



Final Report

Input Process for Invasive Alien Species (IAS) Database (Animal and Fish IAS)

2011

Food and Agriculture Organization of the United Nations
Badan Karantina Pertanian, Kementerian Pertanian
Center for Indonesian Veterinary Analytical Studies



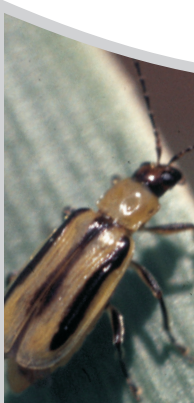


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REPORT

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Table of Content

1. Introduction	1
1.1. Background	1
1.2. Objective	2
1.3. Output	2
2. Project Implementation	3
2.1. Duration	3
2.2. Preparation and Meeting	3
2.3. Database Development	3
2.3.1 Data Collection	3
2.3.2 Data Translation	4
2.3.3 Data Upload	4
2.3.4 Data Verification and Publication	4
3. Evaluation	5
3.1. Data Collection	5
3.2. Data Upload and Verification	5
4. Recommendation	6

List of Table

Table 1. Number of Species Compiled for Database	4
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List of Figure

Figure 1. IAS Database Development 3

List of Annex

Annex 1. List of Invasive Alien Species Animal and Fish	7
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Introduction

1.1. Background

The spread of Invasive Alien Species (IAS) is now recognized as one of the greatest threats to the ecological and economic well being of the planet. Biological invasion by alien species constitutes one of the leading threats to natural ecosystems and biodiversity, and they also impose an enormous cost on agriculture, forestry, fisheries, and other human enterprises, as well as human health. The effects of alien species on native species and ecosystems are numerous and usually irreversible. Many local species are extinct or at the risk of being out-competed by invasive species and many native ecosystems have been irreversibly lost to invasion. Rehabilitation and renewal of degraded environments and extinct local organisms are not easy and sometimes impossible.

These effects are exacerbated by global change and chemical and physical disturbance to species and ecosystems. Expanding global trade has allowed the transport of species to various parts of the world. Natural barriers such as oceans, mountains, rivers, and deserts that allowed the intricate co-evolution of species and the development of unique ecosystems have been breached over the past five centuries, especially during the twentieth century, by rapidly accelerating human trade and travel. Plane, ships, and other forms of modern transportations have allowed both intentional and unintentional movement of species between different parts of globe, often resulting to unexpected and sometimes disastrous consequences. Despite the issue, not all alien species are harmful. Some species are naturalized and have adapted well to the local environment, while some become invasive.

Indonesia, with its many large and small islands, has a great diversity of animal and plants. However, natural disasters, logging and other activities destroy the habitat and reduce biodiversity. Further protecting our biodiversity from possible external threats is also part of our moral obligation. The convention on Biological Diversity (CBD) declared in 1992, in which the issue on invasive alien species was raised, was ratified by the Indonesian government in 1994.

The records on invasive species in Indonesia are few and dispersed. Of all the known invasive species, many have yet been introduced to Indonesia and therefore pose a continuous threat of possible future incursion. Preventive actions must be installed and identification of potential invasive alien species is at the front line. Learning and gathering information of alien species invasion in other countries will help prepare Indonesia prevent breach. A species known to be invasive in a certain area has a great probability of being invasive in other similar areas somewhere in the globe. So compiling and exchanging information on what species are considered invasive between countries would help to identify incoming invasive alien species.

1.2. Objective

The objective of this project is to develop a database of 342 invasive animal and fish species in Indonesian language and upload the database to the provided website.

1.3. Output

The main outputs of the “Project” are systematic description of fish and other animals species (as advised by IT National Consultant) to be posted and entered into MoA IAS Database (website).

Project Implementation

2.1. Duration

The project was started on April 15, 2011, and ended on July 8, 2011.

2.2. Preparation and Meeting

The project prepared data input procedures, web forms, and aligned perceptions on terms in the web form. A total of 8 meetings were held at the Agriculture Quarantine Agency, Cilangkap Fish Quarantine Center, and CIVAS to coordinate database development, web form preparations, database management, and species list.

