

REVIEW OF TRADE IN RANCHED BIRDWING BUTTERFLIES

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1. INTRODUCTION

The present review provides background information on the concept of ranching particularly as applied to birdwing butterflies, an overview of the trade in ranched butterflies and a summary of discussions in the CITES arena. Trade and ranching in the five countries exporting the majority of ranched birdwing butterflies –Australia, Indonesia, the Philippines, Papua New Guinea, and Solomon Islands- are considered, and detailed trade tables for these five countries are provided.

2. BACKGROUND INFORMATION

2.1. CONCEPT OF RANCHING

Ranching generally refers to the collection of eggs or juveniles from the wild, to be then transferred to controlled raising facilities, where the wild-caught specimens are grown for commercial purposes. In a CITES context, this concept was first used when certain crocodilian species were transferred from Appendix I to Appendix II for this purpose. Since then, ranching facilities have also been operating for other taxonomic groups, including birds, other reptiles and invertebrates, although it is not widely practised for these other groups (CITES, 2001). Unlike closed-cycle captive breeding, ranching relies on maintaining a healthy wild population from which individuals are removed on a regular basis.

Resolution Conf. 11.16¹ on 'Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II' defines the term 'ranching' as *the rearing in a controlled environment of specimens taken from the wild*. Although the title of this Resolution indicates that this definition only applies to instances where species are transferred from Appendix I to Appendix II for ranching purposes, another Resolution (Resolution Conf. 12.3² on permits and certificates) notes that source code R refers to "specimens produced in a ranching operation" without further specification, and many non-crocodilian Appendix II specimens have been reported in trade using source code R.

In the case of a species down-listed from Appendix I to Appendix II, a ranching operation "must be primarily beneficial to the conservation of the local population". However, for Appendix-II species in trade and from ranching operations, the trade must satisfy the non-detriment requirements of Article IV of the Convention. However, there is no requirement to demonstrate benefit to the wild population (CITES, 2001).

Resolution Conf.11.16 recommends that annual reports on all relevant aspects of each approved ranching operation be submitted to the Secretariat by the Party concerned, and include any new information on the following:

- i) the status of the wild population concerned;
- ii) the number of specimens (eggs, young or adults) taken annually from the wild;
- iii) an estimate of the percentage of the production of the wild population that is taken for the ranching operation;
- iv) the number of animals released and their survival rates estimated on the basis of surveys and tagging programmes, if any;
- v) the mortality rate in captivity and causes of such mortality;
- vi) production, sales and exports of products; and
- vii) conservation programmes and scientific experiments carried out in relation to the ranching operation or the wild population concerned;

¹ <http://www.cites.org/eng/res/11/11-16.shtml>

² <http://www.cites.org/eng/res/12/12-03R13.shtml>

As a result of the title and wording of Resolution Conf 11.16, there has been confusion over what constitutes ranching of Appendix II species and it has been noted that a clear definition that applies to all Appendix II species as well as to those transferred from Appendix I to Appendix II is needed (e.g. IUCN, 2004).

In response to this, at the 20th meeting of the Animals Committee, a Working Group was established and recommended that Resolution Conf. 11.16 be amended to include operations other than those linked to a down-listing from Appendix I to Appendix II. The following definition for “Ranching” was suggested for inclusion in Resolution Conf. 11.16, and also in Resolution Conf. 12.3: “Ranching is defined as the rearing in a controlled environment of specimens, such as eggs or hatchlings, of life stages which suffer high mortality rates in the wild, that are taken from the wild through controlled collection under a management plan that provides for sustainable use of the species” (CITES, 2004). However, there was not full consensus in the working group on this issue, as some felt that the R code should be used only for those species down-listed from Appendix I to Appendix II. Discussions have continued since then, but a conclusion has not yet been reached.

In addition to this debate, there have been broader discussions on source codes and their use, since “considerable confusion exists among some exporting States on the correct use of codes for specimens of Appendix-II species derived from particular management systems. Incorrect use of these source codes by exporting countries has led to misunderstandings by the Secretariat and/or the authorities of importing countries” (CITES, 2001). In the context of ranching of birdwing butterflies, a further question is whether specimens from production systems can be considered ranched specimens as defined in Resolution Conf. 11.16.

2.2. BUTTERFLY RANCHING

Butterfly ranching has been defined as a method “whereby unenclosed habitat patches are enriched with larval food-plants and adult nectar sources and thereby rendered superattractive, and from where specimens may be harvested by rearing from collected early stages” (New, 1994).

Butterfly ranching for commercial purposes was initiated in the 1970s in Papua New Guinea by the country’s Insect Farming and Trading Agency (IFTA) (Orsak, 1993; Small, 2004).

The basic principle behind butterfly ranching is the planting of butterfly food plants (typically *Aristolochia* and *Adenia* vines) within village gardens or in secondary growth forest to enrich the habitat and attract egg-laying female butterflies. Butterfly ranching thus involves artificial manipulation of the natural density of caterpillar host-plants. Butterflies will lay eggs on species-specific vines and subsequently caterpillars will use the vine as a food resource until they begin to pupate. Once a pupa is formed, it can be collected, and either exported as a live pupa or, more commonly, placed in a cage, hatching box, glass house, or shade house, then the farmer can wait for it to hatch, kill the butterfly (injecting it with a little boiling water or ethyl acetate), dry it in the sun, and take the dead specimen for sale (Hutton, 1985; Ruskin, 1985; Parsons, 1995; Weintraub, 1995; Small, 2004). Pupae are enclosed before the butterfly emerges in order to protect them from predators and also to ease monitoring of the specimens, as they have to be killed reasonably soon after emergence in order to avoid wing damage (Small, 2007, pers. comm.).

Enclosures (ranging from large cages to sleeves of fine netting) are sometimes used to protect butterflies from natural enemies during all stages of their life cycle (Hutton, 1985; Weintraub, 1995).

Butterflies may be reared for commercial purposes through captive-breeding or ranching. Captive breeding refers to cases when all stages of development are enclosed in a controlled environment and when the breeding stock has produced offspring of second or subsequent

generations without the introduction of specimens from the wild, whereas ranching would involve the enclosure in a controlled environment of early stages taken from the wild. Many authors use the terms “ranching” and “farming” almost interchangeably, in particular often using the terms “farming” and “farm” when referring to ranching operations (e.g. Hutton, 1985; Parsons, 1995; Small, 2004). However, Parsons (1992) suggested that the term “farming” would be more appropriately applied to captive breeding rather than ranching.

Butterfly ranching as described above is thought to minimise the impact on wild stocks of butterflies, as the farmer generally leaves a proportion of the pupa (ideally, about 50 per cent) on the vine to repopulate the “farm”. However, it is difficult for a farmer to know how many pupae are present on the vines and thus how many should be collected (Rusking, 1985; Hutton, 1985; Parsons, 1995; Small, 2004). In practice, ranchers tend to collect as many pupae as they can find (Small, 2007, pers. comm.), and they often assume that by leaving imperfect pupae or those that are too high to reach, they will continue to repopulate the farm (Collins & Morris, 1985; Ruskin, 1985; Parsons, 1995), although this is an inexact approach to conservation (Parsons, 1995).

It must be noted, however, that in the case of most ranching birdwings, adults are known to range quite widely, so that the turnover within a “farm” area is very likely to also include visiting wide-ranging wild individuals, as well as those that appear to stay mostly in its immediate vicinity –which many do, based on mark/recapture experiments- (Parsons, 1995).

It has been argued that the enormous reproductive capacity of most insects, and the logistical problems of physically removing a large percentage of individuals from a population, mean that over-collecting insects is extremely difficult and that it seldom poses a genuine threat to butterflies (Pyle, 1976; Pyle et al., 1981; Orsak, 1993; Parsons, 1992; Parsons, 1995).

Butterfly ranching has been widely considered to be a successful conservation tool, both for the butterflies and for their habitats (e.g. Hutton, 1985; New & Collins, 1991; Parsons, 1992; Orsak, 1993; New, 1994; Parsons, 1995; Weintraub, 1995). Collectors pay high sums for some birdwing species - in Europe, for example, a pair of *Ornithoptera meridionalis* was advertised for US\$3400 (Melisch, 2000; Schutz, 2000). This commercial demand may be met by controlled rearing of butterflies, predominantly through ranching but also through the more expensive farming (New, 1994). Ranching or captive-bred butterflies are, unlike wild-caught ones, undamaged and therefore of higher quality; also, once the operation has been established, a higher number of butterflies can be collected with a lower investment of time and effort (Parsons, 1995). Because of the low capital needed, people can participate easily in butterfly ranching, which in turn can also help to reduce destruction of primary habitat by lessening economic dependence on shifting agriculture as a result of cash being available from sales of the insects (New, 1994). Butterfly ranching can, therefore, play a vital role locally in preventing the destruction of tropical forest (Parsons, 1995).

