

Insects

Insects

Mekong river basin has tradition of eating insects and one sees variety of insects in the market today. Insects and freshwater fish have been used as good source of protein especially among inland areas. Although modern advancement of transportation enabled to have food from distance and made insects as less important as a sole source of protein, they are still popular as food to enjoy. They can be a main dish, a snack or an appetizer so they are enjoyed by everybody from elderly to young. In the cities, insect dishes are available in markets, stalls, and eateries.

In the market, there are insects that are sold throughout year, only in certain season, and only by chance. Geographic difference plays a role and marketed insects change from area to area. Commonly seen insects are from Orthoptera, Hemiptera, Hymenoptera, Coleoptera, Lepidoptera. There are even insects that are very popularly consumed in Mekong river basin yet they are protected species in Japan. In this study, we recorded more than 120 species of insects, but in reality, there are more species consumed than one can see in market.

Most popular method to cook insects is frying and seasoning it with salt, fish sauce and MSG, or mix it with chili. Other than frying, they can be roasted, boiled, stir fried, steamed, eaten raw or mixed with chili paste. Also noted is an insect is cooked differently according to its development phase of egg, larva, cocoon, and adult form.

Many of insects are common species and caught in wetlands near villages. They are consumed at home as well as sold at markets in exchange of money. Some species such as silkworm (*Bombyx mori*) and house cricket (*Acheta domestica*) are cultured to enable stable supply to markets. There are suppliers that export them overseas. In this study, approximately 120 species of edible insects have been confirmed. Those species that lack detailed information are introduced with only picture and name. Our purpose here is to introduce as many species as possible.



The Collection Method

As mentioned before, many insect species are utilized as food source in Mekong river basin. Various collection methods exist according to species, seasons, and habitat. In this section, we introduce most popular collection methods.

<Light trap>

This method incorporates fluorescent light and black light which emits strong ultraviolet to be lit during night. It attracts insects with phototactic behavior. Insects fly into light and hit a piece of galvanized metal sheet or cloth set behind the light and drop into a bucket or box underneath. The bucket or box is filled with water so that fallen insects would not escape. This type of trap is often set up in one's yard where it has easy access to electric outlet. The light is shone towards waterfronts such as paddy fields. The trap is filled with water and lit in the evening, then they collect the trapped insects in the morning. It is simple and effective. Typical catches are giant water bug, predaceous diving beetle, water scavenger beetle, termite, mole cricket and others. Large insects and popular species are sorted out and others are frozen altogether to be sold at market or cooked at home. Kinds and amount of insects vary depending on the season, so some people set trap throughout year while others only collect during certain seasons.



<Night collection>

In this method, people go out at night with a light. It is a casual walk to paths, forest fridge, or paddy field near the village. Diurnal insects such as grasshopper which does not move at night are often caught in this method.



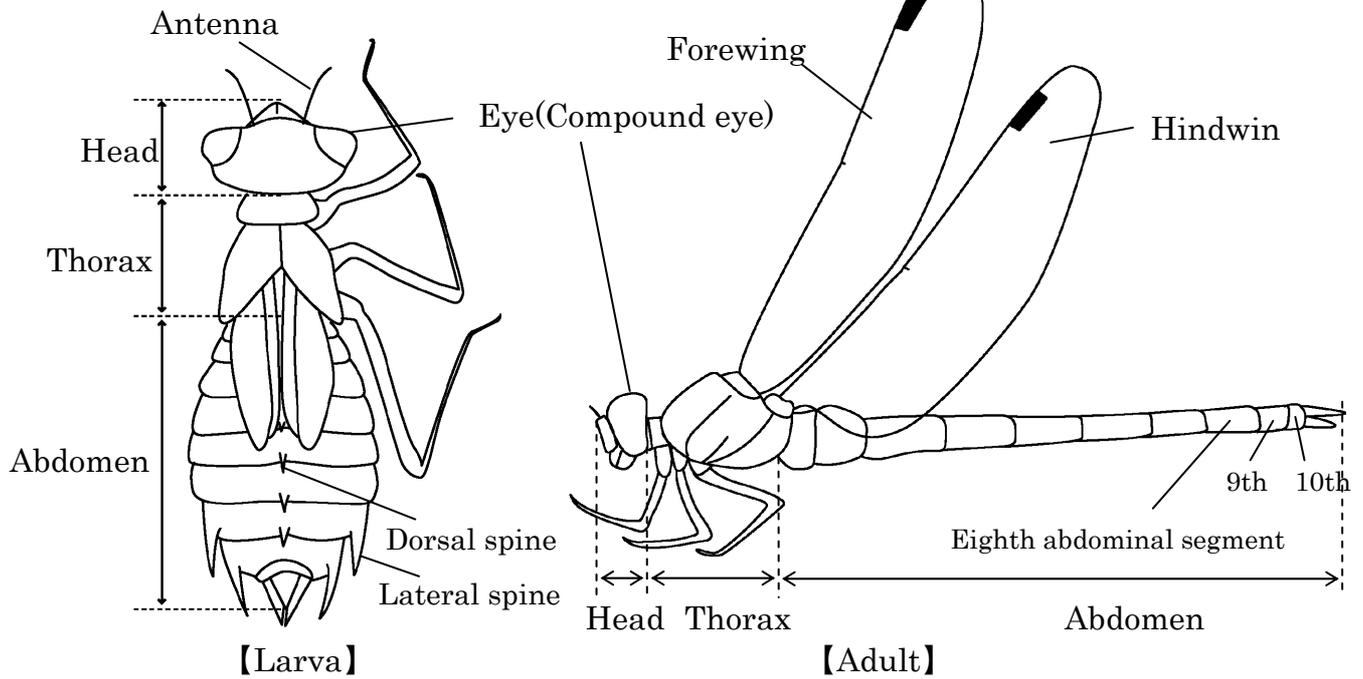
<Bamboo colander>

A round bamboo colander is used, or a handle-less net which is spread and fitted in round or triangular woven bamboo is used to scoop water in. This method is used in shallow water such as paddy or marsh. Aquatic insect such as dragonfly larva, Ferocious water bug, Water stick insect and aquatic coreoptera such as predaceous diving beetle and water scavenger beetle are popular catch. Shrimp, small fish and tadpoles are caught at the same time. It is often used by women and youth.