2.3. Database Development

Data was collected from various resources and reference, mainly the global invasive species database (ISSG), other sources in the internet, books, articles, reprints, and others. The data collected was then translated into Indonesian language and uploaded to the web form prepared. After upload, the data is verified online by appointed consultants. After verification, data is published for general access. Below is the IAS database development flow chart (Figure 1).

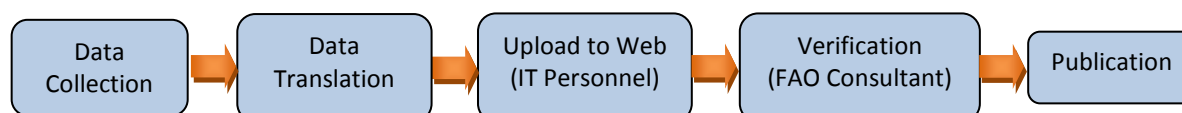


Figure 1. IAS Database Development

2.3.1 Data Collection

Species data was collected and compiled by CIVAS, the Agriculture Quarantine Agency, and the Fish Quarantine Center. A total of 342 species of invasive animals and fish have been compiled. The species in detail is available in Table 1 below.

Table 1. Number of Species Compiled for Database

No.	Class	Total (species)
1.	Mammal	40
2.	Bird	31
3.	Reptile	30
4.	Arachnid	4
5.	Insect	80
6.	Centipede/millipede	2
7.	Mollusk	32
8.	Flatworm	1
9.	Annelid	11
10.	Nematode	1
11.	Amphibian	11
12.	Fish	58
13.	Sea star	2
14.	Crustacean	18
15.	Jellyfish	1
16.	Comb Jelly	1
17.	Microorganism	19
TOTAL		342

2.3.2 Data Translation

All data gathered was translated into Indonesian language, except for the vernacular name (English) and taxonomy (Latin).

2.3.3 Data Upload

In the beginning of the project, data was uploaded directly to the web form by the IT consultant after receiving verified data from verifiers. Initially, the data was first verified before uploaded. By July 7, 2011, a total of 17 species (16 mammals and 1 aves) have been uploaded, but mistakes were still found in the entry.

2.3.4 Data Verification and Publication

By the time this report was written, not all data have been verified due to technical problems in the web form and server. Data verification is conducted by FAO consultants. The database is published after verification is complete.

3

Evaluation

3.1. Data Collection

Data collection could not be finished according to target (15 June 2011). The database was completed on July 7, 2011. This delay was because input officers had other work priorities, particularly for government officers with main duties and functions (Tupoksi). Also, the limited time provided and unstandardized database format both contributed to the delay in data collection.

3.2. Data Upload and Verification

In inputting the database, verification was conducted before the data was uploaded, when in truth the data should have been uploaded first before verified. This change in procedure was taken because the web form was not functioning well, while the database had to be finished in time.

Until now, database uploading and verification is still not complete because of mismatch in the data details and technical issues in the web form, making it inaccessible.

4

Recommendation

Below are a number of improvements recommended:

1. Testing and troubleshooting of the web form should be conducted earlier, so it could be used in time for online data input.
2. Standard format for the data input should be agreed beforehand so data collected would be uniform.

