlicensed). Also not included are the stockpiles amassed by smugglers, the statues and carvings collected by the wealthy, and any amounts held by companies engaged in the illicit manufacture of medicines or distributors making pre-packaged powder. The quantity of manufactured medicines smuggled in from mainland China which contain rhino horn are also not included. Because the higher number of pharmacies used in the calculation above is believed to be the more accurate, it would seem that there is well over 10,000 kg, or ten tonnes, of rhino horn stockpiled in Taiwan. At current retail value (from covert visit data, Tables 4 and 5), 10,000 kg of rhino horn (including 300 kg of Asian horn, some of it in the form of antique carvings) would be worth over US$70 million. Taking this estimated quantity and dividing by the average yearly sales reported by pharmacists in Section IV.C., it would appear that the stocks in Taiwan could last from 10 to 25 years.

The soundness of the surprisingly high estimate of the quantity of rhino horn stockpiled in Taiwan can be evaluated by reviewing Dr. Martin's decade of research into the international trade in rhino horn (e.g. Martin 1980, Vigne and Martin 1987). Martin has estimated that during the 1970s, an average of 8,000 kg of rhino horn came onto the market from Africa annually, for a decade total of 80,000 kg of African horn (27,800 dead rhinos). From 1980 to 1986 inclusive, annual trade volume was around 3,000 kg of African horn (7,280 dead rhinos over that period). From 1970 to 1986, the amount of Asian horn estimated to have been traded is at least 1,040 kg, representing approximately 776 dead Great One-horned Rhinos, 1,673 Sumatran Rhinos, and 45 Javan Rhinos (Martin and Ryan 1990). Total trade volume (including illegal trade), over the past 18 years is therefore estimated to be 102,040 kg (Martin and Ryan 1990).

From the early 1970s until 1984, the small Middle Eastern country of North Yemen imported almost half of the rhino horn put onto the world market for the purposes of making handles for traditional daggers. Imports have been banned, and an economic slump and market saturation have effectively brought an end to North Yemen's position as the world's primary consumer of rhino horn (Vigne and Martin 1991). Subtracting for the amount of horn imported by North Yemen leaves approximately 55,000 kg of rhino horn available to the medicinal markets of

the Far East during the 1970s and 1980s. Over 7,281 kg of rhino horn were officially imported into Taiwan during this period, and it is certain that more has been brought in illegally. Much of the international rhino horn trade has taken place underground, so that import figures for any of the consumer countries cannot be considered reliable.

As one of the remaining major Asian consumer markets, it is likely that at least 1/5 of the estimated supply of 55,000 kg of rhino horn ended up in Taiwan, accelerating at the end of the 1980s when trade bans drove up the price and other countries were able to enforce these bans more effectively. Japan closed down its market in 1980 (Martin and Vigne 1987). The four remaining consumer markets are now China, Thailand, South Korea and Taiwan. Hong Kong had been the world's main importer of rhino horn from World War II up until import was banned in 1979, but was primarily a re-exporter rather than a consumer market (Martin 1980). Macao clamped down on the rhino horn trade in 1985 (Vigne and Martin 1989) and prohibited internal sales in 1988 (Milliken *et al.* 1991). Singapore took over as the world's major entrepôt, permitting legal trade in all five species of rhino until it acceded to CITES, under great international pressure, in 1986 (Martin and Vigne 1987). Since that time, Taiwan has not only increased in importance as a consumer market, as its currency appreciated 40 percent against the US dollar, but appears to have replaced Singapore and Hong Kong as the world's primary entrepôt for the illicit trade in rhino horn (Vigne and Martin 1989).

E. Facilitating the Underground Trade: Taiwan's Role as an Entrepôt

Vigne and Martin (1989) and Martin and Martin (1991) report that rhino horn smuggled out of Africa makes its way to Taiwan via South Africa, one of the few countries in the world which accords full diplomatic recognition to the Republic of China on Taiwan. For many years, South African ports have been the main point of exit for poached horn and ivory, which are smuggled in from neighbouring countries in trucks. Upon reaching South Africa, rhino horn is typically concealed in packages sent by air or sea freight or by post. A growing body of evidence indicates that Taiwanese living in southern Africa are still closely involved in purchasing poached ivory and rhino horn, and that most of the rhino horn leaving southern Africa for Asia is still going to Taiwan (E.B. Martin *in litt.* 1991). In September 1990, three Taiwanese nationals were arrested in South Africa with a total of 110 rhino horns in their possession; an additional 40 horns had reportedly already been sent to Taiwan (Anon. 1990; J. Thomsen *in litt.* 1990). In August 1991, a Taiwanese owner of a Johannesburg jewellery store was arrested with 158 kg of ivory cut into name seals, worth an estimated US$800,000. The Endangered Species Protection Unit, a special task force of the South African police, believes the man is part of a criminal syndicate smuggling ivory and rhino horn to Taiwan and Hong Kong (Anon. 1991a). Rhino horn is also smuggled piecemeal by sailors working on large fishing vessels returning from South Africa, according to our interviews and to Martin and Martin (1991). Martin (1989 and 1991) has also reported that large amounts of rhino horn smuggled into Taiwan have been illicitly re-exported to mainland China.

Working through a journalist who insisted on maintaining his source's anonymity, we interviewed a young Taiwanese man who over the past decade has become spectacularly wealthy through his involvement with a small group of traders specializing in the movement of rhino horn. This man has, for complicated reasons of his own, met previously with a prominent international conservationist, but not with E.B. Martin, so that it is possible to independently corroborate some of Dr. Martin's published information.

The smuggler stated that between 1988 and 1989, 6,000 kg of rhino horn were collected in Taiwan and sold to Hong Kong traders. This type of trading activity was revealed earlier by Vigne and Martin (1989). The shipment was moved into Hong Kong, and was destined for sale to a group of high-level Party cadres in mainland China looking for a solid investment. He reports that 70-80 percent of the shipment has been successfully sold, but that the Chinese are no longer willing to purchase the remainder. The Hong Kong traders now want to re-sell the horn back to Taiwanese, but the Taiwanese group feels that their home market is currently glutted, and to date have not yet been willing to take it back. The Hong Kong group has reduced their selling price to US$1,230 per kg, less than half the current wholesale price in Taipei.

If the Chinese are truthfully declining to purchase more smuggled rhino horn, that would provide a ray of hope in an otherwise very gloomy picture. China recently carried out a stock-take of rhino horn held by its large state-owned pharmaceutical manufacturers, and in December 1989 reported holdings of 9,874.8 kg (Martin 1990). Martin (1990) reported that much of China's horn, however, consists of scrap and powder imported from North Yemen, in addition to antique rhino horn carvings. Stocks of whole horns, as are seen in Taiwan, appear to be relatively small (Martin 1990). China uses between 600 to 700 kg of rhino horn annually for the manufacture of traditional medicines (Martin 1990), so that its stocks should last 15 more years. The imminent integration of Hong Kong into China and the proliferation of illegal but functional direct trading links between Taiwan and China, indicate a major role for Taiwan to serve in the future as an entrepôt for the illicit movement of rhino horn into China, should demand resurface.