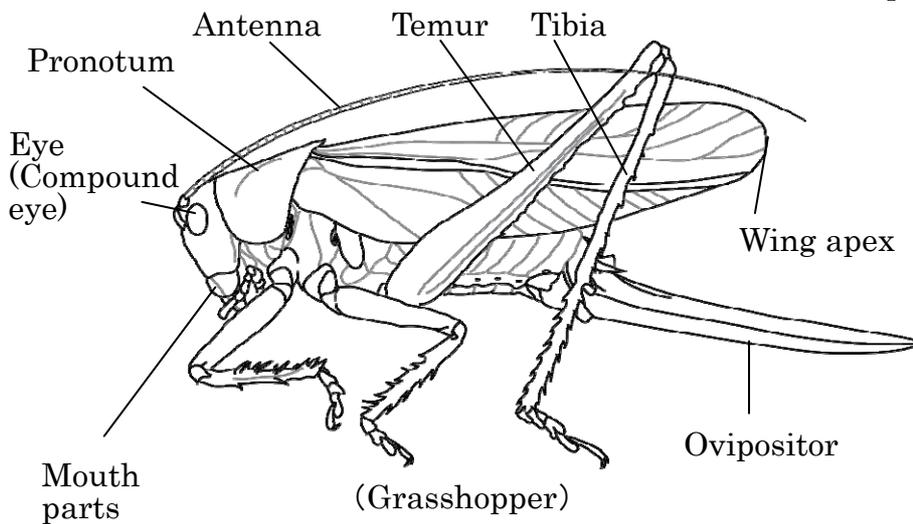


Morphology of insects

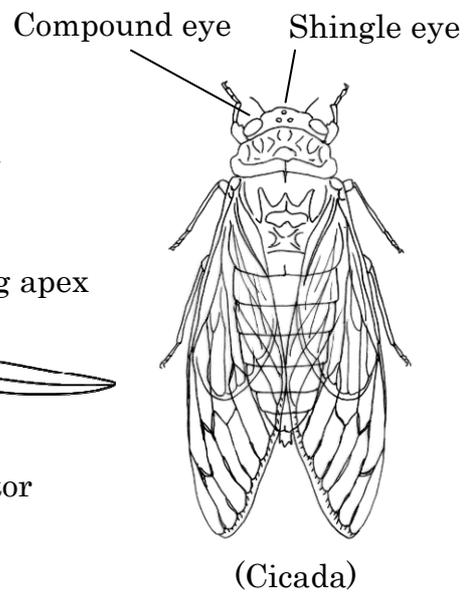
Odonata



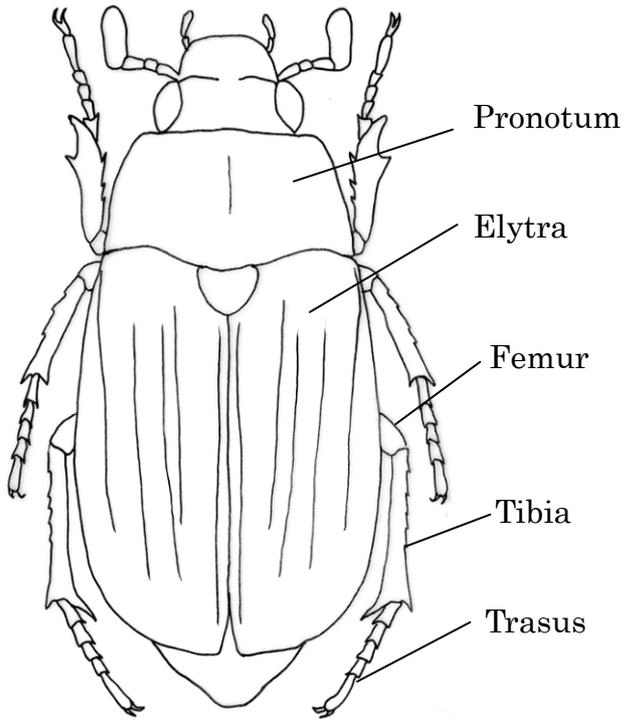
Orthoptera



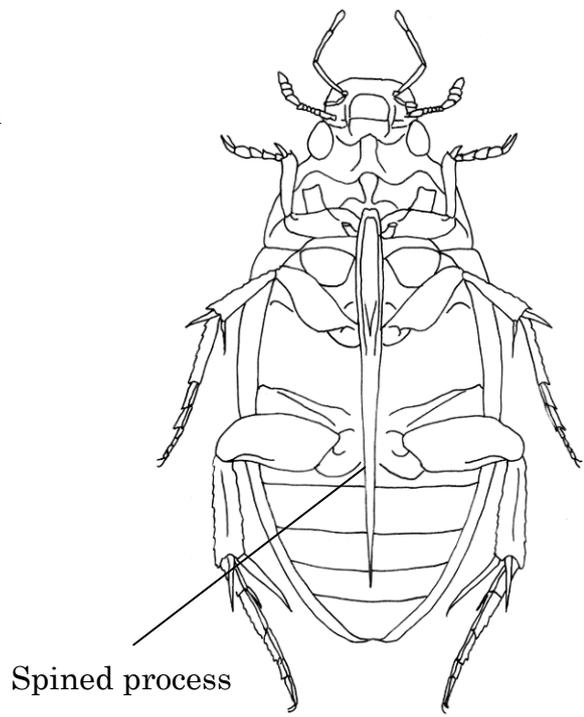
Hemiptera



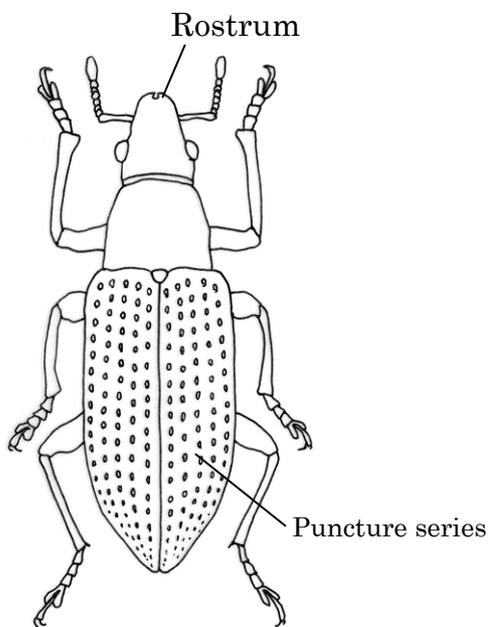
Coreoptera



(Beetle)

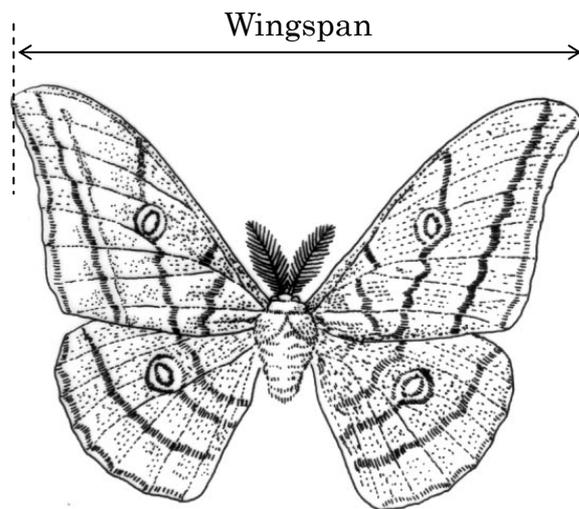


(Water scavenger beetle)



(Billbug)

Lepidoptera



(Emperor moth)

Odonata spp.

Order: Odonata
Family:

LA	<u>Maeng por, Maeng nangam,</u>	_____
	<u>Iniw</u>	_____
KH	<u>Kantomroy , Dounchy ,</u>	_____
	<u>Meichah</u>	_____
TH	<u>Tou on ma lang por bann,</u>	_____
	<u>Tou on ma lang por seau</u>	_____
VN	<u>Chuon chuon trau</u>	<u>Chuòn chuòn trâu</u>
JP	<u>Tombo (adult), Yago (larva)</u>	<u>トンボ (adult), ヤゴ (larva)</u>
Remarks		



Ephthalma frontalis frontalis
18 May.2010 Laos



Ephthalma frontalis frontalis
8 Jul.2009 Laos

Basic Information

Dragonfly larvae have completely different appearance from the adults. The body of a larva is short and thick, usually cylindrical. Larvae of *Aeshnidae* have a proportion of their body width and length as 1:5. Larvae of *Gomphidae* and *Macromiidae* have flat abdomen, and the proportion is 1 to 2:3.5. Larvae of *Libellulidae* have proportion of 1:4. Most of the species are one generation per year, and larvae are aquatic. Both adults and larvae are carnivorous.

They eat other smaller insects. Depending of the species, eggs are dropped on a water body or laid on a plant body in water. When larvae are ready for their final molt, they leave the water and crawl onto a bank where they will molt into adults. Newly emerged adults leave the aquatic environment for a while then come back when they are fully matured.

Use

The dragonfly larvae are primarily used as food. Adults are said to be eaten in some areas, but it is not a common habit. Especially in Laos, dragonfly larvae are used frequently, whereas in Cambodia, they are not a popular insect as food. Larvae are fried, stir-fried, or steamed to be served. In Lao market, steamed larvae wrapped in banana leaves are sold. Adults are roasted or fried to be eaten.

Collection of larvae is usually done by skimming them by using a colander or a hand-held net. During rain season, collection takes place at shallow water with ample aquatic vegetation, such as marshes, and during the dry season, it is done at rivers which have decreased water volume. Several species of larvae are more frequently used, such as *Aeshnidae*, *Gomphidae*, *Corduliidae*, and *Libellulidae*. They are often sold mixed with other small aquatic animals. In this section, we introduce species that are often sighted in markets and around water. It is assumed that there are many more species used as food other than those written in this report.



04 Sep. 2010 Vang Vieng Market, Vientiane Province, Laos



02 Sep. 2010 *Epopthalmia* sp.
Dong Makkai Market, Vientiane Capital, Laos



10 Jun. 2007 Dong Makkai Market, Vientiane Capital, Laos



25 Nov. 2009 Hou Kua Market, Vientiane Capital, Laos



14 Oct. 2009 Dong Makkai Market, Vientiane Capital, Laos



06 Sep. 2009 Dong Makkai Market, Vientiane Capital, Laos



09 Sep. 2010 Phon Sim, Savannakhet, Laos



19 Jan. 2013 Lak14 Market, Champasak, Laos



21 Feb 2009 Vientiane Capital , Laos



26 Jun. 2010 Mueng Song Market, Vientiane Province , Laos



Anax guttatus
16 Sep. 2007 Arak Svay, Siem Reap, Cambodia



26 Aug. 2010 Cambodia



Sinictinogomphus clavatus
Laos



Sinictinogomphus clavatus
02 Sep. 2010 Norng Bon, Vientiane Capital, Laos



Ictinogomphus decoratus melaenops
25 Nov. 2010 Vientiane Capital, Laos



Ictinogomphus decoratus melaenops
8 Jul.2009 Laos



Gomphidia perakensis
27 Jul. 2008 Nathone, Vientiane Capital, Laos



Gomphidia perakensis
Jul.2008 Vientiane, Laos



Hydrobasileus croceus
18 May.2010 Cambodia



Hydrobasileus croceus
12 Oct.2010 Laos



Orthetrum
23 Jul. 2008 Dong Makkai, Vientiane Capital ,
Laos



Orthetrum glaucum
9 Sep.2009 Laos



Orthetrum triangulare
6 May.2010 Laos



Orthetrum pruinosum neglectum
27 Jun. 2010 Phonekeo, Vientiane Province,
Laos



Orthetrum sabina sabina
16 Aug.2010 Dong Makkai, Vientiane Capital ,
Laos



Brachydiplax
27 Jul. 2008 Nathone, Vientiane Capital, Laos



Brachydiplax chalybea chalybea
9 Nov.2007 Vientiane Capital, Laos



Brachydiplax farinosa
26 Jul. 2010 Phone Ngeun, Vientiane Province,
Laos



Diplacodes trivialis
12 Sep. 2007 Phoxay, Vientiane Capital, Laos



Diplacodes trivialis
7 May.2010 Laos



Neurothemis tullia tullia
02 Sep. 2010 Vang Hou, Vientiane Capital,
Laos



Neurothemis tullia tullia
8 Nov.2007 Siem Reap, Cambodia



Tholymis tillarga
02 Sep. 2010 Norng Bon, Vientiane Capital,
Laos



Tholymis tillarga
13 Oct.2010 Laos



Pantala flavescens
04 Sep. 2010 Vientiane Province, Laos



Pantala flavescens
12 Oct.2010 Laos



Potamarcha congener
25 Jul. 2010 Na Seng, Vientiane Province, Laos



Trithemis pallidinervis
01 Aug. 2010 Napuheuy, Vientiane Province,
Laos



Trithemis aurora
26 Jul. 2010 Phone Ngeun, Vientiane Province,
Laos



Diplacodes nebulosa
26 Nov. 2009 Dong Borng, Vientiane Capital,
Laos



Brachythemis contaminata
28 Jun. 2010 Mueng Song, Vientiane Province,
Laos



Crocothemis servilia servilia
01 Aug. 2010 Napuheuy, Vientiane Province,
Laos



Rhyothemis triangularis
09 Sep. 2010 Thating Hang, Savannakhet,
Laos



Rhyothemis plutonia
22 May 2009 Houasang, Vientiane Capital,
Laos



Neurothemis fluvia
27 Jun. 2010 Phonekeo, Vientiane Province,
Laos

Gryllotalpa orientalis

Order: Orthoptera
Family: Gryllotalpidae

LA	<u>Maeng sone</u>	_____
KH	<u>Tok tol</u>	_____
TH	<u>Maeng gi son, Ma lang kra sone, Krachorn</u>	_____
VN	<u>De nhui</u>	<u>Đé nhùi</u>
JP	<u>Kera</u>	<u>ケラ</u>

Remarks

Basic Information

It is widely distributed in Southeast Asia, Australia, and Africa. Its length is 30 to 35mm. Its front legs are formed so that they are suitable to dig holes and bury itself. There is no significant difference in appearance between a male and female. It lives in burrows in the ground of paddy or farm field. Both male and female make a sound, and they communicate while being underground. It is omnivorous and eats any organic matter. Adults have tendency to fly during night and gather around the light sources. It can swim as well.