ANNEX

Annex 1. List of Invasive Alien Species Animal and Fish

List of Invasive Alien Species Mammal

No	Species	No	Species	No	Species
1	<i>Axis axis</i>	15	<i>Lama guanicoe</i>	29	<i>Ovis ammon</i>
2	<i>Bos taurus</i>	16	<i>Lepus americanus</i>	30	<i>Ovis aries</i>
3	<i>Canis lupus</i>	17	<i>Lepus europaeus</i>	31	<i>Procyon lotor</i>
4	<i>Capra hircus</i>	18	<i>Lycalopex griseus</i>	32	<i>Rangifer tarandus</i>
5	<i>Castor canadensis</i>	19	<i>Macaca Fascicularis</i>	33	<i>Rattus exulans</i>
6	<i>Cervus elaphus</i>	20	<i>Macaca mulatta</i>	34	<i>Rattus norvegicus</i>
7	<i>Cervus timorensis</i>	21	<i>Mus musculus</i>	35	<i>Rattus rattus</i>
8	<i>Cricetomys gambianus</i>	22	<i>Mustela erminea</i>	36	<i>Sciurus carolinensis</i>
9	<i>Equus asinus</i>	23	<i>Mustela furo</i>	37	<i>Suncus murinus</i>
10	<i>Equus caballus</i>	24	<i>Mustela nivalis</i>	38	<i>Sus scrofa</i>
11	<i>Erinaceus europaeus</i>	25	<i>Myocastor coypus</i>	39	<i>Trichosurus vulpecula</i>
12	<i>Erythrocebus patas</i>	26	<i>Neovison vison</i>	40	<i>Vulpes vulpes</i>
13	<i>Felis catus</i>	27	<i>Odocoileus virginianus</i>		
14	<i>Herpestes javanicus</i>	28	<i>Oryctolagus cuniculus</i>		

List of Invasive Alien Species Bird

No	Species	No	Species	No	Species
1	<i>Acridotheres fuscus</i>	12	<i>Corvus splendens</i>	23	<i>Passer domesticus</i>
2	<i>Acridotheres tristis</i>	13	<i>Cygnus olor</i>	24	<i>Pitangus sulphuratus</i>
3	<i>Alectoris chukar</i>	14	<i>Estrilda astrild</i>	25	<i>Porphyrio porphyrio</i>
4	<i>Anas platyrhynchos</i>	15	<i>Gallus gallus</i>	26	<i>Psittacula krameri</i>
5	<i>Anser anser</i>	16	<i>Gallus varius</i>	27	<i>Pycnonotus cafer</i>
6	<i>Branta canadensis</i>	17	<i>Gymnorhina tibicen</i>	28	<i>Pycnonotus jocosus</i>
7	<i>Bubo virginianus</i>	18	<i>Leiothrix lutea</i>	29	<i>Streptopelia decaocto</i>
8	<i>Bubulcus ibis</i>	19	<i>Molothrus ater</i>	30	<i>Sturnus vulgaris</i>
9	<i>Carpodacus mexicanus</i>	20	<i>Molothrus bonariensis</i>	31	<i>Zosterops japonicus</i>
10	<i>Circus approximans</i>	21	<i>Myiopsitta monachus</i>		
11	<i>Columba livia</i>	22	<i>Oxyura jamaicensis</i>		

List of Invasive Alien Species Arachnid

No	Species
1	<i>Dysdera crocata</i>
2	<i>Linyphia triangularis</i>
3	<i>Raoiella indica</i>
4	<i>Varroa destructor</i>

List of Invasive Alien Species Reptile

No	Species	No	Species	No	Species
1	<i>Anolis aeneus</i>	11	<i>Anolis porcatus</i>	21	<i>Hemidactylus frenatus</i>
2	<i>Anolis carolinensis</i>	12	<i>Anolis richardii</i>	22	<i>Hemidactylus mabouia</i>
3	<i>Anolis cristatellus</i>	13	<i>Anolis trinitatis</i>	23	<i>Iguana iguana</i>
4	<i>Anolis distichus</i>	14	<i>Anolis wattsi</i>	24	<i>Norops grahami</i>
5	<i>Anolis equestris</i>	15	<i>Boa constrictor imperator</i>	25	<i>Norops sagrei</i>
6	<i>Anolis extremus</i>	16	<i>Boiga irregularis</i>	26	<i>Python molurus bivittatus</i>
7	<i>Anolis garmani</i>	17	<i>Caiman crocodilus</i>	27	<i>Ramphotyphlops braminus</i>
8	<i>Anolis leachii</i>	18	<i>Chamaeleo jacksonii</i>	28	<i>Trachemys scripta elegans</i>
9	<i>Anolis lineatus</i>	19	<i>Elephe guttata</i>	29	<i>Varanus indicus</i>
10	<i>Anolis maynardi</i>	20	<i>Gymnophthalmus underwoodi</i>	30	<i>Varanus niloticus</i>