F. Substitutes for Rhino Horn and Extent of their Use

Conservationists worldwide have called for the promotion of substitutes for rhino horn in order to curtail consumption. The most current research, a study led by an accomplished scholar of Oriental medicine in Hong Kong (But 1991) indicates that, used in larger doses, Saiga Antelope horn, Water Buffalo horn, and cattle horn are effective anti-pyretics which can be substituted for rhino horn. However, the promotion of substitutes has met with resistance from the Chinese medical community, which has used rhino horn for centuries. One well-known doctor in Taiwan wrote recently in a major magazine that many doctors consider rhino horn to be "irreplaceable" (Chen 1991). Regarding studies on the Chinese mainland which approved of the substitution of Water Buffalo horn, he wrote, "..There are several chemical constituents found in rhino horn but lacking in Water Buffalo horn, so that Water Buffalo horn must be taken in greater quantity. Also, people in mainland China involve themselves in more strenuous activity and eat rougher foods than the people of Taiwan, who are accustomed to refined, processed foods and a more sedentary lifestyle. Therefore, in serious cases, it is doubtful that we could absorb the rougher medicine..." (Chen 1991). The full translated text of this article appears as Appendix 4.

Not all the doctors surveyed in the present study were so adamant. There was no consensus regarding either the specific heat syndromes for which rhino horn is indicated, nor for the illnesses for which other substitutes would be acceptable. A wide variety of possible substitutes were suggested by the doctors and pharmacists surveyed, with Saiga Antelope and Water Buffalo horn most frequently mentioned. Although Saiga Antelope horn has been

promoted as a substitute for rhino horn (Martin and Vigne 1987, But *et al.* 1990), there are indications that what was once a soundly managed harvesting scheme of the great herds in the Soviet Union is being sabotaged by poaching. Preliminary reports indicate that the species may now be threatened where it was recently abundant — further evidence of the devastation that can result from the demands of the traditional medical market (T. De Meulenaer *in litt.* 1991). The Saiga Antelope is not legally protected in Taiwan.

A number of plant materials were mentioned as substitutes, including *Chrysanthemum meriflium, Odontochilus inabai, Bupleurum fulcatum, Coptis chinensis*, sugar of the white gourd, and the aerial roots of the Banyan Tree, in addition to proprietary herbal remedies. According to Dr. Tam Ling-Kwan, President of the Sin Hua Herbalists' and Herb Dealers' Promotion Society in Hong Kong, herbalists there also use other medicines to replace rhino horn (Shaw and Chan 1991). The use of herbal remedies as substitutes for rhino horn is a subject deserving of further attention by a qualified specialist, and of further promotion. In addition, many retail pharmacists advised the investigators that an anti-pyretic injection at a Western hospital was the best course of action.

However, regardless of the proven efficacy of various substitutes, and grand statements about the cultural history of rhino horn dispensation, the traditional medical community is probably most enamoured of rhino horn at present due to its exceedingly high price. Taiwanese patients are now more than ever able to afford rhino horn, and its cost may perversely lend it further attraction. The dispensation of inexpensive substitutes is not in the sellers' best financial interests when many patients may actually prefer the more expensive genuine article. Promotion of the use of substitutes will be an integral part of the educational campaign recommended in this report, but it cannot honestly be considered the most expedient approach to the problem of controlling the domestic market.

G. Legal Measures Taken to Control the Import and Use of Rhino Horn

Import of rhino horn was banned in August 1985 by the Board of Foreign Trade (BOFT), largely in response to pressure from WWF. Following this measure, the National Health Administration's Bureau of Drug Control announced in November 1986 that manufacturers of medicines containing rhino horn must register their stocks in order to receive a three-year extension of their export permit, after which time no further exports of these medicines would be permitted. No firms, however, registered any stocks, and the NHA's records thus indicate that no medicines containing rhino horn are currently being manufactured in Taiwan, although this survey discovered evidence to the contrary. The only step the NHA has taken toward controlling dispensation of rhino horn by pharmacists and physicians has been to send an official letter to the various medical societies in November 1989. Referring to recent studies sponsored by WWF documenting continuing availability of rhino horn in traditional pharmacies in Taiwan, the letter advised all society members to refrain from "using, prescribing or manufacturing rhino horn medicines...in order to protect rare animals and uphold the international reputation of our country".

It is odd that the letter did not mention Taiwan's own *Wildlife Conservation Law*, enacted in June 1989. The law is modelled on CITES, to which Taiwan may not become a Party due to non-recognition by the United Nations. The law regulates both international and domestic

trade in all protected species designated by the Council of Agriculture (COA), including their parts and products, and including the majority of fauna species listed in Appendices I and II of CITES. All import, export, trade, exchange or display with intention to sell of protected wildlife or their parts or products requires express permission from the appropriate authorities, either national or local. The rhinos, as CITES Appendix I species, were given protected status when the law was enacted in June 1989, therefore making trade in their parts and products essentially illegal.

Prohibition of the use of rhino horn in traditional medicine met with strong disagreement from the Chinese medical community. The COA held several meetings with society representatives and the NHA to discuss solutions to manage the problem. The most recent meeting was held in February 1990, where a plan was approved in principle that a stock registration would be held and, after a 2-3 year grace period to sell off these stocks, all internal trade would be banned. The registration of all privately-held rhino horn was not called for until August 1990, six months later. By the 30 November deadline, 410 companies and individuals throughout Taiwan had registered a total of 1,464.5 kg; as shown in Table 8.

Yet to date, the decisions of the February 1990 meeting have not become policy. All parties are dissatisfied with the management options. The medical community views rhino horn as a traditional, powerful and very valuable drug in which it has made a substantial investment over the past decade, regardless of the import ban. Industry representatives have suggested that the prescription of rhino horn could be regulated, i.e., it could only be prescribed for certain diseases or conditions. However, while the medical societies could suggest that doctors follow these guidelines, it would be nearly impossible to regulate since rhino horn is frequently sold without a real prescription from a licensed doctor. Meanwhile, the government authorities responsible for carrying out the mandates of the *Wildlife Conservation Law* have told us that they are reluctant to see a total ban on internal trade in rhino horn because they would have little hope of properly enforcing it.

H. Problems with Law Enforcement

As discussed above, there are likely to be anywhere from ten to twenty thousand outlets actively trading in rhino horn or products labelled as such at the present time, despite a good deal of publicity regarding illegal aspects of the trade. To regulate both international and domestic trade in protected species, the Council of Agriculture's Department of Natural Resources Conservation has assigned two people out of their total staff of five. The Technical Department of the Provincial Bureau of Agriculture and Forestry also has one person responsible for trade, out of a staff of five. This office, which is responsible for working closely with the local governments and coordinating reporting to COA, the policy-making body, had an annual budget in fiscal year 1990 of NT$8 million (US$295,203) to carry out all duties associated with the *Wildlife Conservation Law* (of which trade is only a small part). The Taipei Municipal Department of Reconstruction has a staff of five (the largest for a local office) responsible for the *Wildlife Conservation Law*, and a 1990 fiscal year budget of approximately NT$2.3 million (US$84,871), not including salaries (which can run as low as US$500 per month). For the 22 other counties and municipalities, one official is responsible for all duties associated with the *Wildlife Conservation Law*. Thus, Taiwan has at present just 25 officials charged with taking action against illegal traders in rhino horn.