Use

It is used as food in many areas. It is often fried, roasted, or stir-fried to be served. In Laos, it is used as an ingredient of chili paste. It has neutral taste, and people like it very much. Collection is mostly done by light trap method.



30 Jun.2009 Laos



02 Jul. 2010 Phonekeo, Vientiane Province, Laos

Gryllidae spp.

Order: Orthoptera
Family: Gryllidae

LA	Chinav, Chilo, Chilli	_____
KH	Chongrat	_____
TH	Ji pon, Chi reed	_____
VN	De com	Dé côm
JP	Koorogi	コオロギ類

Remarks

Basic Information

Its body is horizontally flat with black to dark brown color, and its antennae are thin and long. Most of the species live closer to the ground surface, and many are nocturnal. Adults live hiding behind an object on the ground, or by digging a shallow hole close to the surface. It is omnivorous and feed on carcass of small animals or dead plants.

Use

Both adult and larva are used as food. It is fried, roasted, or stir-fried to be eaten. In Laos, it is used as an ingredient of chili paste.

In Thailand, it is blanched first then cooked slowly in a fish paste. Canned, fried Gryllidae spp. is also popularly distributed. Popular species that are sold in markets are large *Brachytrupes portentosus*, mid-sized *Gryllus bimaculatus*, and cultured *Acheta domesticus*. In Cambodia, *B. portentosus* is very popular, therefore it is sold at higher price than other *Gryllidae* spp.. Other species confirmed in this study are; *Teleogryllus occipitalis*, *Gymnogryllus vietnamensis*, and *Teleogryllus* sp.. The farming technology of *A. domesticus* has been studied in advance, and its farms are widely seen in many areas. The cultured crickets are fed with artificial diet, and it takes a little over one month for an egg to become ready for shipping. Other than being shipped to the markets, it is also traded as food for pet reptiles to pet stores and zoos.

Collection of Gryllidae spp. takes place at dry paddy field or grass areas by digging soil to find it in the nest.



Tarbinskiellus portentosus
9 Sep.2008 Laos



10,000kip
12 Sep. 2007 Dong Makkai Market,
Vientiane Capital, Laos



24 Jun. 2010 Laos



10 Sep. 2010 Laosou Liya, Savannakhet, Laos



06 Oct. 2010 Vientiane, Laos



15 Feb. 2010 Yang Song, Savannakhet, Laos



15 Feb. 2010 Yang Song, Savannakhet, Laos



15 Feb. 2010 Yang Song, Savannakhet, Laos



15 Feb. 2010 Yang Song, Savannakhet, Laos



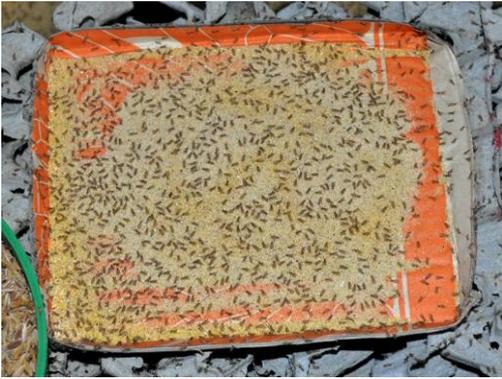
20 Sep. 2011 Na Bong University,
Vientiane Capital, Laos



20 Sep. 2011 Sokham, Vientiane Capital, Laos



20 Sep. 2011 Sokham, Vientiane Capital, Laos



20 Sep. 2011 Sokham, Vientiane Capital, Laos



Acheta domestica



Gryllus bimaculatus
19 May.2009 Cambodia



Gymnogryllus vietnamensis
19 May.2009 Cambodia



Teleogryllus occipitalis
19 May.2009 Cambodia



Teleogryllus sp.
29 Jun.2009 Laos

Mecopoda elongata

Order: Orthoptera
Family: Tettigoniidae

LA	<u>Maeng yong vo</u>	
KH		
TH		
VN	<u>Vat sanh</u>	<u>Vat sành</u>
JP	<u>Taiwan-kutsuwa-mushi</u>	<u>タイワノクツワムシ</u>

Remarks

Basic Information

It is distributed in Indo-China, tropical Asia, Taiwan, and Japan (Nansei Islands). Its length is 50 to 75mm. It lives in a grass area or on a leaf of bushes in forest fringes. It is more active during the night, and adult males make a loud sound during the night.

Use

The general use of *Gampsocleis* spp. will be described in this section. People eat only adult *Gampsocleis* spp.. It is usually fried or stir-fried to be served, and its legs are typically removed

when cooking because they tend to prick a person's mouth. *Gampsocleis* spp. is sold in markets, but it is less often seen when compared to other grasshoppers. It is popular as homemade dish, and some people really favor it in Cambodia. Large species are collected by bare hands during the night by flashing a light. It is often found in grass, in a bush, or in forest fringe along the paddy field. *Mecopoda elongate* is especially attracted to a light, so it is collected by light trap method. Small species are collected by swinging a net in the grassland. With this method, other grasshoppers will be caught as well, so they are all eaten together. Other than *Mecopoda elongate* in the *Gampsocleis* spp., *Conocephalus maculatus* is also popularly used. Other species are also used commonly.



16 Nov.2007 Vientiane Capital, Laos



12 Sep. 2007 Dong Makkai Market,
Vientiane Capital, Laos



03 Aug. 2009 Vientiane Capital, Laos



17 Sep. 2011 Sainyabuli, Laos



Conocephalus maculatus
20 Oct.2010 Laos



Ducetia curciata
9 Sep.2008 Laos



Euconocephalus gracilis
18 May.2009 Cambodia



Holochlora venosa
26 Jun.2009 Laos



Pyrgocorypha sp.
26 Jun.2009 Laos

Cryptanthacris tatarica

Order: Orthoptera
Family: Acrididae

LA	<u>Takten thong</u>	_____
KH	<u>Kon dob krohom, Kon dob para</u>	_____
TH	<u>Tak ka tan lai</u>	_____
VN	<u>Cao cao vo, Chau chau</u>	<u>Cào cào vò, châu châu</u>
JP	<u>Tsuchi-inago</u>	<u>ツチイナゴの一種</u>

Remarks

Basic Information

Female length is about 52mm to the end of wings. Male length is about 4.2cm to the end of wings. Its body is grayish brown and has distinct dark brown mottle.

Use

The general use of *Acrididae*, and *Pyrgomorphidae* in *Orthoptera* spp. will be described in this section. Only adults are used as food, and it is fried to be served most of the time. Variety of seasonings are used such as dipping sauce of MSG and fish sauce, salting to fry, frying with leaves of *Citrus hystrix* as a flavor, or frying chili together to make it spicy.

When eating larger grasshoppers, their legs are removed because they tend to prick a person's mouth. Smaller ones are sometimes stir-fried with other grasshoppers. Larger ones are collected by bare hands at night by flashing a light. *Cryptanthacris tatarica* is a species particularly collected well by this method. Smaller ones are caught by swinging a net in grass areas. In this method, other grasshoppers are caught in the net as well, so they are all eaten together. Other species that are seen in the markets are *Chondracris rosea*, *Patanga succincta*, and *Oxya japonica japonica*. Other species which we could not confirm in the markets are eaten in the same way. Confirmed species are described with basic information below. Some of other unconfirmed species are introduced by pictures.



24 Sep.2008 Cambodia



12 Sep. 2009 Dong Makai Market,
Vientiane Capital, Laos

Chondracris rosea

Order: Orthoptera
Family: Acrididae

LA	<u>Takten, Maeng meuin</u>	_____
KH	<u>Kon dob kiew</u>	_____
TH	<u>Tak ka tan kha daeng</u>	_____
VN	<u>Cao cao</u>	<u>Cào cào</u>
JP	<u>Taiwan-oo-batta</u>	<u>タイワンオオバッタ</u>

Remarks

Basic Information

Female length is about 60mm to the end of wings. Male length is about 45mm.

4 Sep.2008 Laos

Its body is bright green, with yellowish brown compound eyes. It is usually found in tall grass areas and on the leaves of bushes along the forest edge. It flies away when approached by a human. It is mostly active in a daylight.



Patanga succincta

Order: Orthoptera
Family: Acrididae

LA	<u>Takten thong</u>	_____
KH	<u>Kon dob krohom</u>	_____
TH	<u>Tak ka tan pa tan ga</u>	_____
VN	<u>Cao cao</u>	<u>Cào cào</u>
JP	<u>Taiwan-tsuchi-inago</u>	<u>タイワンツチイナゴ</u>

Remarks

Basic Information

Female has about 53mm body length to the end of abdomen, about 70mm to the end of wings.

24 Sep.2008 Cambodia

Its body is light brown. Its forewings are generally thin and long. Part where wings extend past abdomen is distinctively longer than that of other species. From its dorsal side of prothorax toward an area where forewings overlap is colored grayish brown. Its prothorax has distinctive vertical and broad dark brown bands when seen from the side.



Oxya japonica japonica

Order: Orthoptera
Family: Acrididae

LA	<u>Takten thong</u>	_____
KH	<u>Kon dob smau</u>	_____
TH	<u>Tak ka tan kheow</u>	_____
VN	<u>Cao cao xanh, Chau chau</u>	<u>Cào cào xanh, Châu châu</u>
JP	<u>Hanenaga-inago</u>	<u>ハネナガイナゴ</u>

Remarks

Basic Information

It is distributed in Southeast Asia, China, Taiwan, India and Sri Lanka.

Male has a body length of about 17 to 34mm (to the end of wings), and female 21 to 40mm. Individuals differ in coloration of their body and dorsal side; either yellow green or yellow brown. In general its body is glossy. There is a dark brown band from behind the compound eyes to the side of the wings when folded. Both adults and larvae live in a paddy field and surrounding wet grasslands. They favor eating leaves of gramineous plants.