List of Invasive Alien Species Insect

No	Species	No	Species	No	Species
1	<i>Acnemia bifida</i>	28	<i>Gonipterus scutellatus</i>	55	<i>Philornis downsi</i>
2	<i>Acromyrmex octospinosus</i>	29	<i>Harmonia axyridis</i>	56	<i>Polistes chinensis antennalis</i>
3	<i>Adelges piceae</i>	30	<i>Hemiberlesia pitysophila</i>	57	<i>Quadrastichus erythrinae</i>
4	<i>Adelges tsugae</i>	31	<i>Homalodisca vitripennis</i>	58	<i>Radumeris tasmaniensis</i>
5	<i>Aedes aegypti</i>	32	<i>Hoplochelus marginalis</i>	59	<i>Scyphophorus acupunctatus</i>
6	<i>Aedes albopictus</i>	33	<i>Hylastes ater</i>	60	<i>Sirex noctilio</i>
7	<i>Agrilus planipennis</i>	34	<i>Hyphantria cunea</i>	61	<i>Solenopsis geminata</i>
8	<i>Anoplolepis gracilipes</i>	35	<i>Icerya purchasi</i>	62	<i>Solenopsis invicta</i>
9	<i>Anopheles quadrimaculatus</i>	36	<i>Ips typographus</i>	63	<i>Solenopsis papuana</i>
10	<i>Anoplophora chinensis</i>	37	<i>Lasius neglectus</i>	64	<i>Solenopsis richteri</i>
11	<i>Anoplophora glabripennis</i>	38	<i>Linepithema humile</i>	65	<i>Tapinoma melanocephalum</i>
12	<i>Anthonomus grandis</i>	39	<i>Lymantria dispar</i>	66	<i>Technomyrmex albipes</i>
13	<i>Apis mellifera scutellata</i>	40	<i>Maconellicoccus hirsutus</i>	67	<i>Solenopsis papuana</i>
14	<i>Aulacaspis yasumatsui</i>	41	<i>Monomorium destructor</i>	68	<i>Solenopsis richteri</i>
15	<i>Bactrocera tryoni</i>	42	<i>Monomorium floricola</i>	69	<i>Tapinoma melanocephalum</i>
16	<i>Bemisia tabaci</i>	43	<i>Monomorium pharaonis</i>	70	<i>Technomyrmex albipes</i>
17	<i>Brontispa longissima</i>	44	<i>Myrmica rubra</i>	71	<i>Tetropium fuscum</i>
18	<i>Cactoblastis cactorum</i>	45	<i>Nylanderia (=Paratrechina) pubens</i>	72	<i>Trogoderma granarium</i>
19	<i>Calliphora vicina</i>	46	<i>Ochlerotatus japonicus japonicus</i>	73	<i>Tomicus piniperda</i>
20	<i>Ceratitis capitata</i>	47	<i>Ooapterus soledadinus</i>	74	<i>Toumeyella parvicornis</i>
21	<i>Cinara cupressi</i>	48	<i>Oracella acuta</i>	75	<i>Trechisibus antarcticus</i>
22	<i>Coptotermes formosanus</i>	49	<i>Orthezia insignis</i>	76	<i>Trogoderma granarium</i>
23	<i>Culex quinquefasciatus</i>	50	<i>Orthotomicus erosus</i>	77	<i>Vespa velutina nigrithorax</i>
24	<i>Dendroctonus valens</i>	51	<i>Oryctes rhinoceros</i>	78	<i>Vespula germanica</i>
25	<i>Dendrolimus sibiricus</i>	52	<i>Paratachardina pseudolobata</i>	79	<i>Xylosandrus compactus</i>
26	<i>Diaphorina citri</i>	53	<i>Paratrechina longicornis</i>	80	<i>Xylosandrus mutilatus</i>
27	<i>Dysdera crocata</i>	54	<i>Pheidole megacephala</i>		