These officials do not often leave their desks. Conservation authorities do not have police powers, and must secure the cooperation of local police units in order to make an arrest. Enforcement teams are being established for each county and major municipality to streamline this process, with authorities designating responsible officials in various related agencies, including police departments.

The creation of local enforcement teams is a welcome development. However, it should be pointed out that current realities in Taiwan are likely to reduce their effectiveness. There are innumerable illegal businesses of all kinds around the island; for example, only 5,600 restaurants out of an estimated total of 250,000 are licensed (Anon. 1991b). Against this background, it will be difficult to make enforcement of wildlife conservation legislation a priority. Official corruption is a very real problem — several informed sources attributed a reluctance to register rhino horn stocks to fears that they will later be stolen by corrupt members of the local police force. As for the local conservation authorities, many are long-time civil servants whose original purview was limited to agriculture, and who may not understand fundamental concepts of conservation and reject involvement with trade issues (K.D. Peng, pers. comm.). Conservation authorities have not once targeted a traditional pharmacy dealing in endangered species.

Taiwan is a wealthy island with a very large police force, but to state that "Taiwan has the infrastructure to control the trade [in rhino horn] if it really wishes to" (Vigne and Martin 1989) is misleading. It is evident that many officials would like to do more for conservation, but they are constrained both by top-level bureaucratic inertia and by a society for which "ways of making use of wildlife are more important than trying to save it" (Martin and Martin 1991). There appears to be a tacit understanding among both the conservation and health authorities that any attempt to wage war on the medical community would be a losing battle. No action whatsoever has been taken against them, and it unlikely that the situation would improve on the local level in response to international pressure. It is also unrealistic for conservationists to expect Taiwanese society to respond to governmental promotion of the use of substitutes for rhino horn with the same alacrity as the Japanese. A trade ban in name only would help no one except the smugglers.

On the other hand, it may be possible for conservationists to reach a compromise with the traditional medical community, which opposes a trade ban. The primary goal of conservationists is to prevent any more rhino horn from being smuggled into Taiwan, in order to close off trade channels to the poaching syndicates completely. Regulation rather than restriction of the domestic market may be a more appropriate method for preventing further illegal imports of rhino horn.

V. RECOMMENDATIONS

The traditional medical market will be the most difficult market sector consuming endangered species to reform. Given the major flaws in Taiwan's ability to enforce its conservation legislation, it is essential, for the survival of these species, that a relationship of cooperation be established between conservationists and the traditional medical community. Therefore, as a matter of high priority, it is recommended that the Council of Agriculture, the National Health

Administration and the various traditional medicine associations work together closely to develop a monitoring programme to manage Taiwan's stocks of rhino horn.

Permitting a tightly controlled internal trade in existing rhino parts and products may be more effective at shutting off Taiwanese market demand to rhino poachers than total prohibition of internal trade. Prohibition of all internal trade in rhino parts and products, effective immediately, is essentially the present management policy, according to the letter of the *Wildlife Conservation Law*. Given the existence of very large stocks of rhino horn in Taiwan, distributed over the entire island rather than heavily concentrated, and the very high value of these stocks, it is not a very practical solution to the problem of continuing illegal international trade in rhino horn, which is mainly why it has not been enforced. "A complete prohibition on all sales and trade, internal and international, of rhinoceros parts and derivatives, especially horn, whether whole or in any other form, including personal effects..." was the solution urged by the international community when CITES Resolution Conf. 6.10 was adopted by the majority of Parties at the sixth meeting of the Conference of the Parties to CITES in 1987. It is still the position taken by many major conservation organizations, including WWF and TRAFFIC (e.g. Anon. 1991a). However, it is generally acknowledged that the past fifteen years of trade bans have had very little success at conserving rhinos. Given the magnitude of the task assigned to Taiwan's weak conservation law enforcement system, this strategy cannot realistically be expected to prevent further illegal imports of rhino horn.

A. Controlled trade in registered stocks

This sort of management programme was pioneered by Hong Kong's CITES Management Authority, the Department of Agriculture and Fisheries (AFD), as discussed in detail by Milliken (1990). The Hong Kong authorities instituted a series of restrictions which limited the period that dealers were given to dispose of stocks of rhino parts and products acquired before internal trade became illegal. As Milliken (1990) points out, the Hong Kong management programme is in many ways an admirable model for other consumer nations to consider. However, efficient as their series of administrative controls appears on paper, in reality only six individuals and companies registered rhino horn and hide with the government. Today, despite the trade ban, there is evidence of a continuing quiet trade in Hong Kong's numerous retail pharmacies (Milliken *et al.* 1991, Shaw and Chan 1991). Contraband rhino horn continues to be intercepted by Hong Kong Customs authorities (Milliken 1991), and there is evidence that Hong Kong traders are still actively involved in acquiring rhino horn overseas (E.B. Martin *in litt.* 1991).

Taiwan's traditional medicine market is both larger and more "underground" than in Hong Kong, and will thus be even more difficult to control. Outlined below are basic elements of a programme which could effectively oversee consumption of rhino stocks which are exempt by a "grandfather clause" from an immediate internal trade ban. This programme is similar in many ways to the Hong Kong model, the main difference being a recommendation that direct sales to consumers on the retail level be reported to the relevant authorities. Dealers should be permitted an appropriate period of time to dispose of their rhino horn before any decision is made by the Taiwan government to either implement a total trade ban, on the one hand, or permit legal imports of rhino horn, should conservation of the world's rhinos ever become effective. The Hong Kong government allowed those dealers registering rhino horn a total of

nine years to dispose of their stocks, which totalled 696 kg (with an additional 1,825 kg of rhino hide), before freezing possession and banning internal trade (Milliken 1991). It seems appropriate that a period of at least this length be permitted Taiwan registrants to dispose of their rhino horn, given both the larger quantity of registered stocks and the much greater number of registrants. COA has considered a period of three years, but that seems too short given 1) the reported rate of annual sales according to our survey; and 2) that it took nine years for registered rhino horn stocks in Hong Kong to shrink from 696 to zero (Milliken 1991).