26 Jun.2009 Laos



19 Nov. 2009 Thong Khan Kham Market, Vientiane Capital, Laos



31 May 2009 Na Ngom, Vientiane Capital, Laos



26 May 2009 Na Khan, Louang Phrabang, Laos



25 Jun. 2010 Don Makkai, Vientiane Capital, Laos



Crytoanthacris tatarica
25 Jun. 2010 Don Makkai, Vientiane Capital, Laos



Crytoanthacris tatarica
25 Jun. 2010 Don Makkai, Vientiane Capital, Laos



24 Jun. 2010 Hong Kae, Vientiane Capital, Laos



Atractomorpha sp.
Cambodia



Tagasta sp.
Laos



Acrida sp.
Laos



Aiolophus thalassinus tamulus
Cambodia



Calephorus vitalisi
Cambodia



Catantops pinguis
Laos



Choroedocus sp.
Laos



Eyprepocnemis sp.
Laos



Gastrimargus marmoratus
08 Sep. 2008 Laos



Hieroglyphus banian
Cambodia



Locusta migratoria
04 Sep. 2008 Laos



Patanga luteicornis
24 Sep. 2008 Cambodia



Phlaeoba antennata
Sep.2007 Vientiane, Laos



Pternoscirta sp.
Sep.2007 Vientiane, Laos



Trilophidia annulata
Sep.2007 Vientiane, Laos



Valanga nigricornis
Sep.2007 Vientiane, Laos



Xenocatantops humilis
Sep.2007 Vientiane, Laos

Cicadidae spp.

Order: Hemiptera
Family: Cicadidae

LA	Chakchan	_____
KH	Rey, Dong kau duong	_____
TH	Juk jan, Ma lang e	_____
VN	Ve sau	Ve sấu
JP	Semi	セミ類

Remarks

Basic Information

Many of the adults of this species have wings that are membranous and transparent. The abdomen of males serve as a sounding organ and their abdominal cavity is hollow to serve as a resonance chamber. Females use the tip of their abdomen to scratch a tree branch to lay eggs. After the larvae emerge, they descend to the ground by themselves, and go underneath the soil through cracks on the surface. They stay there and grow slowly over a few years. When it is closer to the final molt, they emerge to the surface during the evening to the night, then climb on a tree or a grass to molt as adults.

When matured, males sing to attract females in order to mate.

Use

In Laos and Thailand, several species of adults and larvae are used. Its culinary use in Cambodia was not confirmed in this study. Adults are often fried to eat, and sometimes roasted ones are served with salt. Larvae are also fried and served. In this study, 4 genus and 6 species are confirmed, however, it is assumed that more species are being used. Adults are collected by using a hand-held net with a long handle, a slingshot, a birdlime, or hand-collected by shaking trees during the night. In the Lao mountainous region, there is the method to lure in imitation sound of the cicada voice by bamboo. In Laos, they use Ton Yang as a birdlime, which is made by adhesive resin extracted from woody vines. Using Ton Yang, a collector catches newly emerged adults when they come to acquire water from the moist ground along the Mekong River. He can collect more than 10 *Meimuna subviridissima* in a matter of 5 minutes. Larvae are collected by digging the base of a tree with a hoe. In Vientiane Prefecture, Laos, they were collected in forests around paddy fields during the dry period. People can collect 20 to 30 larvae in an hour.



Macrosemia umbrata
21 Oct.2010 Laos



19 Nov. 2009 Dong Makkai Market,
Vientiane Capital, Laos



Macroseмия tonkiniana
21 Oct.2010 Laos



Meimuna subviridissima
14 Apr.2010 Laos



Muda sp.
21 Oct.2010 Laos



Platylomia bocki
2 Dec.2010 Laos



Pomponia sp. (aff. *linearis*)
28 Nov.2007 Vientiane Capital, Laos



17 Nov.2008 Laos



Apr.2010 Vientiane Capital, Laos



19 Nov. 2009 Dong Makkai Market, Vientiane Capital, Laos



18 Feb. 2010 Morpou, Champasak, Laos



18 Feb. 2010 Morpou, Champasak, Laos



18 Feb. 2010 Morpou, Champasak, Laos



Meimuna subviridissima
18 Feb. 2010 Morpou, Champasak, Laos



27 Nov. 2009 Dong Makkai, Vientiane Capital, Laos



27 Nov. 2009 Dong Makkai, Vientiane Capital, Laos



27 Nov. 2009 Dong Makkai, Vientiane Capital, Laos



27 Nov. 2009 Dong Makkai, Vientiane Capital, Laos

Tessaratoma quadrata

Order: Hemiptera
Family: Scutelleridae

LA	<u>Maeng kheng</u>	_____
KH	_____	_____
TH	<u>Maeng krang, Mung lum yai, Mang kheng</u>	_____
VN	<u>Bo xit nhan</u>	<u>Bo xit nhân</u>
JP	_____	_____

Remarks

Basic Information

The stink bugs have a length of 24.5mm to 34mm. Its body is relatively flat and a light yellowish brown color. It is a pest for longan and lychee trees; therefore, it can be easily found in and around a longan orchard. It feeds on plant sap by inserting a needle-like sucking mouthparts on a leaf vein or the stem of a plant. Eggs are laid in a cluster on the back of a leaf. Larvae live together right after hatching, they are then dispersed to have a solitary life.

Use

Both adults and larvae are used as food.

Live and cooked ones are sold at markets. We could not confirm its use in Cambodia in this study. It is fried or stir-fried to be served. In Laos, it is a popular ingredient for chili paste, called Cheo, and served with sweet rice. Other edible stink bugs tend to have a distinct aroma, but this species is found to be less aromatic. Adults and larvae that are on longan and lychee trees are collected by insect nets. In Laos, a larger amount is collected just before the rain season. From April to June, 3 to 4kg can be collected per day.



26 May 2009 Khouathi, Louang
Phrabang, Laos



5,000kip
13 Feb. 2010 Tha Heua Market, Louang
Phrabang, Laos



26 May 2009 Khouathi, Louang Phrabang, Laos



26 May 2009 Khouathi, Louang Phrabang, Laos



17 Sep. 2011 Sampana, Vientiane Capital, Laos



17 Sep. 2011 Sampana, Vientiane Capital, Laos



13 Feb. 2010 Tha Heua Market, Louang Phrabang, Laos



15 Feb. 2010 Savan Say Market, Savannakhet, Laos



29 Jun. 2010 Dong Borng, Vientiane Capital, Laos



(Cheo-Maeng khen)
17 Sep. 2011 Sampana, Vientiane Capital, Laos

Leptocorisa spp.

Order: Hemiptera
Family: Coreidae

LA	<u>Maeng kheng khao</u>	_____
KH	_____	_____
TH	<u>Ma lang singh</u>	_____
VN	<u>Bo xit hoi</u>	<u>Bọ xít hôi</u>
JP	<u>Kumo-heri-kamemushi</u>	<u>クモヘリカメムシ属の一種</u>

Remarks

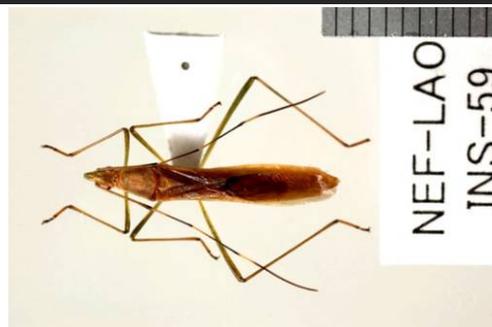
Basic Information

Its length is 14 to 17mm. The body is slender overall. It has a pale green body with brown wings when alive, but the green part changes to yellow when it dies. It lives in gramineous grassland or near the paddy field, and sucks on plant sap from the plant spikes. Its Lao name, “khao”, means rice, since it is often found around rice paddies.

Use

Adults are used as food in Laos. It is fried or roasted and also used as an ingredient for chili paste. It has the distinctive fruity aroma of stink bugs.

The collection takes place at night. Adults are inactive at night, so a collector walks by shining a light to catch them.



Leptocorisa sp.
21 Nov.2007 Vientiane Capital, Laos



Leptocorisa sp.
10 Jun. 2007 Dong Makkai Market,
Vientiane Capital, Laos

Coreidae sp.

Order: Hemiptera
Family: Coreidae

LA	<u>Maeng kheng ka po</u>	_____
KH	_____	_____
TH	<u>Mung nug kran</u>	_____
VN	<u>Bo xit nau</u>	<u>Bọ xít nâu</u>
JP	<u>heri-kamemushi</u>	<u>ヘリカメムシ科の一種</u>

Remarks

Basic Information

Its length is 15 to 18mm. Its body is a long oval shape with a dark brown color. There are three distinctive brown bands on its hind femur.

Use

Adults are eaten in Laos and Thailand. It is fried or stir-fried to be served. In Laos, it is a popular ingredient of chili paste. It is favored for its fruity aroma. Collection is done by using a tool which is a long stick with a bag attached at the end.

A collector would tap on the insect in the tree, and when it drops, he catches it in the bag. A few species within *Coreidae* sp. are confirmed, but the above pictured species is most commonly seen in the market.



20 Apr.2010 Laos



28 Jan. 2013 Thoag Mang, Vientiane Province, Laos



19 Nov. 2009 New Nong Neow Market,
Vientiane Capital, Laos



10,000kip
11 Nov. 2008 Nongsa, Vientiane Province, Laos



14 Feb. 2010 Vientiane Capital, Laos



14 Feb. 2010 Vientiane Capital, Laos



28 Jan. 2013 Don Makkai Market, Vientiane
Capital, Laos



28 Jan. 2013 Don Makkai Market, Vientiane
Capital, Laos

Drosicha sp.

Order: Hemiptera
Family: Margarodidae

LA	<u>Khai chakchan</u>	_____
KH	_____	_____
TH	<u>Phai pang</u>	_____
VN	_____	_____
JP	<u>Waraji-kaigaramushi</u>	<u>ワラジカイガラムシ属の一種</u>

Remarks

Basic Information

Its body is oval and flat. Larvae and adults have evolved into a shape that is well adapted to a parasitic life in which it attaches to the host plant. There is almost no border or joint between its head, thorax and abdomen. Its suctorial mouth is a long thread-like tube which can extend a few times more than its body length. Adults cover their body with wax coating. Only during the larva stage, can they crawl and move. While maturing, they lose their vestigial legs, antennae, eyes and become immobile. They feed on plant sap.