2.3. BIRDWING BUTTERFLIES IN TRADE

Birdwing butterflies (namely species from the genera *Ornithoptera*, *Trogonoptera*, and *Troides*), were listed in Appendix II of CITES on 16/02/1979 (one species, *Ornithoptera alexandrae*, was later -22/10/1987- listed in Appendix I). Since then, ranching specimens of 41 birdwing butterfly species and subspecies (32 species and 9 subspecies) have been reported in trade. The main countries of export of ranching butterflies were Papua New Guinea and Indonesia, followed by the Solomon Islands, Australia and the Philippines. Table 1 summarizes the trade in those birdwing butterfly species that have been reported using the source code R; EU countries imported at least one specimen from all species/country combination in this table. Detailed trade tables for each of the main exporters of ranching birdwing butterflies are included in the Annex to this report.

Some species have never been reported in trade as ranched specimens, however trade in wild or captive-bred specimens has been reported (see Table 2). Malaysia was, by far, the main exporter of these species, with high numbers of mostly wild-sourced *Trogonoptera brookiana* and of mostly captive-bred *Troides helena* reported in trade.

As can be seen from Tables 1 and 2, for most species the trade reported by the exporters is higher than trade reported by importers. This may be due to a number of factors, in particular exporting countries reporting the number of permits issued rather than the actual trade, and also exports which were sent by post may not always be reported as imports upon arrival.

Almost all of the birdwing trade was reported using the terms “bodies” and “live”. Bodies were more frequently traded than live individuals.

Table 1. Overview of global trade in ranched birdwing butterflies from the main exporters of ranched specimens. 1987-2005.

The number in parentheses in the ‘Exporter’ column indicates the minimum number of species and subspecies exported as ranched from the relevant country. The main sources for each country/species combination are indicated. If more than one source code applies, the dominant one is in bold. All species with a total volume of trade of over 100 individuals, as reported by either exporter or importer, have been included. The highest trade volumes (over 3000 individuals, as reported by either Party) are in bold. Total volume of trade includes the terms “bodies” and “live”.

Exporter	Species	Distribution	Source of trade	Total trade reported (by importer/exporter), 1987-2005
Australia (4)	<i>Ornithoptera goliath</i>	ID, PG	C, R	2/102
	<i>Ornithoptera priamus</i>	AU, ID, PG, SB	C, R, W	5199/10514
	<i>Ornithoptera priamus euphorion</i>		C	197/1301
	<i>Ornithoptera richmondia</i> (Syn. of <i>O. priamus</i>)	AU, ID, PG, SB	C	117/447
	<i>Ornithoptera</i> spp.		C	445/85
Indonesia (26)	<i>Ornithoptera aesacus</i>	ID	C, R	2232/2887
	<i>Ornithoptera chimaera</i>	ID, PG	R	324/457
	<i>Ornithoptera croesus</i>	ID	C, F, R	12042/17928
	<i>Ornithoptera goliath</i>	ID, PG	C, R	8815/10613
	<i>Ornithoptera goliath samson</i>		R	356/2563
	<i>Ornithoptera hybrid</i>		R	11/181
	<i>Ornithoptera meridionalis</i>	ID, PG	R	900/1178
	<i>Ornithoptera paradisea</i>	ID, PG	C, R, W	4240/5157
	<i>Ornithoptera priamus</i>	AU, ID, PG, SB	C, F, R, W	26096/39030
	<i>Ornithoptera priamus poseidon</i>		C, R	5695/7694
	<i>Ornithoptera rothschildi</i>	ID	C, R	7778/10596
	<i>Ornithoptera</i> spp.		C, R, W	3438/0
	<i>Ornithoptera tithonus</i>	ID	C, R, W	3735/6227
	<i>Trogonoptera brookiana</i>	BN, ID, MY, MM, TH	R	735/1275
	<i>Troides amphrysus</i>	BN, ID, MY, MM, SG, TH	C, F, R	2679/5042
	<i>Troides criton</i>	ID	C, R	1821/1928
	<i>Troides cuneifer</i>	ID, MY, TH	C, F, R	1660/3056
	<i>Troides dohertyi</i>	ID	C, R	223/546
	<i>Troides haliphron</i>	ID	C, F, R	3748/6006
	<i>Troides helena</i>	BD, BT, BN, KH, CN,	C, F, R, W	8700/23895

Exporter	Species	Distribution	Source of trade	Total trade reported (by importer/exporter), 1987-2005
		HK, IN, ID, LA, MY, MM, NP, SG, TH, VN		
	<i>Troides hybrid</i>		C, R	138/183
	<i>Troides hypolitus</i>	ID	C, F, R	4156/5370
	<i>Troides miranda</i>	BN, ID, MY	C, F, R	282/438
	<i>Troides oblongomaculatus</i>	ID, PG	C, F, R, W	7793/12497
	<i>Troides plato</i>	ID	C, F, R	1217/1747
	<i>Troides prattorum</i>	ID	C, R	733/887
	<i>Troides riedeli</i>	ID	C, R	264/120
	<i>Troides spp.</i>		C, W	1135/-
	<i>Troides vandepolli</i>	ID	F, R	400/500
PNG (18)	<i>Ornithoptera caelestis</i>	PG	R	75/270
	<i>Ornithoptera chimaera</i>	ID, PG	C, F, R	1783/4398
	<i>Ornithoptera goliath</i>	ID, PG	C, F, R, W	5871/9257
	<i>Ornithoptera goliath supremus</i>		R	423/2919
	<i>Ornithoptera meridionalis</i>	ID, PG	C, R	980/1831
	<i>Ornithoptera paradisea</i>	ID, PG	C, R	244/524
	<i>Ornithoptera priamus</i>	AU, ID, PG, SB	C, F, R, W	36261/66388
	<i>Ornithoptera priamus admiralitatus</i>		R	20/110
	<i>Ornithoptera priamus bornemanni</i>		R	153/1010
	<i>Ornithoptera priamus demophanes</i>		R	10/260
	<i>Ornithoptera priamus euphorion</i>		C, W	1147/-
	<i>Ornithoptera priamus poseidon</i>		C, F, R, W	16840/29345
	<i>Ornithoptera spp.</i>		C, R	5490/473
	<i>Ornithoptera urvillianus</i>	PG, SB	C, R, W	2039/6114
	<i>Ornithoptera victoriae</i>	PG, SB	C, R	1144/2027
	<i>Ornithoptera victoriae reginae</i>		R	91/548
	<i>Trogonoptera spp.</i>		C	200/-
	<i>Troides oblongomaculatus</i>	ID, PG	C, F, R, W	19370/27666
	<i>Troides oblongomaculatus papuensis</i>		C, F, R	766/9992
	<i>Troides spp.</i>		C, R	2094/-
Philippines (4)	<i>Trogonoptera trojana</i>	PH	C, F, R	1099/535
	<i>Troides magellanus</i>	PH, TW	C, F	761/105
	<i>Troides plateni</i>	PH	C, R	187/-
	<i>Troides rhadamantus</i>	PH	C, F, W	9258/5816
Solomon Is. (5)	<i>Ornithoptera paradisea</i>	ID, PG	R	101/-
	<i>Ornithoptera priamus</i>	AU, ID, PG, SB	R	277/-
	<i>Ornithoptera spp.</i>		R	100/-
	<i>Ornithoptera urvillianus</i>	PG, SB	F, R	5094/-
	<i>Ornithoptera victoriae</i>	PG, SB	R, W	3919/-
	<i>Ornithoptera victoriae epiphanes</i>		R	136/-

Table 2. Global trade from main exporters of birdwing butterflies from sources other than ranched, 1987-2005.

Details as for Table 1.

Exporter	Species	Distribution	Source of trade	Total trade reported (by importer/exporter), 1987-2005
Canada	<i>Ornithoptera priamus</i>	AU, ID, PG, SB	C	-/361
China	<i>Teinopalpus imperialis</i>	BT, CN, IN, MM, NP, VN	W	79/116
	<i>Troides aeacus</i>	BD, BT, KH, CN, HK, IN, ID, LA, MY, MM, NP, TW, TH, VN	W	69/119
Malaysia	<i>Ornithoptera priamus</i>	AU, ID, PG, SB	C, W	205/-
	<i>Ornithoptera priamus poseidon</i>		C, W	1000/-
	<i>Ornithoptera</i> spp.		W	315/-
	<i>Trogonoptera brookiana</i>	BN, ID, MY, MM, TH	C, W	14046/20340
	<i>Trogonoptera brookiana albescens</i>		C, W	-/1751
	<i>Trogonoptera</i> spp.		W	1121/1
	<i>Troides aeacus</i>	BD, BT, KH, CN, HK, IN, ID, LA, MY, MM, NP, TW, TH, VN	W	110/247
	<i>Troides amphrysus</i>	BN, ID, MY, MM, SG, TH	W	431/522
	<i>Troides amphrysus ruficollis</i>		W	-/122
	<i>Troides andromache</i>		W	63/159
	<i>Troides cuneifer</i>	ID, MY, TH	W	107/173
	<i>Troides helena</i>	BD, BT, BN, KH, CN, HK, IN, ID, LA, MY, MM, NP, SG, TH, VN	C, W	8849/12705
	<i>Troides</i> spp.		W	566/862
Thailand	<i>Troides aeacus</i>	BD, BT, KH, CN, HK, IN, ID, LA, MY, MM, NP, TW, TH, VN	W	1/503