It is recommended that the length of the stock disposal period be left open, at the present stage, to be fixed later through negotiation. The recommendation takes into account the failure of trade bans elsewhere, the large numbers of unlicensed pharmacies and doctors operating in Taiwan, and the large stocks of very valuable rhino horn on the island which are being consumed at an apparently slow rate. All these factors combine to provide a powerful disincentive for dealers to register their rhino parts and products — especially considering the current lack of a legal penalty for failure to register. An appropriate period for legal disposal of registered stocks is the most powerful incentive that under the circumstances can be offered to induce dealers to participate in a monitoring programme in the context of Taiwan's current inability to effectively enforce its domestic conservation legislation. This approach should also incorporate intensive monitoring of the marketplace, consumer education programmes, and swift penalizing of violators. It is our hope that, under the sort of management programme discussed below, violators would be in the minority, rather than the majority as things presently stand.

A.1. Registration of stocks

According to Milliken (1991), "Registration under license is probably the single most critical step in asserting domestic controls for several reasons. First, it allows the government to identify each individual and company holding stocks of rhino [parts and products] and, in doing so, define the scale of the issue. Secondly, it provides the basis to monitor the subsequent dispensation of registered stocks, particularly if those holding possession licenses are obliged to file regular stock inventory reports with the government. Thirdly, in conjunction with effective monitoring and law enforcement efforts, it prevents the undetected introduction of new stocks of rhino horn into the country. And finally, it provides the legal basis to seize and confiscate any stock which remains unlicensed".

(a) Legal basis

Legal basis for the registration of rhino parts and products in Taiwan is provided by administrative measures issued by the Council of Agriculture under the *Wildlife Conservation Law*. The COA issued such a measure in August 1990, obliging all those in possession of rhino horn to register their stocks by November 1990, but its effectiveness was limited because the *Wildlife Conservation Law* does not specify penalties for failure to register. The law should be amended to penalize non-registration.

Involvement of the National Health Administration (NHA) in the management of rhino parts and products would be optimal and logical. Rhino horn is part of the official pharmacopoeia of traditional drugs, some of which are restricted under the 1970 *Law for the Control of Medicaments and Pharmaceutical Firms*. A new category of restricted drugs should be

created under this law to recognize drugs derived from endangered species which are officially protected under other legislation.

(b) Scope

COA administrative measures required only rhino horn to be registered. In order to close all loopholes and more effectively protect rhinos, the scope of the registration requirement should be extended to incorporate all other rhino parts and products, including rhino hide, medicinal products and mixtures claiming to contain rhino parts as ingredients, and rhino horn carvings, trophies and antiques. Any quantity possessed, no matter how small, should be registered.

(c) Verification of stocks

It is essential that any amount of rhino horn and other rhino products be verified by Taiwanese authorities during the registration process. All registered items should be weighed and photographed, and the possibility of marking registered stocks should be investigated. Authorities from the COA and the NHA should carefully consider how to deal with rhino horn which is not in readily recognizable form. Researchers in the USA have developed laboratory tests capable of distinguishing rhino parts; this technology should be further developed and simplified so that it could be employed by government authorities in the field.

(d) Issuance of possession licenses

Possession licenses should be issued to all registrants, and should be updated by stock inventory consumption reports to be filed periodically by all commercial dealers. Dealers may prominently display these possession licenses as advertisements, advising consumers that their rhino products are legal, genuine and government-certified. Possession licenses should record the weight and form of all rhino parts and products, and a separate copy should be retained by the management authority.

(e) Law enforcement and monitoring

Policing the registration process should not be an overly difficult matter. Authorities from the COA and NHA should work closely with the traditional medicine associations to promote compliance. Continued surveys of pharmacies by TRAFFIC investigators would turn up those dealers who trade in rhino products without a possession licence. Law enforcement authorities should act swiftly to penalize violators. On the other hand, conditions under which amnesty might be extended to late registrants should also be carefully considered.

A.2. Sales policy

Only registered rhino parts and products should be permitted to be traded domestically. All import, export and re-export should remain prohibited until the conservation status of rhinos improves worldwide to the point of amending their listing under CITES.

(a) Legal basis

A legal basis should be provided under the *Wildlife Conservation Law* and the *Law for the Control of Medicaments and Pharmaceutical Firms* to permit domestic trade in licensed stocks of rhino parts and products. This may require amendments to the laws, or additional

administrative measures. The NHA's management programme for drugs such as morphine should be re-examined in light of its utility as a model for management of endangered species drugs.

(b) Terms for commercial sales and domestic transfer of registered stocks

The only restriction on sale and transfer of licensed rhino parts and products should be that all transactions are reported and accounted for in the possession licensing system. Therefore, dealers who sell out of rhino horn can re-stock by purchasing registered horn from another licensee. This would permit wholesalers, a major feature of Taiwan's market in rhino parts and products, to remain legally in the business.

(c) Amendment of possession licenses

The Taiwan government should consider retaining a consultant to aid in the design of the possession licensing system. In principal, possession licenses should be updated by periodic stock inventory consumption reports submitted to the management authority. The government should carefully consider whether it is the rhino parts or products which are to be licensed, or the dealers who trade in them. The system must account for trade within the medical community as well as sales to consumers. On the other hand, the system should require only a minimum of paperwork for participating dealers.

(d) Periodic inventory stock assessments

Both announced and unannounced inspections of licensed stock should be carried out by the authorities. It is worth pointing out that NHA teams regularly inspect traditional pharmacies and clinics for possession of prohibited and restricted drugs.

(e) Law enforcement and monitoring

A computer database should be designed to cross-check stock inventory consumption reports. This programme would be capable of turning up anomalies in the reporting process, including sales transactions reported by one party only, discrepancies in reported stock quantities between reporting periods, etc. We suggest that the government retain a consultant to enter reported data into the database, analyze the data, and compile abbreviated reports highlighting and prioritizing those dealers submitting problematic inventory consumption reports. The consultant's report would also report on general market trends, keeping track as stocks decrease.

Trade, exchange or display for sale of unregistered or improperly accounted for rhino parts and products should constitute a violation of Article 33 of the *Wildlife Conservation Law*, which carries a penalty of a jail term up to one year and/or a fine of up to NT$30,000 (US$ 1,107). There should be additional penalties under the *Law for the Control of Medicaments and Pharmaceutical Firms*. Law enforcement authorities should act promptly against reported violators. The National Health Administration should consider designating local officials to be included in the law enforcement teams.

The issue of which agency or agencies will police the programme is a critical one, and must be resolved before any control measures can be put into effect.

A.3. Hold an international workshop

Finally, we suggest as a first step that an international workshop be convened by the Taiwan government to discuss and fine-tune management options. Attendance should be limited to experts with experience in working against rhino poaching and illegal trade in both Africa and Asia, but should include both medical society representatives in addition to officials on the national and local level from within Taiwan.

B. Public education and promotion of substitutes

Educational programmes about rhinos and other endangered species threatened by the traditional medical market should be conducted by conservation organizations such as WWF and TRAFFIC in cooperation with the medical societies. It is apparent from this survey that most consumers of rhino horn know very little about the animal and the way in which it is being driven to extinction. The plight of the rhino is deserving of greater media attention, considering Taiwan's pivotal role. Lectures and fora on the use of substitutes should be held, with invited speakers from the medical communities in Hong Kong, Japan and the USA.