15 May 2009 Dong Makkai Market,
Vientiane Capital, Laos



10,000kip

15 May 2009 Dong Makkai Market,
Xaythany, Vientiane Capital, Laos

Use

It is used as food in Laos, but rarely seen in the market. It only circulates in the market in May of each year. It is fried or steamed in banana leaves. It is often mistaken for a cicada's eggs.

Lethocerus indicus

Order: Hemiptera
Family: Belostomatidae

LA	<u>Maeng da, Maeng da na</u>	_____
KH	<u>Kanteatuk</u>	_____
TH	<u>Maeng da, Malang da</u>	_____
VN	<u>Ca cuong</u>	<u>Cà cuồng</u>
JP	<u>Taiwan-tagame</u>	<u>タイワントガメ</u>

Remarks

Basic Information

It is distributed in tropical to subtropical areas in Eastern Asia and India. Its body is 60 to 90mm. Its body is oval and flat. It lives in a deep pond or a water hole with abundant aquatic plants. Eggs are laid in a pattern that surrounds a branch. The beginning of the rain season marks the peak of the egg laying season. Males protect the eggs until they hatch. The larvae and adults hide between aquatic plants, and catch aquatic insects, tadpoles and small fish by their front legs to feed.

Use

It is one of a famous edible insect in Indo-China, and is very popular. Adults have distinct aroma which resembles coriander, which is the reason it is favored. Males are supposed to be more aromatic than females, so they are traded at a higher price. Mature females with eggs are said to be as tasty as males. It is roasted, fried, or steamed to eat. It is also used as a spice to add flavor to other dishes. In Laos and Thailand, it is used as an ingredient for chili paste. In Cambodia, it is popular as a snack to go with alcohol beverages. There is even an artificial seasoning that tastes like *Lethocerus indicus*. Many methods are used to collect it: skimming it by a colander or hand net, cast net, draw net, gill net, or a light trap. In Laos, during the high season, 45 to 50 counts, sometimes 100 of these can be caught by a colander in half a day. Using a cast net, 20 to 30 counts can be collected in 1 hour.



24 Jun.2009 Laos



10,000kip

11 Jul. 2008 Dong Makkai Market,
Vientiane Capital, Laos



17 Jul. 2010 Napuheuy, Vientiane Province, Laos



28 Jun. 2010 Mueng Song, Vientiane Province, Laos



05 Sep. 2010 Vientiane Capital, Laos



02 Jul. 2010 Napuheuy, Vientiane Province, Laos



15 May 2009 Vientiane Capital, Laos



09 Sep. 2010 Phon Sim, Savannakhet, Laos



02 Jul. 2010 (Cheo-Maeng da) Ban Khun Market, Vientiane Province, Laos



02 Jul. 2010 Ban Khun Market, Vientiane Province, Laos



03 Aug. 2010 Suvarnabhumi International Airport, Thai



21 Sep 2011 Talat Sao, Vientiane Capital, Laos



29 Jan. 2013 Thalot Sao, Chanthabuly, Vientiane Capital, Laos



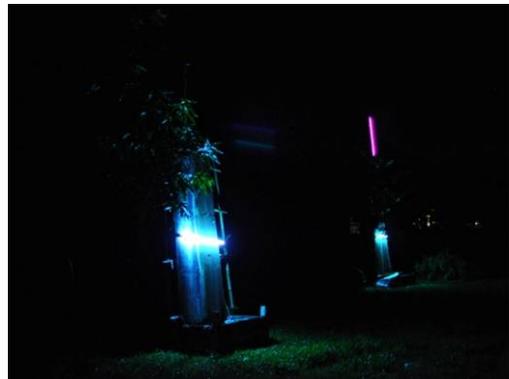
25 Jun. 2010 Dong Makai, Vientiane Capital, Laos



02 Jul. 2010 Napuhey, Vientiane Province, Laos



29 Jun. 2010 Dong Borng, Vientiane Capital, Laos



Appasus sp.

Order: Hemiptera
Family: Belostomatidae

LA	<u>Maeng khaosan</u>	_____
KH	_____	_____
TH	<u>Malang da suan</u>	_____
VN	<u>Ca cuong nho</u>	<u>Cà cuống nhỏ</u>
JP	<u>Kooimushi</u>	<u>コオイムシ科の一種</u>

Remarks

Basic Information

Its length is about 13mm. The body is flat and has an elongated oval shape with the widest part occurring at 1/3 from the caudal end. There are dark and light mottles along the edge of latter part of forewings. Adults hide under dead plants at the bottom of the water, and catch nearby aquatic insects and tadpoles or small fish by their fore legs. The life cycle of larvae is not fully known.

Use

In Laos, adults and larvae are eaten. They are fried or steamed to be served.

This species is often not eaten by itself, but rather mixed with other aquatic organisms. Collection takes place in a shallow marsh or paddy field. Hand-held nets are used, and other aquatic small animals are collected together. It is not well recognized among local people. It is often confused with *Lethocerus indicus* or *Dytiscidea* sp.. Sometimes, a *Naucoridae* sp. is caught because of its similar appearance and used in the same way.



Appasus sp.
24 Jun.2009 Laos



30 Jun. 2010 Dong, Vientiane Province,
Laos



Appasus sp.
28 Jun. 2010 Mueng Song, Vientiane Province,
Laos



Appasus sp.
28 Jun. 2010 Mueng Song, Vientiane Province,
Laos



Naucoris scutellaris
9 Jul.2009 Laos



Naucoris sp.
9 Jul.2009 Laos

Laccotrephes grossus

Order: Hemiptera
Family: Nepidae

LA	<u>Maeng ngoa nam</u>	_____
KH	<u>Kan tea</u>	_____
TH	<u>Mung mang pong nam</u>	_____
VN	<u>Bu cap nuoc</u>	<u>Bù cap nước (Bu cap nuoc)</u>
JP	<u>Taiwan-taikouchi</u>	<u>タイワンタイコウチ</u>

Remarks

Basic Information

It is distributed in Southeast Asia and China. Body length is 24 to 29mm. Its body is long, thin and flat, with a dark brown color. *L. maculatus* is the smaller species in the same family. *L. maculatus* has 16 to 18mm body length, and has a blunt beak at the base of the femur of its front legs. Adults hide in dead plants at the bottom of the water and with its front leg catch aquatic insects, tadpoles, and small fish. Its larva stage of lifecycle is not well known. Mature females lay a cluster of eggs, about 10, in the wet soil near the waterline.

It is assumed that hatched larvae molt 5 times in about 2 months, before becoming adults.

Use

Adults and larvae are used as food. It is not sold by itself, but mixed with other aquatic organisms such as shrimp, small fish, or larvae of a dragonfly. The mixture is steamed, stir-fried, or fried to be served. Due to its slenderness, this insect is not specially favored as food. It is not used in Cambodia. Other than culinary use, it is sometimes used as food for farmed fish. It is collected by using a hand net or colander in the shallow water with abundant aquatic plants such as marshes. Usually, other aquatic insects and animals are caught together. *L. maculatus* is used in the same manner.



22 Sep. 2008 Laos



24 May 2009 Phonekeo, Vientiane
Province, Laos



Laccotrephes sp.
24 May 2009 Phonekeo, Vientiane Province,
Laos



Laccotrephes sp.
24 Nov 2009 Phonekeo, Vientiane Province,
Laos



Laccotrephes sp..
24 Nov. 2009 Phonekeo, Vientiane Province,
Laos



Laccotrephes maculatus
29 Aug.2008 Laos

Ranatra longipes

Order: Hemiptera

Family: Nepidae

LA	<u>Maeng ngord nam</u>	_____
KH	<u>Chang kom</u>	_____
TH	<u>Mung mang pong num</u>	_____
VN	<u>Chom chom nuoc</u>	<u>Chôm chôm nước</u>
JP	<u>Madara-ashimizu-kamakiri</u>	<u>マダラアシミズカマキリ</u>

Remarks

Basic Information

It is widely distributed throughout Southeast Asia. It is also found in Taiwan and Japan (Ryukyu Islands).

Its body is 24 to 29mm, with a stick-like long and narrow appearance. The color varies from light brown to brown. There are 2 small blunt beaks in the middle of front leg femurs.

Use

General use is similar to that of *Laccotrephes grossus*. Both adults and larvae are used. It is stir-fried with other aquatic animals or steamed in banana leaves. Genus *Cercotmentus* in the same family is used in the same way. It is collected by a hand net or a colander in shallow waters with abundant aquatic plants such as marshes. Other aquatic animals are caught together.



10 Dec.2008 Cambodia



17 Sep.2007 Wat Preah Yesu, Siem Reap Cambodia



Cercotmentus brevipes

24 Jun.2009 Laos



Cercotmentus sp.

17 Sep.2008 Laos

Termitidae spp.

Order: Isoptera
Family: Termitidae

LA	<u>Maeng mao</u>	
KH	<u>Me pleing</u>	
TH	<u>Malang mao</u>	
VN	<u>Moi</u>	<u>Mói</u>
JP	<u>Shiroari</u>	<u>シロアリ類</u>

Remarks

Basic Information

Adult length is 6 to 20mm, with a queen of largest species reaches up to 120mm. The winged caste has brown to dark brown coloration on the dorsal side, and light colored lateral and ventral sides. Soldier caste has a larger head than worker caste and its jaw is well developed and black in color. Larvae are white. Its colony is consisted of kings and a queen and other family members, and their social life is based on division of labor. Adults possess wings only for a short period, of which they are involved in reproduction. During the mating season, some of them are attracted to lights.

Some colonies become as large as containing 300 million individuals over the period of a few years.

Use

Winged adults are used as food. They are fried or stir-fried to be eaten. In Thailand, grilled ones are sun-dried and used as preserved food. Its collection takes place in the beginning of a rain season, which is when they start to fly in clusters. At this time, when a collector sets up a light in his yard, a large number of them swarm to it.