Key to country ISO codes:

AU – Australia	MM – Myanmar
BD - Bangladesh	MY – Malaysia
BN - Brunei Darussalam	NP - Nepal
BT – Bhutan	PG- Papua New Guinea
CN – China	PH - Philippines
HK – Hong Kong	SB – Solomon Islands
ID – Indonesia	SG - Singapore
IN - India	TH – Thailand
KH – Cambodia	TW – Taiwan, Province of China
LA – Lao People’s Democratic Republic	VN – Viet Nam

2.4. DISCUSSIONS AND OPINIONS OF CITES AND THE SRG

A Review of Significant Trade in specimens of CITES Appendix-II species prepared in 1993 indicated concern regarding the trade in *O. urvillianus* and *O. victorinae* from the Solomon Islands. As a result, a number of recommendations for action were made, and in 1994 the CITES Standing Committee recommended that all Parties suspend imports of specimens of *O. urvillianus* and *O. victorinae* from the Solomon Islands until it implemented the relevant recommendations. This recommendation to suspend trade has been in place since then.

The SRG regularly reviews the trade in species imported into the EU, and in the last ten years it has produced a number of positive and negative opinions and import suspensions for several of the birdwing butterfly species in international trade.

3. BUTTERFLY RANCHING IN THE MAIN COUNTRIES OF EXPORT

Trade and ranching in the five countries exporting the majority of ranched birdwing butterflies –Australia, Indonesia, the Philippines, Papua New Guinea, and Solomon Islands– are considered in detail in the following sections. Additionally, Table 3 provides a summary of information provided by the German CITES Scientific Authority on birdwing butterfly ranching in Indonesia, Papua New Guinea, the Philippines and the Solomon Islands.

Table 3. Birdwing butterfly ranching in Indonesia, Papua New Guinea, the Philippines and the Solomon Islands. Information provided by the German CITES Scientific Authority.

Aspects	Indonesia	Papua New Guinea	Philippines	Solomon Islands
Planting butterfly food plants to attract egg laying females and provide food for caterpillars	yes	yes	Females and males are taken from the wild every 3-4 months; then placed in cages with food and host plants	yes
Taking part of the pupae from the food plants (how many?)	Yes. No information on percentage of offtake	Yes. No information on percentage of offtake	-	Yes. No information on percentage of offtake
Rearing in a controlled environment (cages, houses)	can be assumed as live specimens and bodies are traded, no information given in report	yes	yes	can be assumed as "pupae are taken for hatching"
Return to the wild of specimens reared in a controlled environment	no information available	no information available	10 % of reared/bred specimens	no information available
Other benefits to the populations in the wild	no information available	no information available	no information available	no information available
Export product: pupae (live) and/or imago (dead)	live specimens and bodies	live specimens and bodies	live specimens and bodies	live specimens and bodies
Export Quota	no information available	no information available	no information available	moderate quota set acc. to information by MA but definite numbers haven't been provided
Information available on natural population size and structure (e.g. natural densities of butterflies) or monitoring in place to allow recognition of changes in population size and structure owing to ranching	no information available	no information available	no information available	no information available
Communities/breeders taking part in ranching (numbers known?)	Yes. Numbers available for 1992	Yes. No information on numbers	Yes. No information on numbers	Yes. No information on numbers
Information on how trade is organized	information available	information available	no information available	no information available

3.1. AUSTRALIA

Birdwing trade from Australia

Relatively low-level trade has been reported from Australia to the EU (see Annex 1). The majority of trade, as reported by both exporter and importer, has involved captive-bred specimens of *Ornithoptera priamus*.

Legislation

There are no EU import restrictions on birdwings exported from Australia.

Currently Australian regulations allow the export of captive-bred insects only; it is illegal to export native, wild-caught or ranched insect material (PoA, 2003). This is reflected in the almost complete absence of exports of ranched or wild-sourced birdwing specimens from Australia (see trade tables in Annex).

Birdwing ranching in Australia

No information was obtained on birdwing ranching activities in Australia. Information on captive breeding operations in Australia was available through the websites of some farms.

3.2. INDONESIA

Birdwing trade from Indonesia

Indonesia is the main exporter of birdwing butterflies (as reported by exporter and importer), both by volume and by number of species reported in trade (see Annex). Six *Ornithoptera* species, together with *Troides oblongomaculatus*, have been regularly exported from Indonesia to the EU in significant numbers since 1994. Other *Troides* species were also reported in trade from Indonesia to the EU since 1998.

In 1994 and 1995, almost all birdwings exported from Indonesia to the EU were reported by the importer as captive-bred specimens. In 1996, exports of ranched specimens were also reported by the exporter and importers, and for two years (1996-1997), both sources were commonly reported in the trade. After 1997, however, most exports of birdwings were reported as ranched by both exporter and importers.

Legislation

In February 1998, the SRG formed negative opinions for wild specimens of *Ornithoptera croesus*, *Ornithoptera meridionalis*, *Ornithoptera tithonus*, and wild and ranched specimens of *Ornithoptera andromache* from Indonesia. These negative opinions resulted in import suspensions in September 1999. In May 2002, the SRG reverted the negative opinion for *O. meridionalis*, and the import suspension was lifted. For the other three species, however, the import suspensions are still valid.

Collection of wild birdwing specimens is subject to quotas set by Indonesia. Wild-taken specimens are only allowed to be collected for ranching/breeding and/or for research by the Indonesian Science Institute (Regulation SK.33/IV-KKH/2007, Mandate of the Director General of Forest Protection and Nature Conservation).

Birdwing ranching in Indonesia

In 1988, WWF set up a community-managed butterfly ranching programme in the buffer zone of the Arfak Mountains Nature Conservation Area (Irian Jaya, Indonesia), through the Area's Management Plan 1988-1992. Specifically, the local Hatam people were building butterfly gardens, which involved enriching areas of jungle (generally secondary growth in old gardens) with *Aristolochia* vines and flowering shrubs (New, 1990; New & Collins, 1991;

Parsons, 1995). Catching of specimens by netting was discouraged, and the relatively high value of ranched specimens was stressed (New, 1990).

By 1992, about 1,000 families had been involved in the use of Arfak Mountain birdwing butterflies in this way, and around 1500 gardens in 47 mountain villages had been planted, many of which were then in production (Neville, 1992, in Parsons, 1995). Species ranched were mostly *Ornithoptera tithonus*, and to a lesser extent *O. rothschildi*, *O. paradisea arfakensis* and *O. goliath samson* (Parsons, 1995). A butterfly cooperative, Yayasan Bina Lstari Bumi Cendrawasih (YBLBC), was established in 1993 by WWF. By then, ranching was fully operational, as reflected in the number of ranched specimens reported in the trade from Indonesia after that year (Rosser & Haywood, 2002). YBLBC buys and sells the butterflies, arranges for CITES permits, markets and ships the butterflies and pays the farmers (BCN, 1997).

By 1997, six species of birdwing were being ranched in Indonesia, and of the 2,848 households in districts participating in the project, YBLBC estimated that 50% were involved in butterfly ranching and thus receiving direct benefits from the enterprise; the butterflies' contribution to household income represented on average over 50% of total cash income for the majority of participating households (BCN, 1997). Ranching birdwings in the Arfak Mountains Nature Reserve continued as a sustainable activity in the following years (MacKinnon & Wardojo, 2001; Rosser & Haywood, 2002; CITES, 2006).

The Indonesian Scientific Authority reported that, in relation to *Ornithoptera priamus*, they carried out surveys of butterfly ranches, monitored the way in which the species was obtained and traded, and offered advice if necessary (CITES, 2006). They noted that butterflies were not taken directly from the wild, and that butterfly ranching or farming operations were encouraged instead. Ranching is done within the species' distributional ranges and farming is done outside them (CITES, 2006).

3.3. PAPUA NEW GUINEA

Birdwing trade from Papua New Guinea

The majority of trade between 1988 and 1997 comprised captive-bred, and to a lesser extent wild-sourced, *O. priamus* and *T. oblongomaculaus*. Around 1997, there was a shift in the trade towards ranched specimens, and a higher number of species were reported in trade, mostly as ranched specimens (e.g. *O. chimaera*, *O. goliath*, *O. meridionalis*, *O. paradisea*, *O. urvillianus*, *O. victoriae*). A similar pattern is apparent also for countries other than EU-27. See Annex for more details.

Legislation

There are currently no EU import restrictions on birdwing butterflies from Papua New Guinea.