It is encouraging that the licensed doctors surveyed were over- whelmingly positive concerning conservation of rhinos: all 34 respondents expressed support for the need to conserve the species. A few indicated that their desire was utilitarian: "Rhinos should be conserved so that they can reproduce and the source of rhino horn won't be extinguished". The majority, however, expressed abhorrence at the possibility of the extinction of the rhino: "A doctor who kills off another organism in the name of saving lives is indeed without mercy". Another wrote, "People = living organisms. Rhinos = living organisms. Basically, human lives are not more valuable than rhinos, and rhinos are becoming fewer and fewer". Many of the doctors who wrote simply that "rare animals should be protected from extinction" also indicated that they continued to use rhino horn, apparently not making the connection between their trade and extinction. One doctor wrote, "Rhinos should be conserved but use of their horn should be permitted. If horn can be taken without killing the rhino, what harm is done? Is the rhino killed when the horn is taken?" Traditional pharmacists interviewed overtly were also nearly unanimous in support of conservation of wild rhinos, with 124 out of 125 expressing support.

Finally, it should be noted that the Chairmen of several traditional medical societies have expressed their enthusiasm to the authors about participating in a management programme which permits sale of registered stocks; the degree and quality of their participation will determine any such programme's ultimate success. As a lukewarm response to the management programme outlined above would ruin its effectiveness, the government could proceed on a trial basis. If there are too many problems with a cooperative approach, the experiment could be called off and a trade ban instituted, with the advantage of the government having learned a considerable amount about the domestic market for rhino horn in the process.

While bringing Taiwan's market for rhino parts and products under control is a measure of fundamental importance for the conservation of rhinos in the immediate future, it is education, of course, which must be seen as the long-term approach to curbing the Taiwanese consumer's taste for endangered species. As Dr. Paul But in Hong Kong says about the need to promote

anti-pyretic substitutes for rhino horn, "I hope we can try to find ways and means not just to block a culture, but to help convince the users within a culture to try to accept new alternatives" (Shaw and Chan 1991).

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APPENDIX 1

Distinguishing Characteristics of "Siam" (Asian) and "Guang" (African) Rhino Horn, According to a Review of Mainland Chinese Medical Literature

	"Siam" Rhino Horn	"Guang" Rhino Horn
Ease of separating strands	Easy to "peel" vertically away from central core	Difficult to separate strands
Texture	Straight, thick longitudinal threads	Fine, durable composite threads
Odour when immersed in boiling water	Mild fragrance	None
Cross section	Vertical threads tightly arranged in 30-40 concentric bundles	Vertical threads tightly arranged in 20-30 concentric bundles
Shape of threads in cross section	Triangular or rectangular	Circular, oval or compressed oval
Distribution of keratin	Keratin occurs between two "angles" loosely scattered	Keratin abundant and distributed evenly

APPENDIX 2: DATA RECORDING SHEETS FOR COVERT INTERVIEWS

親訪用 VISIT

台灣犀牛角藥店使用情形調查記錄表
TAIWAN RHINO HORN PROJECT PHARMACY
50 entered DATA RECORDING SHEET

地區：台中縣 TAICHUNG COUNTY
AREA:

INVESTIGATOR
調查員：張
ID No.：10

日期 DA DATE	時間 TIME	店名 STORE NAME	地址 ADDRESS	電話 TELEPHONE	有無犀角 of RHINO HORN POSSESSION	該處方價 元/份 PRESCRIPTION PRICE	犀角價 元/錢 RHINO HORN PRICE PER CHIEN	該店犀角存量 TOTAL POSS AMNT OF HORN IN POSSESSION	備註 NOTES
3/7	PM 1:00				有 YES	1500.-	500.-	切成小塊 瓶裝	老板不給多行 並說犀角下太多
/	PM 1:30				有	3500.- ~~1500~~ 3000.-	大塊 1000.- 小塊 800.-	×	店門沒有(但老板說可從別處拿)
/	PM 3:00				有	~~1500.-~~ 1500.-	水犀 500.-	犀牛粉 罐裝	老板說現在已難進貨所以沒有犀角
3/8	AM 9:00				有	1500.-	水犀 "WATER" 600.-	有一小塊 但已有磨了粉	
/	AM 9:30				有	1500.-	火犀 1000.-	粉狀 罐裝	
/	10:00				有	1000.-	水犀 400.-	塊狀一小塊 粉狀些許	已無進貨
/	10:30				有	1500.-	火犀 "FIRE" 1000.-	只有些許粉狀	藥單犀角二錢半下太重,他店裏只二錢
/	11:00				無 NO	×	×	×	老板說動物要保護,不賣犀角
/	11:20				有	800.-	水犀 300.-	有一點點犀角 及一小塊	內有羚羊角,等几種動物標本
/	11:50				有	3000.-	火犀 1000.-	不拿給我看	他一直配藥 口氣不甚好

APPENDIX 2 continued

電話訪問用 TELEPHONE QUERY

台灣犀牛角藥店使用情形調查記錄表

調查員：鄭 ID No.: 22

地區：高雄市 KAOHSIUNG CITY
AREA

P1.

日期 DATE	時間 TIME	店名 STORE NAME	地址 ADDRESS	電話 TELEPHONE	有無犀角 POSSESSION OF RHINO HORN	該處方價 元／份 PRESCRIPTION PRICE	犀角價 元／錢 PRICE OF RHINO HORN/CHIEN	備註 NOTES
80.2.11.	p.m 9:00				YES → 有粉 (↓ POWDER)	×	500~600	店主說，藥方估價在电話說不清不好算叫我，親自拿藥方去附近問
	9:10				有粉.	×	純 600左右	表示，很忙不願估價. 犀角是粉，配有犀角的藥方，不太願意賣出 因為不好算，而且現在很難買貨.
80.2.12.	p.m. 5:52				有	800~900	水犀 300~400	全支去切條. 不是磨粉的
	p.m 5:55				有粉.	900左右	水 350	是粉末的，以前存貨
	p.m. 6:02				有粉	1,700	水 600~700	粉末的，火犀角沒有，但可以幫忙調到貨，鑑度不錯.
	6:10				有	1300 ←	水 500 火：上仟元	水犀角是粉末狀. 火犀角是小塊再切條. 剩下不多.
	6:15				有粉	600份.	水：150	是賣粉末的，因為刨成絲時易摻進玻璃碎屑，較不好.
	6:20				有粉	1500	水：600	粉末狀的. 火犀角沒有賣，現在很少了
	6:25				有粉	1000左右	好的 400	粉狀.
	6:32				有粉	1,700	600~700	粉的

APPENDIX 3: LICENSED TRADITIONAL DOCTORS' SURVEY

Dear Friend,

All five of the world's rhinoceros species are endangered, and several may become extinct in the near future because of uncontrollable poaching to supply the trade in rhino horn. Although all countries with rhino populations have banned export, and all user countries have banned import, these measures have not prevented the rhinos from being depleted at an alarming and unsustainable rate.