23 Jul. 2010 Stung Treng, Cambodia



15 May 2009 Vientiane Capital, Laos

Corydalidae sp.

Order: Neuroptera
Family: Corydalidae

LA	<u>Maeng kan ter</u>	_____
KH	_____	_____
TH	<u>Maeng song kan</u>	_____
VN	_____	_____
JP	<u>Hebitombo</u>	<u>ヘビトンボ類</u>

Remarks

Basic Information

Forewings and hindwings of an adult are about the same shape. They are broader than that of a dragonfly, and the wingspan is 40 to 150mm. Larvae become 50 to 60mm at final molt. They have hard head and prothorax, and a well-developed mandible and legs. Middle and hind thorax are soft, and each segment of the abdomen has distinctive flexible protuberance. Its egg, pupa, and adult are terrestrial whereas the larva is aquatic. Larva period is usually 1 to 3 years during which it molts about 10 times and grows. During the daytime, it hides under dead leaves or small gravels in the water, and becomes active at night.

It is carnivorous and catches aquatic insects with its well-developed mandible. At the final molt, larvae leave the water and make a round room in the ground to become a pupa. A pupa emerges as an adult in about 10 days.

Use

In Laos, larvae are used as food. It is sold in the market together with other aquatic organisms, but it is not found very often. It is fried, put in soups, or skewered to be served. Sometimes it is steamed with other fish or aquatic insects. Its collection takes place at rivers and streams, but it is not intended to catch solely this species. Other aquatic animals are collected together with colanders and nets.



22 Nov. 2009 Na Kom, Vientiane
Province, Laos



24 Nov. 2009 Vang Vieng Market,
Vientiane Province, Laos

Oecophylla smaragdina

Order: Hymenoptera
Family: Formicidae

LA	<u>Mod som, Mod deng</u>	_____
KH	<u>Ang krong</u>	_____
TH	<u>Mod daeng</u>	_____
VN	<u>Kien vang</u>	<u>Kiến vàng</u>
JP	<u>Asia-tsumugi-ari</u>	<u>アジアツムギアリ</u>

Remarks

Basic Information

It is distributed in Indo-China peninsula, Malaysia, India, South China, and the Philippines. Total length is 5 to 10mm. Its body is pale, semi-transparent brown in color. Their habitat is forest, and they make a ball-shaped nest in the tree by gathering nearby leaves. Their colony is made up of a large number of ants, sometimes 500 thousand individuals. Adults are extremely aggressive, and if a human comes close to the nest, they would bite with their strong jaw. It is called “weaver ant” because it makes its nest by weaving leaves together using a thread which is secreted from its body.

Use

Adult, pupa, larva, and egg are used as food. It is stir-fried, made into a salad, put in soup or omelet to be served. In Cambodia, it is stir-fried together with a float plant *Neptunia oleracea*. It is often used to add sour flavor to a dish. In Cambodia, it is used as a medicine to condition the uterus. In Laos, it is collected in a forest near a village or a paddy field. A bag is attached at the end of a rod of about a few meters, and using the bagged end, a collector will tap the nest and catches the adult, pupa, larva and egg that are dropped into the bag. Cambodia exports a large amount of collected *Oecophylla smaragdina* to Thailand. Other than this species, use of *Clemtogaster* sp. was confirmed, but it is not often found in the markets. *Clemtogaster* sp. is used in the same way.



17 Sep.2007 Wat Preah Yesu, Siem Reap, Cambodia



16 Jan. 2013 Kham Hai Market, Khon Kaen, Thailand



24 Oct.2008 Cambodia



14 Feb. 2010 Lak2 Market, Khammouane, Laos



14 Feb. 2010 Lak2 Market, Khammouane, Laos



19 Sep.2007 Siem Reap, Cambodia



06 Nov. 2008 Dong, Prey Veng, Cambodia



02 May 2009 Nathone, Vientiane Capital, Laos



27 May 2009 Na Khan, Louang Phrabang, Laos



19 Jan. 2013 Lak14 Market, Champasak, Laos



28 Aug. 2008 Otdom, Prey Veng, Cambodia



23 May 2009 Vang Vieng, Vientiang Province, Laos



19 Jan. 2013 Ban Watlouang, Champasak, Laos



27 Jan. 2013 Vientiane Capital, Laos



14 Mar. 2009 Dong Borng, Vientiane Capital, Laos



Clematogaster sp.
14 Feb. 2010 Lak2 Market, Khammouane, Laos

Vespa affinis

Order: Hymenoptera
Family: Vespidae

LA	<u>Tor hua sua</u>	_____
KH	<u>Au mal, Koun au mal, Som boh au mal</u>	_____
TH	<u>Tor hua sua</u>	_____
VN	<u>Ong vo ve</u>	<u>Ong vò vễ</u>
JP	<u>Tsumaguro-suzumebachi</u>	<u>ツマグロスズメバチ</u>

Remarks

Basic Information

It is distributed in tropical areas of East Asia, Himalayan region, India, Southeast Asia, and New Guinea. Workers have 18 to 28mm body length with a dark brown color. Its abdomen has distinctive coloration with yellow anterior half and black posterior half. They live in secondary environment, and make their nests on a tree branch, on grass near the ground surface, on a vine up to 1m above ground, or space under the eaves of a house.



12 Sep.2008 Laos



02 Jul. 2010 Vientiane Capital, Laos

Use

Larva, pupa, and adult are used as food. In Cambodia, only the larva is used. Larvae and pupae are steamed or fried to be served. Usually, a nest itself is steamed and pupae and larvae inside are picked up to be eaten. In Thailand, it is marinated in fish sauce and being sold. This is eaten by grilling with butter and served as a snack hood of alcohol. Adults are often fried to be served. In Laos and Thailand, an alcohol beverage in which adults are pickled, is sold. Other species of *Vespa* are used in the same manner.



13 Jul. 2010 Vientiane Capital, Laos



29 Jul. 2010 Nong Yao, Vientiane Capital, Laos



29 Nov. 2009 Dong Makkai Market, Vietntiane Capital, Laos



26 May 2009 Tha Heua Market, Louang Phrabang, Laos



06 Sep. 2009 Dong Makkai Market, Vietntiane Capital, Laos



27 Jul. 2010 Dong Makkai Market, Vietntiane Capital, Laos



24 Jun. 2010 Dong Makkai Market, Vietntiane Capital, Laos



Vespa sp.
01 Dec.2010 Laos

Apis spp.

Order: Hymenoptera
Family: Apidae

LA	<u>Pheuang</u>	_____
KH	<u>Pong rout, Tak khmom</u>	_____
TH	<u>Pheung min</u>	_____
VN	<u>Ong mat</u>	<u>Ong mât</u>
JP	<u>Mitsubachi</u>	<u>ミツバチ類</u>

Remarks

Basic Information

Worker bees are about 15mm. They have a dark brown body with relatively large head which has no significant development on its hind angle. The compound eyes are large, and they reach from front angle of the head to hind angle. Antennae are relatively short. Abdomen is yellow, but it looks striped due to dark lining of a posterior edge of each segment. Bees that are kept by humans from ancient times, such as *Apis mellifera*, make a nest in closed space such as a hollow of a tree, and develop a few honeycombs that are suspended in parallel.

Bees such as *Apis dorsata* and *Apis florea* make a nest in open space with one honeycomb. One nest of *Apis mellifera* is consisted of 40 to 60 thousand workers, 200 males and one queen. The queen lays 1,500 eggs per day, and usually lives 1 to 5 years. Workers secrete wax to make perpendicular honeycombs filled with hexagonal rooms. Workers also maintain the nest, nurse the eggs and larvae, and collect flower nectar. Their life span is about 6 weeks. When a queen weakens or number of workers exceeds a certain level, colony fission (swarming) occurs.

Use

Larva and nest (honey) are used as food. Honey is especially favored in every day diet. A nest that contains larvae are cut into square bars and roasted or steamed in banana leaves to be served. It is very sweet. In Thailand, larvae marinated in fish sauce are sold. It is grilled with butter and served with alcohol.



Apis cerana
01 Dec.2010 Laos



16 Feb. 2010 Dongfai Market,
Savannakhet, Laos



19 Feb. 2010 Lak2 Market, Khammouane, Laos



13 Feb. 2010 Tha Heua Market, Louang Phabang, Laos



23 Nov. 2009 Tam Chan, Vientiane Province, Laos



21 Jan. 2013 Pakse New Market, Champasak, Laos



31 Jan. 2010 Dong Makkai Market, Vientiane Capital, Laos



29 Nov. 2009 Dong Makkai Market, Vientiane Capital, Laos



29 Nov. 2009 Dong Makkai Market, Vientiane Capital, Laos



29 Nov. 2009 Dong Makkai Market, Vientiane Capital, Laos

Heliocopris bucephalus

Order: Coleoptera
Family: Scarabaeidae

LA	<u>Chuchee, Bao</u>	
KH	<u>Kom pounng aeh</u>	
TH	<u>Chuchee bou</u>	
VN	<u>Bo hung</u>	<u>Bò hung</u>
JP	<u>Seaka-namban-daikoku-kogane</u>	<u>セアカナンバンダイコクコガネ</u>

Remarks

Basic Information

Body length is 30 to 50mm, with some large ones reaching maximum of 70mm. It is entirely black color and has a round figure. Its thickness of lateral side and width of dorsal side are about the same. Its front edge of the head broadens like a fan. Front legs are serrated which are adapted to digging. It gathers around a dung of an elephant or a water buffalo, and larvae feed on it. A pair will mate at a dung site and they dig a tunnel under the dung to make a broad chamber. Parents roll the dung to make a ball and bring it into the chamber.

Each dung ball has one egg inside. Hatched larva feeds on the dung ball and becomes pupa inside the ball. Parents stay with the ball inside the chamber during this period to keep the ball free from mold and flies.

Use

Larva, pupa and adult are used as food in southern Laos and surrounding area. Larva and pupa are mainly used, and dung balls that contain those are sold in the markets. They are fried or put in soup, stew, omelet and salad. They are gutted when cooking. Adults are fried, or roasted then ground to be put into a curry dish. Since its nature of feeding on dungs, many local people avoid eating it. Dung balls are collected mainly in dry season from November to May. It takes place in and around a paddy field. A collector tells that the high season is March through April, during which individuals are plump and taste better. The grooming chamber is sought by digging under old and dried dung of a water buffalo. A few dung balls and a female adult are found per chamber.