National legislation apparently prohibits capturing wild specimens of all birdwing butterflies in the genera *Ornithoptera*, *Trogonoptera* and *Troides*, with the sole exception of duly licensed garden-farms specifically equipped for this purpose (CITES, 2006b). However, Small (2007) considered this piece of legislation to be unenforceable, especially for rural insect ranchers that are spread throughout the country. He suggested that it probably refers to the netting of specimens rather than the ranching of pupae, and therefore reared butterflies would not be considered wild-caught under PNG law (Small, 2007).

Birdwing ranching in Papua New Guinea

Papua New Guinea was the first country to specify insect conservation as a national objective in its constitution (Ruskin, 1985). In 1966, the Government declared seven endangered species of *Ornithoptera* totally protected. Many expatriate dealers and traders were deported

and in 1974 legislation was introduced restricting trade to Papua New Guineans (Hutton, 1985). The Papua New Guinea government considered insects a national resource, and it made butterfly ranching part of the nation's economic development. At Bulolo, Morobe Province, it established the Insect Farming and Trading Agency (IFTA) in 1978 to handle the business details of trade (Ruskin, 1985).

The functions of IFTA are to facilitate the link between overseas buyers and local farmers, to oversee payments, to pool stock in order to fulfil large orders and to serve as an educational centre for prospective farmers, to provide quality control, marketing, field extension, and research and monitoring of Papua New Guinean insects (Ruskin, 1985; Small, 2004).

IFTA charges from US\$5 to just over US\$100 for each birdwing specimen, depending on the species and gender (IFTA, 2004).

By 1985, there were more than 500 butterfly farmers in ten provinces of Papua New Guinea (Hutton, 1985). In 1995, there were 19 provinces involved, however this figure decreased to nine by 2002. The number of villages has remained at around 125 between 1995 and 2001 (Small, 2004). Between 1995 and 2002, a total of 4,691 ranchers sold insects to IFTA, although only 14 did so throughout the eight-year period. The average income per rancher over this period was estimated to be US\$73 per annum (Small, 2007).

Butterfly ranching in Papua New Guinea follows the general system outlined in the butterfly ranching section above (section 2.2), as it was, in fact, in Papua New Guinea where butterfly ranching was developed (Parsons, 1995). The Papua New Guinean butterfly ranching system has been proposed as a desirable model to be followed in other regions, and countries such as Indonesia and the Solomon Islands had shown interest and progress in that direction (Hutton, 1985; New & Collins, 1991; Parsons, 1995).

Parsons (1995) noted that the supply to the IFTA from many farmers/collectors in Papua New Guinea was often sporadic on an individual basis, because local villagers were usually self-sufficient, and because collectors often earned enough money in one shipment to last them several months, ceasing to collect if there was no apparent interest in their activities. For this reason, extension visits (i.e. visits mostly by IFTA personnel) have been necessary to keep farmers motivated and also to take the idea to remote villages (Parsons, 1995).

During the 1980s, IFTA transformed from an initially State-run monopoly into essentially a private company. In the mid 1990s, IFTA lost its monopoly, as the Department of Environment and Conservation (DEC) began issuing CITES export permits to other institutions as well as IFTA; these institutions were: Wau Ecology Institute (WEI), OISCA, WIMAX, and NIF (Small, 2004). Small (2007) stated that currently the only traders in operation in Papua New Guinea are IFTA and WEI. Both organisations purchase dead and dried insects from rural communities and sell them internationally (obtaining export permits from DEC). They also conduct training sessions and field extension work for ranchers and collectors (Small, 2007).

Despite IFTA's initial dynamism in the 1970s and 1980s and the enthusiasm shown by most experts relating the sustainability of ranching (e.g. Hutton, 1985; New, 1994; Parsons, 1995), Small (2007) suggested that to date no real research and monitoring has been conducted to confirm the biological sustainability of insect ranching.

3.4. PHILIPPINES

Birdwing trade from the Philippines

Up until 2002, virtually no trade in birdwings was reported from the Philippines. Since then, import volumes from the country have been relatively low both to the EU and globally (see

Annex). All EU imports and the great majority of global imports were reported as captive-bred specimens, and less than 5% of global reported trade involved ranched specimens.

Troides rhadamantus is the most traded birdwing species from the Philippines, accounting for over 80% of birdwing trade from the country. The other two species traded in significant amounts from the Philippines are *Trogonoptera trojana* and *Troides magellanus*.

Legislation

There are currently no EU import restrictions on birdwings exported from the Philippines.

Birdwing ranching in the Philippines

Very limited information was obtained on birdwing ranching activities in the Philippines.

The Philippines' Department of Environment and Natural Resources (DENR) provided in 2005 the following information regarding butterfly farming in the Philippines (Alvarez, 2005):

"1. The trade of butterfly specimens is based on the approved guidelines pursuant to DENR Administrative Order No. 2002-19 dated September 16, 2003, entitled "Guidelines on the Trade of Captive-bred Butterfly Specimens;

2. The collection of wild species of butterflies shall be allowed only for breeding purposes, under a Wildlife Collector's Permit (WCP) and Wildlife Farm Permit (WFP) duly issued by the DENR. The WCP and WFP shall have a duration of three years and may be renewed thereafter for the same period. However, with the approval of the new procedural guidelines, the permit has been extended to five years;

3. The permittee shall maintain and operate a wildlife breeding farm facility, consisting of breeding and rearing cages, food/host plants, with an area of at least 4 square meters and a height of at least 2 meters. The breeding enclosure and rearing cages for the eggs and larvae are enclosed with nets to prevent the entry of predators. A larger enclosure shall be required depending on the volume of specimens to be utilized for breeding by the permit holder. An area of at least 100 m² shall be set aside for planting of food/host plants. In addition, the permittee shall continuously plant different species of host and food plants in areas of collection where the 10% of the production of bred butterflies shall also be released;

4. The permittee shall collect for breeding purposes, only the kind and the quantity of wild butterflies allowed in a designated area. The breeding stock may be collected from the wild population or from the progenies produced from previous breeding;

5. The wild stock population in pair of every species or a male or female of the species may be collected every 3 to 4 months or during the 3rd or 4th generations of the stock, depending on the needs to ensure good quality butterflies. The wild stock is collected through the use of a trapping net;

6. The collected wild stock are placed in breeding enclosures. When the adult butterflies have laid their eggs, they are gathered and placed in the hatching cages. Each species of butterfly has its own cage when the eggs will be hatched. The larvae are placed in rearing cages with fresh leaves of the respective plants until they develop into pupae;

7. Progenies produced from previous breeding are re-bred as a breeding stock. Collection from the wild as breeding stock is necessary to ensure good quality butterflies;

8. Captive-bred livestock specimens are locally traded/exported in the form of pupae while dead stock specimens are the adult butterflies restrained or dried in triangular glassine envelope;

9. 10 % of the total production of bred butterflies for each of the species allowed to be collected and bred shall be released in the collection areas for replenishment of the wild population;

10. Per our record, 30 WCP/WFP holders were allowed to collect at least 30 different species, 10 pairs for every species, during the duration of the permit, for breeding purposes. Of the 30 WCP/WFP holders, 25 of them are allowed to breed CITES listed Appendix II species. These species are: *Trogonoptera trojana*, *Troides magellanus*, *Troides rhadamanthus*, *Trogonoptera brookiana*, and *Troides plicata*. Moreover, six of the permittees are exporting deadstock CITES specimens only to US, Canada, Germany, Russia, France and Poland;

11. The constant supply of pupae and dead stock comes from captive-bred butterflies originating from accredited breeding farms”.

3.5. SOLOMON ISLANDS

Birdwing trade from the Solomon Islands

The Solomon Islands only very recently became a Party to CITES having acceded on 26/03/2007, and the Convention entered into force in that country on 24/06/2007. Because of this, trade data are not available from the Solomon Islands; however, trade has been reported by some trade partners. The majority of trade reported from the Solomon Islands involved two species: *Ornithoptera urvillianus* and *Ornithoptera victoriae* (see Annex).

Before 1998, very little trade in birdwing butterflies from the Solomon Islands was reported by EU Member States. Since then, ranched specimens of *O. urvillianus* and *O. victoriae* were the main EU-reported birdwing imports.

It has been suggested that, in the late 1980s and early 1990s, some exports from the Solomon Islands went to Papua New Guinea, for marketing through IFTA (WCMC *et al.*, 1993).

Legislation

In November 1994, the CITES Standing Committee recommended to all Parties to suspend imports of specimens of *O. urvillianus* and *O. victoriae* from the Solomon Islands, a recommendation that is still in place.

In February 1998, the SRG formed a negative opinion for wild-sourced *O. urvillianus* and *O. victoriae* from the Solomon Islands. An import suspension was subsequently put in place for wild specimens of both species from the Solomon Islands in September 1999. These EU suspensions are still current.

Subsequent SRG discussions in 2002 and 2006 resulted in a confirmation of the suspensions for wild specimens being confirmed again. It was agreed that the Solomon Islands would be requested more information on their ranching operations.