This survey is being sent to you courtesy of the Chinese Medical Doctors Association and TRAFFIC International. TRAFFIC (Trade Records Analysis of Fauna and Flora in International Commerce) is an international wildlife trade monitoring group which has carried out numerous studies of the rhino and the trade in its horn worldwide. As with all international conservation groups, we are very concerned about the status of the rhinoceros. On the other hand, we also recognize the importance of rhino horn in traditional Chinese pharmacology. We would like to see a program which would manage, rather than totally eliminate, domestic trade in rhino horn.

The questions below are a preliminary survey to gauge the knowledge of medical professionals about the situation of the world's rhinos and attitudes toward management of trade in rhino parts and products. Your responses are of critical importance toward designing a management strategy which would not adversely affect either the wild rhinos or the Chinese medical community. Your answers will be kept anonymous; there is no need to include your name and address on the survey form. Since our task is rather urgent, it is greatly appreciated if you could answer the following essay questions and return the questionnaire within one week to the address affixed to the outside of the survey form.

If you have further questions about the rhino or about this project, you are welcomed to contact Professor Pei of the Department of Forestry, National Pingtung Institute of Agriculture, Nei-Pu, Pingtung. The telephone number is: (08) 774-0134.

Thank you very much for your attention.

Sincerely,

Dr. Wei Kai-Yu, President, Republic of China Chinese Medical Doctors Association

Professor Pei Chia-Jai, Department of Forestry, National Pingtung Institute of Agriculture

Ms. Kristin Nowell, TRAFFIC Consultant, Taiwan

APPENDIX 3 continued

親愛的醫師：

根據最近的調查結果顯示，世界上現存的五種犀牛都面臨了生存的危機，甚至可能在不久的將來就會絕種。因此，為了保存犀牛，所有有野生犀牛的國家，目前都已禁止犀牛的出口，而所有的犀牛使用國家，也已經禁止犀牛的進口。雖然如此，仍然無法阻止犀牛數量大量減少的趨勢，因為盜獵犀牛的程度依舊很大。

本研究是由中華民國中醫藥學會以及 TRAFFIC 國際組織合作進行。TRAFFIC 是一個觀察國際上有關野生動植物交易買賣的團體，他們進行了許多有關犀牛及犀牛角貿易的研究，因而對犀牛的現況非常地關心。但同時，我們也非常了解犀牛角在傳統中藥上的重要性。因此，我們希望能夠有一個管理（而非全面禁止使用）的方案，來管理國內犀牛角的市場，而唯有您的協助，才可能達到這個目標。

本問卷中所提的問題，是想要了解目前國內中醫界對犀牛現況的認識程度，以及對犀牛角市場管理的意見。您的意見，將直接做為我們在擬定管理策略時的參考。而我們希望這是一個既不傷害野生犀牛族群，也不影響中國醫學傳遞的管理辦法。因為本研究在時間相當的緊迫，非常的希望您能在一周之內，將您的意見寄出。

若您有更進一步的問題，歡迎您寫信到：屏東縣內埔鄉，國立屏東農專森林科，裴家騏副教授　收。或請電：（08）774-0134。

謝謝您的協助。祝

醫　安！

中華民國中醫藥學會理事長
魏　開　瑜

國立屏東農專森林科副教授
裴　家　騏

TRAFFIC國際保育組織台灣代表
Ms. Kristin Nowell

APPENDIX 3 continued

Respondent ID Number: 022304

Rhino Horn Survey Questionnaire

Please note that: 1) respondents may remain anonymous if so preferred; 2) when answering quesions, please do so by placing a check between the parentheses; 3) to increase the available information on rhino horn, please answer the questions to the best of your knowledge even if you do not currently prescribe it. Thank you!

1. Have you ever prescribed rhino horn for your patients? Yes (✓) No ( )
Please list the illnesses for which or circumstances under which rhino horn would traditionally be prescribed, and place a check in the parentheses to indicate for which of these you would currently prescribe rhino horn. If you would not currently prescribe rhino horn for these conditions, please explain why not (if the space is not enough, please continue in another space).

At present	Traditionally	Why not currently used
( )	FEVERS	Blood Diseases
	~~BOILS~~	_____ (etc.)
	LEUKEMIA	

Have you ever prescribed rhino horn as a general health tonic? ( )Yes (✓)Never

2. Which of the following substitutes have you used in place of rhino horn:
( ) saiga antelope horn ( ) water buffalo horn ( ) cattle horn ( ) Ba-Gua-Huang [an herbal mixture] ( ) Other: _____
What considerations or what circumstances prompted you to use a substitute?

3. On average, how many (LITTLE) *chien* [=3.75 grams] of rhino horn do you use annually? The average number of 0-3-0-5 *chien* used per prescription is how many?

4. Do you use (✓) "Water" horn, ( ) "Fire" horn, or ( ) both? You prefer to use ( ) "Water" horn, ( ) "Fire" horn, ( ) no preference. What is the difference between the two, and is it geographical? PRICE DIFFERENCE "FIRE" HORN IS MORE EFFECTIVE

5. What price per *chien* do you currently charge your patients for:
$NT 500-1000 "water" horn _____ "fire" horn
Five years ago, what price per *chien* did you charge your patients for:
150-200 "water" horn _____ "fire" horn

6. Please provide a rough estimate of the amount of rhino horn currently in Taiwan: _____ horns or _____ kilograms NO IDEA
Compared to five years ago, how would you describe the current market demand for rhino horn: ( ) substantially increased ( ) moderately increased ( ) same ( ) moderately decreased ( ) substantially decreased

7. Which specialist would be more likely to use a greater than average amount of rhino horn?
Is there a difference in the amount of rhino horn used between licensed and unlicensed doctors? (✓) Yes ( ) No Why or why not? IT IS BELIEVED THAT THE MORE EXPENSIVE THE MEDICINE, THE MORE EFFECTIVE IT IS.

8. What do you know about how rhino horn is acquired and brought to Taiwan? BEFORE BY IMPORTING. NO, NO IDEA.

9. (✓) Yes ( ) No Have you heard of the government's plan to control the use of rhino horn? Could you please state your opinion of this plan? THE GOVT SHOULD ALLOW HORN IMPORT FOR MEDICAL PURPOSES BUT NOT DECORATION

10. ( ) Yes (✓) No Have you registered your horn with the government? Why or why not? BECAUSE HE HAS ONLY A LITTLE AND IT IS NOT IN WHOLE FORM

11. Do you believe the rhino should be conserved? (✓) Yes ( ) No Why?
SO THAT THEY REPRODUCE AND THE SOURCE IS NOT EXTINGUISHED.

APPENDIX 3 continued

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注意事項：1.本問卷採不記名方式進行；2.問題中若有括弧，請在適當的答案前打勾；3.為了增加有效的資料，即使您從未使用過犀牛角，也請您盡量依您所知道的，告訴我們其它的資料。 謝謝!!