List of Invasive Alien Species Centipede/Millipede

No	Species
1	<i>Cylindroiulus latestriatus</i>
2	<i>Scolopendra morsitans</i>

List of Invasive Alien Species Mollusc

No	Species	No	Species	No	Species
1	<i>Achatina fulica</i>	12	<i>Gemma gemma</i>	23	<i>Ostrea edulis</i>
2	<i>Batillaria attramentaria</i>	13	<i>Geukensia demissa</i>	24	<i>Perna perna</i>
3	<i>Bellamyia chinensis</i>	14	<i>Helix aspersa</i>	25	<i>Perna viridis</i>
4	<i>Boonea bisuturalis</i>	15	<i>Ilyanassa obsoleta</i>	26	<i>Pomacea canaliculata</i>
5	<i>Ceratostoma inornatum</i>	16	<i>Limnoperna fortunei</i>	27	<i>Pomacea insularum</i>
6	<i>Corbicula fluminea</i>	17	<i>Littorina littorea</i>	28	<i>Potamocorbula amurensis</i>
7	<i>Crassostrea gigas</i>	18	<i>Musculista senhousia</i>	29	<i>Potamopyrgus antipodarum</i>
8	<i>Crepidula fornicata</i>	19	<i>Mya arenaria</i>	30	<i>Rangia cuneata</i>
9	<i>Dreissena bugensis</i>	20	<i>Mytilopsis leucophaeata</i>	31	<i>R apana venosa</i>
10	<i>Dreissena polymorpha</i>	21	<i>Mytilopsis sallei</i>	32	<i>Urosalpinx cinerea</i>
11	<i>Euglandina rosea</i>	22	<i>Mytilus galloprovincialis</i>		

List of Invasive Alien Species Flatworm

No	Species
1	<i>Platydemus manokwari</i>

List of Invasive Alien Species Annelid

No	Species
1	<i>Alitta succinea</i>
2	<i>Amyntas agrestis</i>
3	<i>Dendrobae na octaedra</i>
4	<i>Dendrodrilus rubidus</i>
5	<i>Ficopomatus enigmaticus</i>
6	<i>Lumbricus rubellus</i>
7	<i>Lumbricus terrestris</i>
8	<i>Octolasion tyrtaeum</i>
9	<i>Sabella spallanzanii</i>

List of Invasive Alien Species Nematode

No	Species
1	<i>Bursaphelenchus xylophilus</i>

List of Invasive Alien Species Amphibian

No	Species
1	<i>Eleutherodactylus coqui</i>
2	<i>Eleutherodactylus johnstonei</i>
3	<i>Eleutherodactylus planirostris</i>
4	<i>Gastrophryne carolinensis</i>
5	<i>Lithobates catesbeianus</i> (=Rana catesbeiana)
6	<i>Litoria aurea</i>
7	<i>Osteopilus septentrionalis</i>
8	<i>Rhinella marina</i> (=Bufo marinus)
9	<i>Scinax ruber</i>
10	<i>Scinax x-signatus</i>
11	<i>Xenopus laevis</i>