22 Apr. 2010 Laos



14 Feb. 2010 Boung Huana Market,
Khammouane, Laos



14 Feb. 2010 Boung Huana Market, Khammouane, Laos



17 Feb. 2010 Pakse New Market, Champasak, Laos



15 Feb. 2010 Haumeueng Toy, Savannakhet, Laos



15 Feb. 2010 Haumeueng Toy, Savannakhet, Laos



23 Jan. 2013 Watlouang, Champasak, Laos



23 Jan. 2013 Lak20, Salavan, Laos



24 Jan. 2013 Pa khaor yai, Champasak, Laos



24 Jan. 2013 Pa khaor yai, Champasak, Laos

Proagoderus mouhoti

Order: Coleoptera
Family: Scarabaeidae

LA	<u>Chuchee</u>	_____
KH	<u>Kom poulaieh</u>	_____
TH	<u>Chuchee bou</u>	_____
VN	<u>Bo hung</u>	<u>Bo hung</u>
JP	<u>Kabuto-emma-kogane</u>	<u>カプトエンマコガネ</u>

Remarks

Basic Information

Its body length is 15 to 19mm. The entire body is dark green and shiny. Adult flies and finds dungs which become food for its larva. It digs a shallow tunnel underneath the dung, and brings in the dung ball to lay one egg in it. Larva feeds on the dung ball from inside, and eventually becomes a pupa and emerges. Adult is active during daytime, but more so after evening through night, and is attracted to a light.

Use

No culinary use was confirmed in Thailand, but adult use was observed in Laos. It is fried or roasted to be eaten. People take time to clean the dung from a beetle, then soak it in the water or wash thoroughly before cooking. If this process is not thoroughly done, the odor lingers. Since it feeds on dungs, some local people avoid eating it. It is collected by picking adults that gather around dungs of a water buffalo in the early morning, or by digging underneath the dung. Collection mainly takes place around a dried paddy field during the dry season. Other than this species, adults of smaller to medium sized dung beetle are also used. Smaller species which body size is 10 to 20mm, are preferred in the markets. Other than this species, many individuals from genus *Onthophagus* are sold. Many other species are mixed and sold.



24 Jun. 2010 Hou Kua Market, Vientiane Capital, Laos



24 Jun. 2010 Hou Kua Market, Vientiane Capital, Laos



24 Jun. 2010 Hou Kua Market, Vientiane Capital, Laos



24 Jun. 2010 Hou Kua Market, Vientiane Capital, Laos



26 Jul. 2009 Vientiane Capital, Laos



26 Jul. 2009 Vientiane Capital, Laos



28 Jul. 2010 Dong Makkai, Vientiane Capital, Laos



24 Jun. 2010 Hou Kua Market, Vientiane Capital, Laos



17 Feb. 2010 *Onthophagus* spp.
Pakse New Market, Champasak Laos



30 May 2009 *Onthophagus* spp.
Dong Makai Market, Vientiane Capital, Laos



24 Nov. 2009 Phonekeo, Vientiane Province,
Laos



Onthophagus. sp.
24 Nov. 2009 Phonekeo, Vientiane Province,
Laos



24 Nov. 2009 Phonekeo, Vientiane Province,
Laos



Catharsius birmanensis
22 Apr.2010 Laos



Copris siamensis
30 Jun.2009 Laos



Copris sinicus
01 Jun.2010 Laos



Digitonthophagus bonasus
22 Apr.2010 Cambodia



Liatongus rhadamistus ♂
01 Jun.2010 Laos



Microcopris reflexus
01 Jul.2009 Laos



Onitis sp.
30 Jun.2009 Laos



Onthophagus armatus
21 Jan.2009 Laos



Onthophagus recticornutus ♀
09 Sep.2009 Laos



Onthophagus sagittarius ♂
01 Jul.2009 Laos



Onthophagus seniculus ♂
01 Jul.2009 Laos



Onthophagus sp.
09 Sep.2009 Laos



Paracopris punctulatus
01 Jun.2010 Laos

Holotrichia spp.

Order: Coleoptera
Family: Scarabaeidae

LA	<u>Maeng chee noun, Chee noun deng</u>	_____
KH	<u>Khnyong krohom</u>	_____
TH	<u>Malang chinoon</u>	_____
VN	<u>Bo ray, Ray me</u>	<u>Bọ rầy, Rầy me</u>
JP	<u>Kurokogane</u>	<u>クロコガネ属の複数種</u>

Remarks

Basic Information

Body length is 15 to 35mm. It is uniformly brown to a black color with oval shape. Larva lives underground near the surface, and feeds on plant roots. Adult is active during the daytime, and feeds on various plant leaves. Adult becomes more active after the evening, and is attracted to a light after dark.

Use

Adult is used as food. It is fried or stir-fried to be served. It is collected by placing a light in the yard.

Other than genus *Holotrichia*, culinary use of herbivorous beetles such as *Anomala*, *Apogonia*, and *Lepidiota* is confirmed. Genus *Holotrichia* is preferred in Laos, and *Anomala antique* is preferably used in northeastern Thailand. In Cambodia, it is used in only a few areas.



Holotrichia sp.
02 Dec.2010 Loas



Holotrichia sp.
16 Apr. 2010 Vientiane Capital, Laos



28 Jul.2010 Dong Makai, Vientiane Capital, Laos



10 Jun. 2007 New Nong Neow Market, Vientiane Capital, Laos



13 Feb. 2010 Dong Makai Market, Vientiane Capital, Laos



Anomala antique
02 Dec.2010 Cambodia



Anomala sp.1
02 Dec.2010 Cambodia



Anomala sp.2
02 Dec.2010 Laos



Apogonia cribricollis
02 Dec.2010 SCambodia



Lepidiota bimaculata
02 Dec.2010 Vientiane, Laos

Xylotrupes gideon tonkinensis

Order: Coleoptera
Family: Scarabaeidae

LA	<u>Maeng kham</u>	_____
KH	<u>Kanh chae</u>	_____
TH	<u>Malang kham</u>	_____
VN	<u>Kien vuong</u>	<u>Kiến vương</u>
JP	<u>Gideon-hime-kabuta</u>	<u>ギデオンヒメカブト</u>

Remarks

Basic Information

Male has a length of 35 to 80mm. Female length is 28 to 55mm. Entire body is glossy reddish brown to a black color. Females lack cephalic horn, but males have distinctive forked-horns one on the head and the other pointing forward from the center of the thorax. Larvae feed on decomposed plant material and become pupae over the period of 2 years. Adults feed on plant sap and live 2 to 4 months.

Use

Larva, pupa, and adult are used as food. In Laos, adults are used more often. Adults are cooked by removing forewings and fried or roasted. Usually the abdomen is the only part that is eaten, but since there is not much volume, it is not very popular as edible insect. Larva and pupa are marinated in coconut milk and roasted. Other than culinary use, its male is very popularly used in an insect fight in northern Thailand. Adults raised for fighting is also sold.



04 Nov. 2008 Takeo, Cambodia



12 Sep. 2007 Dong Makkai Market,
Vientiane Capital, Laos



26 Nov.2007 Vientiane Capital, Laos



10 Oct. 2009 Vientiane Capital, Laos



19 Sep. 2009 Thung Yao, Lamphun, Thailand



19 Sep. 2009 Thung Yao, Lamphun, Thailand



19 Sep. 2009 Thung Yao, Lamphun, Thailand



19 Sep. 2009 Thung Yao, Lamphun, Thailand

Cybister limbatus

Order: Coleoptera
Family: Dytiscidea

LA	<u>Tap tao, Maeng nieng,</u>	_____
	<u>Maeng cheid</u>	_____
KH	<u>Khonteh long, Dong kam bot</u>	_____
TH	<u>Doung ding</u>	_____
VN	<u>Bu nieng</u>	<u>Bù niềng</u>
JP	<u>Fuchitori-gengprou</u>	<u>フチトリゲンゴロウ</u>
Remarks		



22 Jul.2009 Laos



Cybister sp.
28 Jun. 2010 Phonekeo, Vientiane
Province, Laos

Basic Information

It is distributed in Southeast Asia, China, Taiwan, Japan (Nansei Islands), the Philippines, India and Nepal. Adult length is 32 to 35mm and has a long oval shape. Its dorsal side is shiny and black with brownish tint. There is a yellowish brown lining from lateral dorsal prothorax to the lateral forewing. Ventral side is uniformly black. Adults are carnivorous. Eggs are laid singularly in the aquatic plant tissue. In a captive life, a larva molts twice in one month before leaving the water, then it buries itself about a few to 10cm in the ground to become a pupa and emerges. Newly emerged adult comes out from the ground then starts an aquatic life.

Use

Not only this species but most of the genus *Cybister* is used as food. Adult is used in many countries, but the use of larva is only confirmed in Laos. Adult is mainly fried or stir-fried to be eaten. Hard forewings are removed when cooking. In the market, it is often found mixed with other types of *Hydrophilidae*. Larva is stir-fried, cooked, or steamed to be served. It is rarely used solely, but rather, it is cooked as a mixture with larvae of dragonfly, tadpoles, or shrimps and other aquatic organisms. Adults are collected by skimming with a hand net or a colander, or gathered by light trap method. Larvae are skimmed by a hand net or a colander. Many adults are found in the remaining puddles of dried paddy field during the dry season.