Birdwing ranching in the Solomon Islands

The potential for commercial butterfly ranching in the Solomon Islands was acknowledged in the 1980s (New & Collins, 1991; Parsons, 1992). However, by the early 1990s, the country was still considered to lack a cohesive system of sustainable utilization of its butterfly resources (Parsons, 1992). By 2002, efforts to establish a butterfly farming initiative for *Ornithoptera victoriae* were reported to have met with only limited success (Tennent, 2002). The Australian Foundation for the Peoples of Asia and the Pacific (AFAP) and the Solomon Islands Development Trust (SIDT) reported that they had promoted butterfly ranching in the Solomon Islands as an income generation activity for the communities, however, no specific details were available (ACFOA, 2003; SIDT, 2007).

Birdwings have been exported as ranched specimens from the Solomon Islands since 1997. A review of *O. urvillianus* and *O. victoriae* in the Solomon Islands can be found in UNEP-WCMC (2006).

Following a SRG request for further information, the Ministry of Natural Resources (CITES Scientific Authority of the Solomon Islands), indicated that “butterfly ranching/farming” was practised by local communities throughout the country. Under this programme, various butterfly food plants (*Aristolochia*, *Citrus*, *Euodia*, etc.) and flowering plants (such as *Hibiscus* and *Bougainvillea*) are planted to attract butterflies and induce them to breed on these vines. Locals then selectively collect the pupae before they hatch (‘butterflies breed on these vines until pupa stages, when the locals selectively collect them for hatching’), leaving some for repopulation purposes. The Ministry also referred to a ‘small export quota’, which had been established until a survey on the farming/ranching programme has been carried out, in order to provide some cash income to local livelihoods in the interim. They considered the trade to be non-detrimental to wild populations, and suggested that the programme had led to an increase in the birdwing population (Masolo, 2007).

Regarding *Ornithoptera victoriae*, one exporter stated that it had farms in the provinces of Malaita, Western, Makira, and Sarita Isabel. According to this exporter, local farmers plant *Aristolochia* around homes in small villages, where birdwings lay their eggs. Once pupae are formed, they reportedly collect 50% of them, focusing on the largest and undamaged ones and leaving the rest for repopulation purposes. The focus of the operation is on *Ornithoptera victoriae*. It was unclear whether pupae or adults are harvested, although Masolo (2007) seems to suggest that pupae are harvested. The reply from the Department of Forests, Environment and Conservation indicated that the requested information was unavailable until the lists of exporters and their activities in the country are updated and reviewed, a process underway at that time (Hurutarau, 2007).

A number of issues have been raised as a result of this discussion, in particular:

+ whether specimens are reared in a controlled environment at any life stage and therefore whether source code W would be more appropriate than source code R as defined in Conf. Res. 11.16. This issue is relevant for all countries for which trade in ranched specimens is reported;

+ whether imports of ranched specimens of these species should be allowed into the EC while the existing Standing Committee recommendations to suspend imports of *O. victoriae* (and *O. urvillianus*) from the Solomon Islands are in place;

On request by the European Commission, the CITES Secretariat clarified in June 2007 that Resolution Conf. 12.8 (Rev. CoP13) is silent on the source of specimens to be covered by the suspension recommendations, but as the resolution concerns the implementation of article IV of the Convention (non-detriment finding) and this article applies equally to specimens of wild and ranched origin, the Secretariat believes that the intention was that the recommendation should apply to specimens of both sources (Wijnstekers, 2007).

According to Small (2007, pers. comm.):

- As with the ranching operations in Papua New Guinea, it is not known what percentage of pupae on foodplants are returned to the wild.
- *O. urvillianus* (often traded as *O. priamus urvillianus*) and *O. victoriae* are the only CITES-listed birdwing butterfly species ranched in the Solomon Islands.
- The number of local communities taking part in the ranching programme is unknown.
- It is not clear how the trade is organized. It seems that specimens of *O. urvillianus* and *O. victoriae* have been sent out of Guadalcanal in the last couple of years.
- Annual quotas for different species in the Solomon Islands are not known.

4. ANNEX 1: TRADE TABLES

Note: 2006 trade data is not complete. Trade data downloaded on 19th June 2007. If there is a current EC opinion or trade suspension (situation June 2007) for any country/species/source combination this has been indicated in the trade tables between brackets next to the relevant source code [positive opinion: (+); import suspension: (b)].

4.1. AUSTRALIA

i) Direct exports of birdwing butterflies from Australia to EU-27, 2000-2006

Taxon	Source	Reported by	2000	2001	2002	2003	2004	2005	2006	Total
<i>Ornithoptera goliath</i>	C	Importer								
		Exporter			6					6
	R (+)	Importer								
		Exporter				8				8
	W	Importer								
		Exporter	8							8
<i>O. paradisea</i>	R (+)	Importer								
		Exporter				1				1
	W	Importer								
		Exporter	2							2
<i>O. priamus</i>	C	Importer	83	255	63	76	22	59	78	636
		Exporter	253	401			121	156		931
	R (+)	Importer		40						40
		Exporter								
	W (+)	Importer								
		Exporter	12							12
<i>O. priamus euphorion</i>	C	Importer	3							3
		Exporter	105	511						616
<i>O. richmondia</i>	C	Importer	3	10			2			15
		Exporter	14	24						38
<i>O. rothschildi</i>	W	Importer								
		Exporter	4							4
<i>Ornithoptera</i> spp.	C	Importer		6						6
		Exporter								
	R	Importer		1						1
		Exporter								
<i>O. tithonus</i>	W	Importer								
		Exporter	4							4
<i>O. urvillianus</i>	C	Importer	1							1
		Exporter								
<i>O. victoriae</i>	R	Importer								
		Exporter				8				8
<i>Troides oblongomaculatus</i>	W (+)	Importer								
		Exporter	4							4
Total		Importer	90	312	63	76	24	59	78	702
		Exporter	406	936	6	17	121	156		1642

ii) Direct exports of birdwing butterflies from Australia to countries other than EU-27,
2000-2006

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
<i>Ornithoptera chimaera</i>	bodies	R (+)	Importer							
			Exporter			4	6			10
<i>Ornithoptera goliath</i>	bodies	C	Importer							
			Exporter	10			1			11
		R (+)	Importer						2	2
			Exporter	2		5	20			27
<i>Ornithoptera paradisea</i>	bodies	C	Importer							
			Exporter	2			1			3
		R (+)	Importer							
			Exporter				5			5
<i>Ornithoptera priamus</i>	bodies	C	Importer	2	40	2	18	20	47	129
			Exporter	94	198			102	188	582
		R (+)	Importer	100					20	120
			Exporter							
	live	C	Importer		160	400	797	624	263	2244
			Exporter	70	373			776	1138	2357
		W (+)	Importer		100				200	300
			Exporter							
	unspecified	W (+)	Importer	2						2
			Exporter							
<i>Ornithoptera priamus euphorion</i>	bodies	C	Importer	1			40	4	4	49
			Exporter	19	38			7		64
		R	Importer						2	2
			Exporter		5					5
<i>Ornithoptera richmondia</i>	bodies	C	Importer					5	4	9
			Exporter	14	10			7	12	43
<i>Ornithoptera rothschildi</i>	bodies	C	Importer							
			Exporter	4						4
		R	Importer						3	3
			Exporter							
<i>Ornithoptera spp.</i>	bodies	C	Importer	2			7		1	10
			Exporter							
		R	Importer				14			14
			Exporter							
		W	Importer		11					11
			Exporter							
	live	C	Importer				130			130
	unspecified	C	Importer	4						4
			Exporter							
<i>Ornithoptera tithonus</i>	bodies	C	Importer							
			Exporter	10						10
	unspecified	C	Importer	2						2
			Exporter							
<i>Ornithoptera urvillianus</i>	bodies	C	Importer							
			Exporter	20						20
		R	Importer							
			Exporter	2						2

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
<i>Ornithoptera victoriae</i>	bodies	R	Importer							
			Exporter			2	8			10
<i>Teinopalpus</i> spp.	bodies	W	Importer				1			1
			Exporter							
<i>Troides oblongomaculatus</i>	bodies	C	Importer							
			Exporter	2						2
Total			Importer	113	311	402	1007	653	546	3032
			Exporter	249	624	11	41	892	1338	3155