問題一.您是否用過犀牛角？(√)有過 ( )從未

麻煩請將傳統上犀牛角所治療的疾病或病徵列出，並在括弧內勾出您現在會在其中的那些疾病或病徵上用犀牛角。若有所不同，也請簡單的說明為什麼？(若空格不夠，請自行加列於後)

現在	傳統上	不再用(或增加)的原因	現在	傳統上	不再用(或增加)的原因
( )	熱性病	神經性高燒	( )	血症	增性出血
( )	毒性症	熱性毒病症	( )		
( )			( )		

您是否會在調藥中使用犀牛角：( )會 (√)不會

問題二.您曾使用過下列何種藥材以代替犀牛角：( )羚羊角 ( )水牛角 ( )牛角 ( )八卦青

( )其它：_____

在何種狀況下您會使用其它退換藥材來代替犀牛角？

問題三.您平均每年使用甚少.錢的犀牛角。 平均每服藥用0.3~0.5錢的犀牛角。

問題四.您使用 (√)水犀角 ( )火犀角 ( )兩者都用。您比較喜歡 ( )水犀角 ( )火犀角 ( )兩者都一樣

這兩者有什麼差異？和出產的地方有關嗎？

價格問題 大學教授

問題五.現在，您在用藥的時候，每錢的價格各為(新台幣)：水犀角800-1000 火犀角_____

五年前每錢的價格又各為(新台幣)：水犀角150-200 火犀角_____

問題六.請您估計台灣現在大約有犀牛角_____隻 或 _____公斤 不明

與五年前比較，您認為目前台灣市場上，犀牛角的需求：( )增加了很多 ( )增加一些 不明

( )沒有改變 ( )減少了一些 ( )減少了很多

問題七.您覺得那些科的醫生用的犀牛角會比較多？

您覺的有執照和沒有執照的中醫，使用犀牛角的量 (√)會 ( )不會 有不同。為什麼？

慣以貴重藥品.取信

問題八.您知道現在進口的犀牛角是如何得到，以及如何運入台灣的嗎？

以前進口，現在不明

問題九.您 (√)知道 ( )不知道 目前我們的政府對犀牛角市場的管理方案。您對這個方案有何意見？

商用應該.藥品不該

問題十.您 ( )有 (√)沒有 向政府登記您所擁有的犀牛角。假如沒有，是否可以請您寫出原因？

量少.不整枝.

問題十一.您是否覺得犀牛角要被保護？ (√)是 ( )否， 為什麼？

健康生存必供來源

APPENDIX 4

Rhino Horn — As an Anti-pyretic and Cardiotonic, There Is No Substitute

Most anti-pyretics cause weakness of the heart and increase the possibility of developing a secondary syndrome

Author: Dr. Chen Ching-Hwei
Published in *Changchun (Keeping Young)* magazine, January 1991, Taipei

Our government recently enacted a new law which requires that all "Conservation Wildlife" and their parts be registered with the Council of Agriculture and may not be sold. After the law was enacted, rhino and Saiga Antelope horn, which have long been internationally listed as endangered species, and are also valuable components of Chinese pharmacology, again became the focus of debate between conservationists and the Chinese medical community. In order to protect rare animals while at the same time enabling physicians to carry out their mandate of saving lives, some people argue that, according to research done in mainland China, Water Buffalo and mountain goat horn may be used as substitutes for rhino and Saiga Antelope horn. Is this true? Why, in some Chinese doctors' opinion, are rhino and Saiga Antelope horn irreplaceable?

Rhino horn is particularly effective against prolonged high fever

A long time ago, rhino horn was a common medicine, especially among wealthy families, who would keep some around the house. If their neighbours' children were struck by high fever, these wealthy families would grind some rhino horn into water in a rough bowl for the children to drink, to great effect. Most anti-pyretic medicines will cause weakness after ingestion, but such is not the case for rhino horn. Not only will it not cause weakness, but it is a cardiotonic as well. As for Saiga Antelope horn, it will not only lower fever, but may also enhance the functioning of the nervous system. This is why these two medicines are so valuable in traditional Chinese medicine.

Actually, there is a complete pharmacology for lowering fever, including 1) drugs for inducing diahorrea, 2) drugs for inducing heavy perspiration, and 3) so-called "cold" medicines. Yet if these three techniques do not prove effective in some cases, the prescription of rhino and Saiga Antelope horn is called for.

In the *Ben Cao*, it is stated that if rhino horn is taken for a long period of time it acts as a tonic capable of "lightening" the body, so that the range of applications for rhino horn is broad, ranging from an absence of symptoms to high fever. There are several well-known Chinese prescriptions which include rhino horn: *ZhiXueDan* (Purple Snow Pills) which is anti-pyretic, *NiuWangQingXingWan* (Cow Bezoar Clearing-the Mind Pellets) which treats convulsions and palsy, and *ZhiBaoDan* (Apoplexy Pills) for the treatment of apoplexy. All these prescriptions include both rhino and Saiga Antelope horn.

Water Buffalo horn cannot replace rhino horn

During the 1960s, my clinic saw many young patients. During that period encephalitis and poliomyelitis were widespread; many patients went to big Western hospitals and underwent treatment to reduce high fever, only afterwards to fall victim to polio or dull-wittedness. This is because the growth of disease-causing microorganisms is closely correlated with

temperature: if the temperature is too high, the environment is not suitable for microorganismal growth. An infection by a viral or bacterial agent will cause the temperature to rise in the human body due to immune system action.

When the body's temperature was forced down by the Western medicine used at that time, the lowered temperature creates a suitable environment for the growth of dangerous disease-causing microorganisms — which may some times attack the nervous system and cause polio. I have cared for many patients who went to big hospitals where doctors were unable to bring down their fever; whether such patients have high fever in combination with either convulsions or coma or just fever alone, rhino and Saiga Antelope horn can cure their symptoms almost every time. Successful cases include my own son, who once ran a continued high fever for 30 days.

Some people have recently suggested that, according to research carried out in mainland China, Water Buffalo horn may be used in place of rhino horn and mountain goat horn in place of antelope horn. This claim warrants further examination. In the *Encyclopedia of Chinese Medicine*, it is stated that the composition of rhino horn includes keratin and albumen, free amino acids, guanidine and several phenyls. Its action reduces fever, cools the blood, controls shock, counteracts toxins, and is cardiotonic; it is usually prescribed for encephalitis, polio and other diseases of the nervous system, high fever, coma and convulsions. In comparison with rhino horn, the composition of Water Buffalo horn lacks two kinds of amino acid, a phenyl and several proteins. Although the action of Water Buffalo horn is very similar to that of rhino horn, it must be used in much higher dosage in order to achieve the desired effect.

Human life and animal life should be given equal weight

According to the above description, it can be seen that there are several chemical constituents found in rhino horn but lacking in Water Buffalo horn, so that Water Buffalo horn must be used in greater quantity. Also, people in mainland China involve themselves in more strenuous activity and eat rougher foods than the people of Taiwan, who are accustomed to refined, processed foods and a more sedentary lifestyle. Therefore, in serious cases, it is doubtful that we could absorb the rougher medicine, particularly in a case of encephalitis. Whether we should use Water Buffalo horn to treat critically ill patients, where the results may be potentially disastrous, is indeed open to discussion. It is hard to agree that we should use Water Buffalo horn to replace rhino horn under such circumstances.