List of Invasive Alien Species Fish

No	Species	No	Species	No	Species
1	<i>Arapaima gigas</i>	21	<i>Leuciscus idus</i>	41	<i>Salmo salar</i>
2	<i>Acanthogobius flavimanus</i>	22	<i>Lutjanus kasmira</i>	42	<i>Salmo trutta</i>
3	<i>Alosa pseudoharengus</i>	23	<i>Micropterus salmoides</i>	43	<i>Salvelinus fontinalis</i>
4	<i>Ameiurus nebulosus</i>	24	<i>Misgurnus anguillicaudatus</i>	44	<i>Salvelinus namaycush</i>
5	<i>Atractosteus spatula</i>	25	<i>Morone americana</i>	45	<i>Sarotherodon occidentalis</i>
6	<i>Betta splendens</i>	26	<i>Neogobius melanostomus</i>	46	<i>Scardinius erythrophthalmus</i>
7	<i>Channa argus</i>	27	<i>Oncorhynchus mykiss</i>	47	<i>Sciaenochromis ahli</i>
8	<i>Channa marulius</i>	28	<i>Oreochromis aureus</i>	48	<i>Serrasalmus gibbus</i>
9	<i>Channa striata</i>	29	<i>Oreochromis mossambicus</i>	49	<i>Serrasalmus nattereri</i>
10	<i>Cichla ocellaris</i>	30	<i>Perca fluviatilis</i>	50	<i>Serrasalmus rhombeus</i>
11	<i>Cichlasoma urophthalmus</i>	31	<i>Petromyzon marinus</i>	51	<i>Serrasalmus spilopleura</i>
12	<i>Colomesus psittacus</i>	32	<i>Phalloceros caudimaculatus</i>	52	<i>Serrasalmus serrulatus</i>
13	<i>Colossoma macropomum</i>	33	<i>Phoxinus phoxinus</i>	53	<i>Sparus aurata</i>
14	<i>Electrophorus electricus</i>	34	<i>Polyodon spathula</i>	54	<i>Tetraodon duboisi</i>
15	<i>Esox lucius</i>	35	<i>Potamotrygonidae spp.</i>	55	<i>Tetraodon lineatus</i>
16	<i>Gambusia holbrooki</i>	36	<i>Pterygoplichthys anisitsi</i>	56	<i>Tetraodon mbu</i>
17	<i>Glyptoperichthys gibbiceps</i>	37	<i>Pterygoplichthys gibbiceps</i>	57	<i>Tetraodon miurus</i>
18	<i>Gymnocephalus cernuus</i>	38	<i>Pygopristis denticulata</i>	58	<i>Tridentiger trigonocephalus</i>
19	<i>Hypophthalmichthys molitrix</i>	39	<i>Pylodictis olivaris</i>		
20	<i>Lates niloticus</i>	40	<i>Rutilus rutilus</i>		

List of Invasive Alien Species Sea Star

No	Species
1	<i>Acanthaster planci</i>
2	<i>Asterias amurensis</i>

List of Invasive Alien Species Crustacean

No	Species	No	Species
1	<i>Artemia franciscana</i>	11	<i>Orconectes rusticus</i>
2	<i>Bythotrephes longimanus</i>	12	<i>Orconectes virilis</i>
3	<i>Carcinus maenas</i>	13	<i>Pacifastacus leniusculus</i>
4	<i>Cercopagis pengoi</i>	14	<i>Porcellio scaber</i>
5	<i>Charybdis japonica</i>	15	<i>Procambarus clarkii</i>
6	<i>Chthamalus proteus</i>	16	<i>Pseudodiaptomus inopinus</i>
7	<i>Daphnia lumholtzi</i>	17	<i>Rhithropanopeus harrisii</i>
8	<i>Elminius modestus</i>	18	<i>Sphaeroma quoianum</i>
9	<i>Eriocheir sinensis</i>		
10	<i>Hemigrapsus sanguineus</i>		

List of Invasive Alien Species Jellyfish

No	Species
1	<i>Phyllorhiza punctata</i>

List of Invasive Alien Species Comb Jelly

No	Species
1	<i>Mnemiopsis leidyi</i>

List of Invasive Alien Species Microorganism

No	Species	No	Species
1	<i>Avian Influenza Virus</i>	11	<i>Newcastle disease virus (NDV)</i>
2	<i>Avipoxvirus</i>	12	<i>Pasteurella multocida</i>
3	<i>Banana bunchy top virus (BBTV)</i>	13	<i>Plasmodium relictum</i>
4	<i>Beak and feather disease virus (BFDV)</i>	14	<i>Rinderpest virus</i>
5	<i>Candidatus Liberibacter africanus</i>	15	<i>Vibrio cholerae</i>
6	<i>Candidatus Liberibacter americanus</i>	16	<i>West Nile virus</i>
7	<i>Candidatus Liberibacter asiaticus</i>	17	<i>Xanthomonas axonopodis pv.citri</i>
8	<i>Chronic Wasting Disease (CWD)</i>	18	<i>Xylella fastidiosa</i>
9	<i>Foot-and-mouth disease virus (FMDV)</i>	19	<i>Yersinia pestis</i>
10	<i>Myxobolus cerebralis</i>		

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