4.2. INDONESIA

i) Direct exports of birdwing butterflies from Indonesia to EU-27, 2000-2006

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	2006	Total
<i>Ornithoptera aesacus</i>	bodies	C	Importer		3	6			16		25
			Exporter		3						3
		F	Importer								
			Exporter	4							4
		R (+)	Importer				2	30	64	63	159
			Exporter			8	2	86	80		176
<i>Ornithoptera chimaera</i>	bodies	C	Importer								
			Exporter						8		8
		R (+)	Importer							3	3
			Exporter								
<i>Ornithoptera croesus</i>	bodies	C	Importer		112	72					184
			Exporter		110						110
		F	Importer	100							100
			Exporter	140							140
		R	Importer				150	325	608	385	1468
			Exporter			142	100	630	694		1566
<i>Ornithoptera goliath</i>	bodies	C	Importer	40							40
			Exporter								
		R	Importer		86	149	110	422	298	267	1332
			Exporter	44	202	157	219	472	310		1404
	live	R	Importer	39							39
			Exporter								
<i>Ornithoptera goliath samson</i>	bodies	R	Importer	24	46						70
			Exporter	250	51						301
	live	R	Importer								
			Exporter	39							39
<i>Ornithoptera hybrid</i>	bodies	C	Importer								
			Exporter		2						2
		F	Importer								
			Exporter	2							2
<i>Ornithoptera meridionalis</i>	bodies	C	Importer						24		24
			Exporter								
		R	Importer					36	28	14	78
			Exporter					80	72		152
<i>Ornithoptera paradisea</i>	bodies	C	Importer		10						10
			Exporter								
		R (+)	Importer	8	75	12	38	200	144	130	607
			Exporter	58	90	20	74	294	32		568
<i>Ornithoptera priamus</i>	bodies	C	Importer		82						82
			Exporter								
		F	Importer	40							40
			Exporter								
		R (+)	Importer	12	26	36	275	690	1383	394	2816
			Exporter	120	104	281	315	990	1328		3138
	live	R (+)	Importer					100			100
			Exporter								

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	2006	Total
<i>Ornithoptera priamus poseidon</i>	bodies	R	Importer		150	20					170
			Exporter	82	197						279
	live	R	Importer	112							112
			Exporter	112							112
<i>Ornithoptera rothschildi</i>	bodies	R (+)	Importer	38	168	33		222	462	122	1045
			Exporter	266	119	33	20	328	472		1238
<i>Ornithoptera spp.</i>	bodies	R	Importer						10		10
<i>Ornithoptera tithonus</i>	bodies	C	Importer		18						18
			Exporter								
		R	Importer	18	83	7	43	104	22	93	370
			Exporter	274	130	11	74	136	34		659
	live	R	Importer								
			Exporter	6							6
<i>Trogonoptera brookiana</i>	bodies	R (+)	Importer					30	100	24	154
			Exporter					20	100		120
<i>Troides amphrysus</i>	bodies	C	Importer		104	14			45		163
			Exporter		104						104
		R (+)	Importer				90	332	232	143	797
			Exporter			30	74	432	207		743
<i>Troides criton</i>	bodies	C	Importer						100		100
			Exporter								
		R (+)	Importer						782	70	852
			Exporter						372		372
<i>Troides cuneifer</i>	bodies	C	Importer		10	20					30
			Exporter		10						10
		F	Importer	20							20
			Exporter	20							20
		R (+)	Importer				52	116	260	20	448
			Exporter			32	140	400	176		748
		C	Importer		26	4					30
			Exporter	10	26						36
<i>Troides dohertyi</i>	bodies	R (+)	Importer				2		30	20	52
			Exporter			6			16		22
		C	Importer		80	66					146
			Exporter		80						80
<i>Troides haliphron</i>	bodies	F	Importer		40						40
			Exporter		46						46
		R (+)	Importer				60	755	700	97	1612
			Exporter			106	112	885	504		1607
		C	Importer		320	20					340
			Exporter		320						320
		F	Importer								
			Exporter	34							34
<i>Troides helena</i>	bodies	R (+)	Importer			500	290	330	442	152	1714
			Exporter			590	360	500	492		1942
	live	R	Importer			100		100			200
			Exporter			100		800			900
	bodies	F	Importer								
			Exporter	30							30

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	2006	Total
<i>Troides hypolitus</i>	bodies	C (+)	Importer		100	68			20		188
			Exporter		100					100	
		R	Importer			120	51	258	128	366	923
			Exporter			229	70	338	156		793
<i>Troides miranda</i>	bodies	F	Importer			4					4
			Exporter			4					4
		R (+)	Importer					40	4	4	48
			Exporter					40	4		44
<i>Troides oblongomaculatus</i>	bodies	R (+)	Importer	20	30			350	476	242	1118
			Exporter	20	342			500	270		1132
	live	R (+)	Importer	30							30
			Exporter	30							30
<i>Troides plato</i>	bodies	C	Importer		40						40
			Exporter		40						40
		R (+)	Importer			60	26	70	136		292
			Exporter			66	67	130	20		283
<i>Troides prattorum</i>	bodies	C	Importer		25						25
			Exporter		25						25
		F	Importer								
			Exporter	2							2
		R (+)	Importer				29	55	50	41	175
			Exporter			4	104	85			193
<i>Troides riedeli</i>	bodies	R (+)	Importer							50	50
<i>Troides vandepolli</i>	bodies	C	Importer						20		20
			Exporter								
		R (+)	Importer						24	8	32
			Exporter					20	50		70
Total			Importer	501	1634	1311	1218	4565	6608	2708	18545
			Exporter	1589	2055	1819	1731	7166	5397		19757

ii) Direct exports of birdwing butterflies from Indonesia to countries other than EU-27, 2000-2006.

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
<i>Ornithoptera aesacus</i>	bodies	F	Importer	20						20
			Exporter							
		R (+)	Importer			200	2	865	544	1611
			Exporter			240	327	712	784	2063
<i>Ornithoptera chimaera</i>	bodies	C	Importer							
			Exporter						50	50
		R (+)	Importer					73	248	321
			Exporter				3	80	316	399
<i>Ornithoptera croesus</i>	bodies	C	Importer			300				300
			Exporter		290					290
		F	Importer	460						460
			Exporter	285						285
		R	Importer			400	390	1133	1782	3705
			Exporter			750	774	2040	3236	6800

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
<i>Ornithoptera goliath</i>	bodies	C	Importer						12	12
			Exporter							
		F	Importer	30						30
			Exporter							
		R (+)	Importer	274	26	240	878	653	853	2924
			Exporter	124	136	330	1334	926	1364	4214
		W	Importer			4	100			104
			Exporter							
<i>Ornithoptera goliath samson</i>	bodies	R	Importer	30						30
			Exporter	372	118					490
<i>Ornithoptera hybrid</i>	bodies	F	Importer							
			Exporter	1						1
<i>Ornithoptera meridionalis</i>	bodies	R	Importer				108	402	288	798
			Exporter				314	268	444	1026
<i>Ornithoptera paradisea</i>	bodies	F	Importer	27						27
			Exporter							
		R (+)	Importer	66	22	84	1232	419	698	2521
			Exporter	70	80	88	1280	688	976	3182
		W	Importer			4				4
			Exporter							
<i>Ornithoptera priamus</i>	bodies	C	Importer		200					200
			Exporter							
		F	Importer	230					200	430
			Exporter							
		R (+)	Importer	366	650	906	1070	2540	3470	9002
			Exporter	476	1605	1316	3438	4764	6761	18360
	live	C	Importer						540	540
			Exporter							
		F	Importer	80						80
			Exporter							
		R (+)	Importer							
			Exporter	200					1840	2040
		W (+)	Importer						660	660
			Exporter							
<i>Ornithoptera priamus poseidon</i>	bodies	R	Importer	350				250	620	1220
			Exporter	1679	105					1784
		W	Importer	25			200			225
			Exporter							
<i>Ornithoptera rothschildi</i>	bodies	R (+)	Importer	280	10		590	235	878	1993
			Exporter	1333	54	51	960	672	1078	4148
		W	Importer	580						580
			Exporter							
<i>Ornithoptera spp.</i>	bodies	W	Importer		56					56
			Exporter							
<i>Ornithoptera tithonus</i>	bodies	F	Importer	36						36
			Exporter							
		R	Importer	84	18	160	288	322	499	1371
			Exporter	212	86	160	508	463	735	2164
		W (+)	Importer	26						26
			Exporter							

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
	live	R	Importer							
			Exporter	40						40
<i>Trogonoptera brookiana</i>	bodies	C	Importer							
			Exporter						100	100
		R (+)	Importer					20	561	581
			Exporter					20	1035	1055
<i>Troides amphrysus</i>	bodies	C	Importer		60				30	90
			Exporter		300					300
		R (+)	Importer					105	574	679
			Exporter			50		878	970	1898
<i>Troides criton</i>	bodies	R (+)	Importer					120	560	680
			Exporter					460	880	1340
<i>Troides cuneifer</i>	bodies	C	Importer		60	40				100
			Exporter		90					90
		F	Importer	40						40
			Exporter							
		R (+)	Importer				100	41	414	555
			Exporter			130	243	297	404	1074
<i>Troides dohertyi</i>	bodies	C	Importer	1		6				7
			Exporter		80					80
		R (+)	Importer						50	50
			Exporter			6			120	126
<i>Troides haliphron</i>	bodies	C	Importer			40				40
			Exporter							
		F	Importer	130						130
			Exporter	80						80
		R (+)	Importer				80	216	589	885
			Exporter			110	123	600	976	1809
<i>Troides helena</i>	bodies	C	Importer		1120					1120
			Exporter		2980					2980
		F	Importer	441						441
			Exporter	240						240
		R (+)	Importer				100	282	350	732
			Exporter				1312	600	1040	2952
	live	C	Importer						640	640
			Exporter							
		F	Importer	50						50
			Exporter	200						200
		R (+)	Importer							
			Exporter				1700	3500	2960	8160
		W (+)	Importer						1140	1140
			Exporter							
<i>Troides hypolitus</i>	bodies	C	Importer		120					120
			Exporter		590					590
		F	Importer	100						100
			Exporter	60						60
		R (+)	Importer			200		85	396	681
			Exporter			250	100	282	936	1568
<i>Troides miranda</i>	bodies	F	Importer	20						20
			Exporter							
		R (+)	Importer						54	54