For the purpose of protecting endangered species only, banning the use of rhino and Saiga Antelope horn could bring about the unfortunate result of ill people unable to secure proper fever-reducing treatment or, worse yet, actually bringing about increased levels of polio or dim-wittedness. As a matter of fact, most Chinese doctors use these two medicines very rarely, and for serious cases only. Therefore, for the dual purpose of both protecting endangered animals and human livelihood as well, perhaps our government could consider replacing its current restriction of the use of rhino horn with a restriction on the occasions for which it would be permissable to use rhino horn.

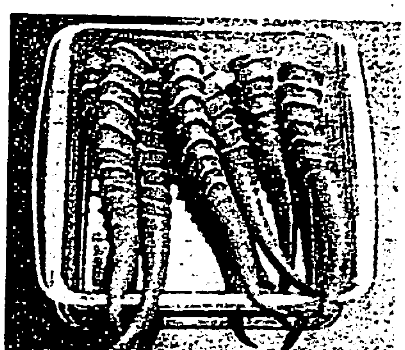
APPENDIX 4 continued

犀角

退燒強心無可取代

中醫師 陳錦輝口述　整理 陳淑芬　攝影 吳軍威

▲小孩發高燒非常常見，如果長時間不退，不妨試試羚羊角、犀牛角。



▲羚羊角與山羊角仍有所不同。

陳錦輝
民國二十三年生
五十九年中醫師特考及格
曾從世代臨床醫師鄭坤堯習內科、
並跟針灸名家修養齋習針灸多年
專長爲高血壓與內科

前不久政府公布了一項新的法令，規定凡持有保育類野生動物和其產製品者，必須在去年底前向當地農業主管機關登記，而且不准轉售。此令一出，長久以來被列爲保護對象，同時也是中醫用藥的珍寶——犀牛角和羚羊角，又再度成爲生態保育界和中醫界論戰的焦點。爲了解決愛護稀有動物和醫生濟世活人兩種完全不同的立場爭議，於是有人根據大陸的研究資料，主張以現今產量仍多的水牛角、山羊角取代犀角、羚羊角。但是這種提議眞的可行嗎？爲什麼在中醫師心目中，犀角和羚羊角是不可或缺甚至無法取代的珍貴藥材呢？

犀角專治高燒不退

APPENDIX 4 continued

▲犀牛角絕對不能取代犀牛角水以能不對。

很久以前，犀牛角便是一種常用的藥物，尤其過去台灣的大戶人家，通常都會蹲貯犀牛角存放，一旦鄰家小孩高燒不退，又買不起犀牛角服用時，就會將犀角放在粗碗裡加水研磨，然後直接讓小孩喝下，效果非常好。一般退燒藥物都會引起虛弱的現象，而服用犀牛角退高燒，非但不會如此，反而有强心的作用；羚羊角則有加强中樞神經的功能，這也就是此二種藥物的最高價值處。

本實上，中醫對於退燒解熱，是有一套完整的用藥系統，其中包括：內藥以內下方式退燒；熱藥以發汗方式退燒；涼藥以降低體溫退燒。如果三者都無法發揮作用，就是此系統外的犀牛角，羚羊角派上用場的時刻。

另外在中藥原典本草經中也載明，犀牛角久服可輕身，由此可知，犀牛角的適用範圍極廣，從無病痛至高燒均可食用。其他中藥方如紫雪丹（功能：鎮痙開竅、泄熱解毒。適應症：外感熱病、神昏譫語、抽搐痙厥、小兒熱甚驚厥。）、牛黃清心丸（治諸風雜痰）、至寶丹（療卒中急風、不語、中惡氣絕……）等，其主要成分都包括犀牛角和羚羊角二項藥材。

水牛角不能取代犀角

民國四十九年至五十八年期間，是我診治小兒科最多的時候，那陣子也是腦炎、小兒麻痺流行，有很多患者到大醫院退燒後，卻變成小兒麻痺或痴呆。這是因爲微生物的生長與溫度有密切關連，溫度太高不利生存。對人體而言，如果病毒侵犯，體溫便會升高，同時白血球迅速增加，形成完整的免疫抗病系統。此時如果强制以西藥降低體溫，反而有利病毒生存，甚至侵入腦部，導致小兒麻痺。我曾接觸不少到大醫院診治卻一直高燒不退的病例；如果是高燒，同時又有昏迷或痙攣的症狀，或是只有熱症，但一般中藥均無法退燒，用犀牛角和羚羊角二種藥物，幾乎可全部治癒。包括我自己的兒子，連續高燒三十天，也是用這二種藥將他醫好的。

最近，有些人根據大陸研究資料，提出以水牛角代替犀牛角、山羊角代替羚羊角爲處方的說法，這有待進一步的考證。因爲在藥字典中刊載的犀牛角成分爲角蛋白，其他白蛋白、肽類、游離氨基酸、脂衍生物、甾醇類等，有清熱、涼血、定驚、解毒、退高燒兼强心作用；可治腦炎、脊髓灰白質炎、中樞神經感染病、發熱、昏迷、痙攣等。而水牛角的成分則無天冬氨酸、精氨酸、微量甾醇類、不同蛋白質等。而且，水牛角的性味功效雖與犀角基本相同，但它的效力較弱，所以用量宜大。

人命動物命應兼顧

根據上述分析，可見許多犀角的成分水牛角都沒有，並且用量遠大於犀角。再者，大陸人運動多、粗食，不像在台灣的人平常講究精緻飲食，養尊處優慣了。在緊要關頭，能否吸收較粗糙的東西實在令人懷疑？況且罹患腦炎發燒乃屬緊急狀況，值不值得冒著危險試用替代的水牛角亦有待商榷。以上種種問題，都令人對水牛角取代犀角功能入藥一說難以認同。

因此，如果單純爲了保護稀有動物而禁止使用犀角及羚羊角，極可能導致許多人因無法安善退燒解熱，甚至造成小兒麻痺或痴呆症狀的遺憾。其實，中醫師們也是在非常緊急的情況才會用這兩種藥材，所以爲了保護動物，也爲了保障人們的生命，政府是否可以考慮，將原本的禁令，改成對中醫師的用藥時機限制呢？

The TRAFFIC Network is the world's largest wildlife trade monitoring programme with offices covering most parts of the world. TRAFFIC is supported by WWF — the World Wide Fund for Nature (known as World Wildlife Fund in Canada and the United States) and IUCN — the World Conservation Union to monitor trade in and utilisation of wild plants and animals, and works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). As the majority of the Network's funding is provided by WWF, the Network is administered by the WWF Programme Committee on behalf of WWF and IUCN.

The TRAFFIC Network shares its international headquarters in the United Kingdom with the World Conservation Monitoring Centre.

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