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
<i>Troides oblongomaculatus</i>	bodies	R (+)	Exporter					2	54	56
			Importer	400	24			40	270	734
			Exporter	1280	367			140	626	2413
<i>Troides plato</i>	bodies	C	Importer		30					30
			Exporter		120					120
		F	Importer							
			Exporter	40						40
		R (+)	Importer					168	240	408
			Exporter					190	220	410
<i>Troides prattorum</i>	bodies	C	Importer			80			2	82
			Exporter		25					25
		F	Importer	10						10
			Exporter							
		R (+)	Importer				100	9	21	130
			Exporter			90	100	108	54	352
<i>Troides spp.</i>	bodies	R	Importer					20	48	68
			Exporter							
<i>Troides vandepolli</i>	bodies	C	Importer						20	20
			Exporter							
		R (+)	Importer					10	222	232
			Exporter					30	248	278
Total			Importer	4156	2396	2664	5238	8008	17473	39935
			Exporter	6692	7026	3571	12516	17720	28207	75732

4.3. PAPUA NEW GUINEA

i) Direct exports of birdwing butterflies from Papua New Guinea to EU-27, 2000-2006

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	2006	Total
<i>Ornithoptera caelestis</i>	bodies	R (+)	Importer				10				10
			Exporter	22			24				46
<i>O. chimaera</i>	bodies	C	Importer				2				2
			Exporter								
		R (+)	Importer	106	20	14	25	23	14	24	226
			Exporter	162	36	106	129	293			726
	live	W	Importer	12							12
			Exporter								
		R	Importer		2						2
			Exporter								
<i>O. goliath</i>	bodies	C	Importer				4		2		6
			Exporter								
		R (+)	Importer	111	91	82	12	122	20	22	460
			Exporter	56	17	503	223	705			1504
	live	W	Importer								
			Exporter		2						2
<i>O. goliath supremus</i>	bodies	R	Importer	94	4	68	6				172
			Exporter	206	205		23				434
	live	R	Importer		4						4
			Exporter								
<i>O. meridionalis</i>	bodies	C	Importer				2				2
			Exporter								
		R (+)	Importer	91	12	26	6	2	1	4	142
			Exporter	147	51	72	25	44			339
<i>O. paradisea</i>	bodies	R (+)	Importer				2				2
			Exporter	260	12	6	14				292
<i>O. priamus</i>	bodies	C	Importer	1			5		6		12
			Exporter								
		R (+)	Importer	838	973	353		523	46	74	2807
			Exporter	666	307	3743	1155	2375			8246
	live	R (+)	Importer		2						2
			Exporter								
<i>O. priamus admiralitatus</i>	bodies	R	Importer	20							20
			Exporter	66			4				70
<i>O. priamus bornemanni</i>	bodies	R	Importer	44		28					72
			Exporter	70	102						172
<i>O. priamus demophanes</i>	bodies	R	Importer	8							8
			Exporter	42	70						112
<i>O. priamus poseidon</i>	bodies	C	Importer				20				20
			Exporter								
		R	Importer	361	218	138	62				779
			Exporter	1047	1015		509				2571
		W	Importer	100							100
			Exporter								
	live	R	Importer		3		43				46
			Exporter								

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	2006	Total
<i>Ornithoptera</i> spp.	bodies	R	Importer	66				11			77
			Exporter								
<i>O. urvillianus</i>	bodies	C	Importer				100				100
			Exporter								
		R (+)	Importer	142	79	116	40			10	387
			Exporter	671	297		557				1525
	live	R (+)	Importer		2		200				202
			Exporter								
<i>O. victoriae</i>	bodies	C	Importer				2				2
			Exporter								
		R (+)	Importer	53	72	62	6	26	60	100	379
			Exporter	40	8	194	32	147			421
	live	R (+)	Importer		2						2
			Exporter								
<i>O. victoriae reginae</i>	bodies	R	Importer	25	12	8					45
			Exporter	42	151		9				202
<i>Troides oblongomaculatus</i>	bodies	C	Importer			2			3		5
			Exporter								
		R (+)	Importer	228	126	469	20	922			1765
			Exporter	306	120	1645	148	1900			4119
	live	R	Importer				100				100
			Exporter								
<i>T. oblongomaculatus papuensis</i>	bodies	C	Importer				100				100
			Exporter								
		R	Importer	71	2						73
			Exporter	164	281		521				966
			Importer	2371	1624	1366	767	1629	152	234	8143
			Exporter	3967	2675	6269	3373	5464			21747

ii) Direct exports of birdwing butterflies from Papua New Guinea to countries other than EU-27, 2000-2006

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
<i>O. allotiei</i>	bodies	W	Importer							
			Exporter					1		1
<i>O. caelestis</i>	bodies	C	Importer			6	16			22
			Exporter							
		R (+)	Importer			6		6		12
			Exporter	79			88			167
<i>O. chimaera</i>	bodies	C	Importer	314			63	4		381
			Exporter							
		F	Importer	2				30		32
			Exporter							
		R(+)	Importer	6	15	36	24	40	164	285
			Exporter	419	245	696	146	330		1836
		U	Importer	20						20
			Exporter							
		W	Importer	4		26	4		1	35
			Exporter					1		1
	derivatives	R (+)	Importer						10	10

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
	live	F	Exporter							
			Importer		4					4
			Exporter							
<i>O. croesus</i>	bodies	W	Importer	20						20
<i>O. goliath</i>	bodies	C	Exporter							
			Importer	365	24	20	1319	9	4	1741
		F	Exporter							
			Importer	6		49		72	40	167
		I	Exporter							
			Importer				40			40
		R (+)	Exporter							
			Importer	31	125	246	224	122	641	1389
		U	Exporter	548	243	1221	1745	1182		4939
			Importer	20						20
		W	Exporter							
			Importer	26	2	47	8	40	2	125
	derivatives	R (+)	Exporter							
			Importer						10	10
	live	F	Exporter							
			Importer		4					4
		W	Importer	2						2
<i>O. goliath supremus</i>	bodies	R	Exporter							
			Importer	20						20
<i>O. hybrid</i>	bodies	R	Exporter	249	633		324			1206
			Importer							
<i>O. meridionalis</i>	bodies	C	Exporter	1						1
			Importer	310		2	17	2		331
		F	Exporter							
			Importer					4		4
		R (+)	Exporter							
			Importer	18	7	6	24	2		57
		W	Exporter	426	110	115	80	75		806
			Importer	11		2				13
	live	F	Exporter							
			Importer		2					2
<i>O. paradisea</i>	bodies	C	Exporter							
			Importer	3			133	1	4	141
		R (+)	Exporter							
			Importer				14		5	19
		W	Exporter	5	4	12	30	4		55
			Importer			2				2
	live	W	Importer	1						1
<i>O. priamus</i>	bodies	C	Exporter							
			Importer	2454	164	550	1909	97	1208	6382
		F	Exporter							
			Importer			320	935	264	100	1619
		I	Exporter							
			Importer				20			20

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
		R (+)	Importer	634	1395	102	6	530	311	2978
			Exporter	3705	4445	11506	6550	10036		36242
		W (+)	Importer	496	66	810	16	60	81	1529
			Exporter			5	1	26		32
	derivatives	R	Importer						10	10
			Exporter							
	live	C	Importer	100						100
			Exporter							
		F	Importer	100	15					115
			Exporter							
		W (+)	Importer	4						4
			Exporter							
<i>O. priamus admiralitatus</i>	bodies	R	Importer							
			Exporter	12	23		5			40
<i>O. priamus bornemanni</i>	bodies	R	Importer							
			Exporter	412	172		20			604
<i>O. priamus demophanes</i>	bodies	R	Importer							
			Exporter	63	15		2			80
<i>O. priamus euphorion</i>	bodies	R	Importer			12				12
			Exporter							
<i>O. priamus miokensis</i>	bodies	R	Importer							
			Exporter				5			5
<i>O. priamus poseidon</i>	bodies	C	Importer	323	20		40			383
			Exporter							
		F	Importer	404				100		504
			Exporter							
		R	Importer	251	709	200	80	355	2100	3695
			Exporter	5312	2363		2533			10208
		U	Importer	400						400
			Exporter							
		W	Importer	872	307	40	100	1000		2319
			Exporter		1					1
	live	C	Importer	100						100
			Exporter							
		W	Importer	100						100
			Exporter							
<i>Ornithoptera spp.</i>	bodies	C	Importer	2						2
			Exporter							
		F	Importer						126	126
			Exporter							
		R	Importer			18		10		28
			Exporter				433			433
		W	Importer	40					1	41
			Exporter							
	live	C	Importer	100						100
			Exporter							
<i>O. urvillianus</i>	bodies	C	Importer	1			8	207		216
			Exporter							
		F	Importer		160					160
			Exporter							
		O	Importer	2						2
			Exporter							

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total
<i>O. victoriae</i>	bodies		Exporter							
			R (+) Importer	46	313	22		50	50	481
			Exporter	2299	739		146			3184
			U Importer	50						50
			Exporter							
			W (+) Importer			120	100			220
			Exporter							
			- Importer	10						10
			Exporter							
			C Importer	240		44	30			314
			Exporter							
			F Importer	2				2	2	6
			Exporter							
			I Importer				4			4
			Exporter							
			R (+) Importer	6	30	80	33	24	6	179
			Exporter	377	28	418	119	186		1128
			U Importer		168					168
			Exporter							
			W (+) Importer	4		46	4		1	55
			Exporter					5		5
<i>O. victoriae reginae</i>	bodies		F Importer		2					2
			Exporter							
			W (+) Importer	2						2
			Exporter							
			R Importer		14					14
			Exporter	36	200					236
<i>Trogonoptera</i> spp.	bodies	C	Importer	200						200
<i>Troides oblongomaculatus</i>	bodies		Exporter							
			C Importer	698		400	386		5	1489
			Exporter							
			F Importer			200		410		610
			Exporter							
			R (+) Importer	543	541		2	631	46	1763
			Exporter	2009	150	4667	68	2211		9105
			U Importer	400						400
			Exporter							
			W (+) Importer	590	4	9	40			643
			Exporter					5		5
			derivatives R (+) Importer						10	10
<i>T. oblongomaculatus papuensis</i>	bodies		Exporter							
			C Importer			100	202			302
			Exporter							
			R Importer							
			Exporter	2085	1266		1807			5158
			(blank) Importer	100						100
<i>Troides</i> spp.	bodies		Exporter							
			C Importer					1		1
		I	Importer		22					22

Taxon	Term	Source	Reported by	2000	2001	2002	2003	2004	2005	Total	
			Exporter								
			R	Importer	110					110	
			Exporter								
			W	Importer	1					1	
			Exporter								
			Total	Importer	10564	4113	3521	5801	4073	4938	33010
				Exporter	18037	10637	18640	14102	14062		75478

4.4. PHILIPPINES

i) Direct exports of birdwing butterflies from the Philippines to EU-27, 2000-2005.

Taxon	Importer	Term	Source	Reported by	2002	2003	2004	2005	Total			
<i>Trogonoptera trojana</i>	France	bodies	C	Importer				20	20			
				Exporter								
<i>Troides magellanus</i>	France	bodies	C	Importer				50	50			
				Exporter								
	Germany	bodies	F	Importer				20	20			
				Exporter								
	Netherlands	bodies	C	Importer		100			100			
				Exporter								
<i>Troides plateni</i>	Spain	bodies	C	Importer				20	20			
				Exporter								
<i>Troides rhadamantus</i>	Czech Republic	bodies	C	Importer				500	500			
				Exporter								
	France	bodies	C	Importer				240	240			
				Exporter								
	Germany	bodies	F	Importer				1	1			
				Exporter								
		live	C	Importer								
				Exporter	10				10			
	Netherlands	bodies	C	Importer		100			100			
				Exporter		200			200			
		live	C	Importer								
				Exporter	97				97			
	Spain	live	C	Importer			50		50			
				Exporter								
	United Kingdom	bodies	C	Importer								
				Exporter		200			200			
Total				Importer		200	50	851	1101			
				Exporter	107	400			507			

ii) Direct exports of birdwing butterflies from the Philippines to countries other than EU-27, 2000-2005.

Taxon	Term	Source	Reported by	2002	2003	2004	2005	Total
<i>Ornithoptera priamus</i>	bodies	W (+)	Importer				20	20
			Exporter					
<i>Ornithoptera priamus poseidon</i>	bodies	W	Importer				27	27
			Exporter					
<i>Ornithoptera urvillianus</i>	bodies	W	Importer				13	13
			Exporter					
<i>Teinopalpus spp.</i>	egg (live)	C	Importer	15				15
			Exporter					
<i>Trogonoptera trojana</i>	bodies	C	Importer	20	120	275	60	475
			Exporter			340		340
		F	Importer		8	110	215	333
			Exporter					

Taxon	Term	Source	Reported by	2002	2003	2004	2005	Total
<i>Troides magellanus</i>	live	R	Importer	12			169	181
			Exporter					
		C	Importer			55	5	60
			Exporter			195		195
		W	Importer			30		30
			Exporter					
	bodies	C	Importer	8	60	152	185	405
			Exporter			105		105
		F	Importer		40	50	19	109
			Exporter					
		R	Importer	11				11
			Exporter					
<i>Troides plateni</i>	bodies	C	Importer	24	6			30
			Exporter					
		R	Importer				87	87
			Exporter					
	live	C	Importer				50	50
		Exporter						
<i>Troides prattorum</i>	live	C	Importer			50		50
			Exporter					
<i>Troides rhadamantus</i>	bodies	C	Importer		224	379	480	1083
			Exporter		2475	620		3095
		F	Importer		100	150	100	350
			Exporter					
		R	Importer	50			75	125
			Exporter					
		W (+)	Importer				8	8
			Exporter					
	live	C	Importer	251	1140	1422	2880	5693
			Exporter	964		1250		2214
		W (+)	Importer	61	200	466	305	1032
			Exporter					
Total			Importer	468	1898	3139	4748	10253
			Exporter	964	2475	2510		5949

4.5. SOLOMON ISLANDS

i) Direct exports of birdwing butterflies from Solomon Islands to EU-27, 2000-2006. All bodies

Taxon	Importer	Units	Source	Reported by	2000	2001	2002	2003	2004	2005	2006	Total
<i>Ornithoptera priamus</i>	France	-	R (+)	Importer	84							84
				Exporter								
<i>Ornithoptera spp.</i>	Germany	-	R	Importer					100			100
				Exporter								
<i>O. urvillianus</i>	Austria	-	R	Importer					80	10		90
				Exporter								
	Czech Rep.	-	R	Importer						470		470
				Exporter								
	France	pairs	R	Importer		65						65
				Exporter								
		-	R	Importer	264		64	320	20	140		808
				Exporter								
	Germany	pairs	R	Importer			246		70			316
				Exporter								
		-	R	Importer		6	534	236		78	80	934
				Exporter								
<i>O. victoriae</i>	Austria	-	C	Importer				80				80
				Exporter								
			R	Importer					20	36		56
				Exporter								
	Czech Rep.	-	R	Importer						98		98
				Exporter								
	France	pairs	R	Importer		20	10					30
				Exporter								
		-	R	Importer	146	2	38	192	14	8		400
				Exporter								
			W (b)	Importer	14							14
				Exporter								
<i>O. victoriae epiphanes</i>	France	pairs	R	Importer		10						10
				Exporter								
<i>O. victoriae isabellae</i>	France	pairs	R	Importer		5						5
				Exporter								
Total				Importer	508	240	1240	1246	423	1065	240	4962
				Exporter								

ii) Direct exports of birdwing butterflies from Solomon Islands to countries other than EU-27, 2000-2006.

Taxon	Term	Units	Source	Reported by	2001	2002	2003	2004	2005	Total
<i>Ornithoptera paradisea</i>	bodies	pairs	R	Importer				100		100
				Exporter						
		-	R	Importer				1		1
				Exporter						
<i>Ornithoptera priamus</i>	bodies	-	R	Importer		188				188
				Exporter						
<i>Ornithoptera urvillianus</i>	bodies	pairs	R	Importer		42		361		403
				Exporter						
		-	F	Importer		200				200
				Exporter						
			R	Importer	302	92	451			845
				Exporter						
			W (b)	Importer	100					100
				Exporter						
<i>Ornithoptera victoriae</i>	bodies	pairs	R	Importer		20		214		234
				Exporter						
		-	R	Importer	286	50	197		75	608
				Exporter						
			W (b)	Importer	2	100				102
				Exporter						
	live	-	R	Importer			94			94
				Exporter						
<i>Ornithoptera victoriae reginae</i>	bodies	-	R	Importer			4			4
				Exporter						
Total				Importer	724	692	1296	676	75	3463
				Exporter						

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