06 Sep. 2009 Dong, Vientiane Province, Laos



24 Jul. 2010 Phonekeo, Vientiane Province, Laos



Cybister sp.
27 Jun. 2010 Phonekeo, Vientiane Province, Laos



06 Sep. 2009 Dong, Vientiane Province, Laos



Cybister sp.
12 Sep. 2010 Sivilay, Vientiane, Vientiane Capital, Laos



30 May 2010 Phonekeo, Vientiane Province, Laos



Cybister sp. 28 Jan. 2013 Thoag Mang, Vientiane Province, Laos



Cybister sp.
Jan. 2013 Lak14 Market, Champasak, Laos



19 Jan. 2013 Lak14 Market, Champasak, Laos



26 Nov. 2009 Dong Bong, Vientiane Capital, Laos



24 Jul. 2008 Mai Haiyone, Vientiane Province, Laos



Cybister rugosus
01 Sep.2008 Laos



Cybister sp. 1
01 Sep.2008 Laos



Cybister sp. 2
2007 Vientiane Capital, Laos



Cybister sugillatus
2 Jul.2009 Laos



Cybister tripunctatus ssp.
2 Sep.2009 Laos

Hydrophilus bilineatus cashimirensis

Order: Coleoptera
Family: Hydrophilidae

LA	Tap tao, Maeng cheid	
KH	Khonteh long	
TH	Malang neang	
VN	Dien dien	Diên diên
JP	Kogata-gamushi	コガタガムシ

Remarks

Basic Information

Its body length is about 35mm. It has a shiny black body with slender oval shape. *Hydrophilus cavisternum* has a similar appearance to this species. Adults are often found clinging to an aquatic plant and staying still. Adults are herbivorous except for the mating season, during which they feed on animals. Females use plant fragments in the water to make an egg sac filled with eggs, called “cradle”, near the water surface. There are several tens of eggs in one egg sac. Eggs are expected to hatch in about 2 weeks. Larvae are carnivorous, catching small animals alive by their strong mandibles. After larvae molt twice, they leave the water to bury themselves in the ground and become pupae, then adults.

Newly emerged adults come out from the ground and start an aquatic life.

Use

Adults are eaten including *H. cavisternum* in the same genus. It is mainly fried or stir-fried to be served. The hard forewings and prickles on the underside are removed when cooking. Larvae are almost never used, but in Lao market, it is found occasionally mixed with larvae of dragonfly, frogs, or shrimps and other aquatic animals. Adults are skimmed and collected with a hand net or a colander. Light trap is also used for collection. Adults of *Hydrophilidae* are called by the same local name with *Dytiscidae*, and the two are not distinguished as separate species. In Laos, *Hydrophilus* and *Cybister* are considered as female and male of the same species. *Hydrophilus* is considered as males because people mistakenly recognize the spiny protuberance on the underside of its abdomen as a reproductive organ.



05 Oct.2010 Laos



Larva, *Hydrophilus* sp.
25 Jun. 2010 Dong Makai, Vientiane
Capital, Laos



Hydrophilus sp.
06 Sep. 2010 Dong, Vientiane Province, Laos



Hydrophilus sp.
25 Jun. 2010 Dong Makai, Vientiane Capital, Laos



Hydrophilus sp.
29 Nov. 2009 Dong Makai Market, Vientiane Capital, Laos



Hydrophilus sp.
06 Nov. 2008 Neak Loeung, Kandal, Cambodia



Hydrophilus bilineatus cashimirensis
27 Sep. 2010 Cambodia



Hydrophilus cavisternum
04 Oct. 2010 Laos

Sternocera sp.

Order: Coleoptera
Family: Buprestidae

LA	<u>Maeng khap</u>	_____
KH	<u>Kom phem</u>	_____
TH	<u>Malang tub</u>	_____
VN	<u>Kim quit</u>	<u>Kim quit</u>
JP	<u>Midori-futo-tamamushi</u>	<u>ミドリフトタムムシ類</u>

Remarks

Basic Information

It is a large beetle with body length of 30 to 40mm. Overall, its color is light golden green with metallic luster. Some species have reddish brown antennae and legs. A few species are distributed in Indo-China region. They are very similar in appearance, such as *Sternocera aeguisignata* and *S. ruficornis*. Their detailed ecology is not understood yet; however, larvae of *Sternocera* sp., including this species, are known to feed on plant roots in the ground. Adults are diurnal and feed on plant pollen and leaves.

Use

Adults are used as food. It is occasionally found in the markets. When cooking, its forewings are removed and the remaining is fried, roasted, or stir-fried to be served. To collect, it is picked up by hands if it is on a tree, or by shaking it off the tree. In Cambodia, it is said to be cultivated, but it is assumed to be merely protecting the host trees that the beetles feed on.



27 Nov. 2007 Vientiane Capital, Laos



Sternocera sp.

10 Sep. 2010 Chaleun Souk, Savannakhet,
Laos

Cerambycidae spp.

Order: Coleoptera
Family: Cerambycidae

LA	<u>Maeng nam fon</u>	_____
KH	_____	_____
TH	<u>Doung creem, Doung hnoud yao</u>	_____
VN	<u>Xen toc</u>	<u>Xén tóc</u>
JP	<u>Kamikirimushi</u>	<u>カミキリムシ類</u>

Remarks

Basic Information

Adult body is 40 to 70mm for larger species and about 3mm for smaller species. Medium to large sized species of more than 30mm are popularly used. In general, the body is slender and cylindrical. It is known for its long antennae, which are the longest among other beetles. When touched, it produces sound by rubbing the edge of the pronotum scraping against a file on the mesonotum. Smaller species usually matures in one year, while larger species takes 3 to 5 years to mature. Most of the species bore holes on plant materials, usually a tree, and feed on them.

Use

Larvae, pupae and adults of larger species are used as food. Adults are occasionally spotted in the markets, but it is not sold solely, but mixed with other insects. Adults are fried, stir-fried or roasted to be eaten. Hard parts such as the forewings are removed when cooking. In Thailand, larvae and pupae of *Apriona japonica* are fried or steamed in banana leaves to be served. Species that are attracted to lights are collected by light trap method. In Laos, adult use of *Dorysthenes walker*, *Hoplocerambyx spinicornis*, *Xystrocera globose*, and *Batocera davdis* are confirmed.



Dorysthenes walker
29 Jun. 2010 Dong Borng, Vientiane
Capital, Laos



Hoplocerambyx spinicornis
29 Jun. 2010 Dong Borng, Vientiane
Capital, Laos

Hypomeces squamosus

Order: Coleoptera
Family: Curculionidae

LA	<u>Maeng sang</u>	_____
KH	<u>Me ambok</u>	_____
TH	<u>Malang kom tong</u>	_____
VN	<u>Cau cau xah</u>	<u>Câu cầu xanh</u>
JP	<u>Zoumushi</u>	<u>Family ゾウムシ</u>

Remarks

Basic Information

Adult length is about 10mm. Its mouthparts are stout and short. Fresh adult is covered with shiny green scales, but eventually they all scrape off. The color of scales varies depending on the region it resides, from green, reddish copper, purple, to gray, but green individuals are most abundant. It lives in a flatland to low hill areas, and commonly found on leaves of trees along the roadside.

Use

Adults are eaten in Laos and Cambodia. It is mainly fried to be served. Insect nets with a long-pole are used to collect ones on a tree.



28 Nov.2007 Cambodia



18 Feb. 2010 Pakse New Market,
Champasak, Laos

Cryptotrachelus spp.

Order: Coleoptera
Family: Rhynchophoridae

LA	<u>Maeng kwang</u>	_____
KH	_____	_____
TH	<u>Duang mai pai</u>	_____
VN	<u>Duong tre</u>	<u>Đông tre</u>
JP	<u>Oo-osazoumushi</u>	<u>オオオサゾウムシ属の複数種</u>

Remarks

Basic Information

Adult body is 15 to 30mm. Its coloration is shiny vermillion. Larvae have a dark brown head with yellowish brown body, and they do not have legs. They feed on bamboos from inside, sometimes reaching to the outer layer and making a hole. Fully grown larvae make a simple chamber in a bamboo joint, using tree debris and become pupae then emerge.

Use

Larvae are used in Laos and Thailand. It is usually fried to be served. In Laos, people said larvae of bamboo-eating weevils have soft skin and are tastier than larvae of *Rhynchophorus ferrugineus*.

Its collection takes place in a bamboo forest, and larvae are sought inside bamboos.



Cryptotrachelus sp.
09 Sep. 2010 Thating Hang,
Savannakhet, Laos



Larva, *Cryptotrachelus* sp.
24 Sep. 2010 Phonekeo, Vientiane
Province, Laos



Crytotrachelus sp.
03 Oct. 2010 Phonekeo, Vientiane Province,
Laos



14 Oct. 2010 Phonekeo, Vientiane Province,
Laos



24 Sep. 2010 Phonekeo, Vientiane Province,
Laos



24 Sep. 2010 Phonekeo, Vientiane Province,
Laos

Rhynchophorus ferrugineus

Order: Coleoptera
Family: Rhynchophoridae

LA	Duang ton tan, Maeng kwang	_____
KH	_____	_____
TH	Duang sakoo	_____
VN	Duong dua	Đuông Dừa
JP	Yashi-oo-osazoumushi	ヤシオオオサゾウムシ

Remarks

Basic Information

It is distributed in Southeast Asia, India, China, Taiwan, Japan (Okinawa), and Papua New Guinea. Adult length is 22 to 35mm. Its body is shaped like a grain of rice. Larvae have a dark brown head with yellowish brown body, and they do not have legs. Larvae feed on palm trees, and the woody part of palm trees become powdery after larvae feed on it. When larvae have reached their full growth, they make pupal chamber by using palm fibers and pupate then emerge.



17 May 2009 Vientiane Capital, Laos



27 Jun. 2010 Phonekeo, Vientiane Province, Laos

Use

Larvae and pupae are used as food in Laos and Thailand. They are mainly fried to be served. Texture and taste are close to that of French fries. It is a pest for Palmyra Palm (*Borassus flabellifer*). It is collected from an infested, dying Palmyra Palm. It is occasionally found in the markets. Its harvesting method is being studied in universities in Thailand and Laos.

Omphisa sp.

Order: Lepidoptera
Family: Pyralidae

LA	<u>Duang mai phai, Duang mae</u>	_____
KH	<u>Dong kau neang</u>	_____
TH	<u>Rot duan, Duang mai pai,</u> <u>None mai pai</u>	_____
VN	_____	_____
JP	<u>Taketsutoga</u>	<u>タケツトガ</u>

Remarks

Basic Information

Adult wingspan is 20 to 30mm for males, and slightly larger for females. Adults fly out from bamboo stem during the night to mate and lay eggs on the surface of a young bamboo shoot. Hatched larvae gather around and move to a fresh part of the shoot in a single line and make a hole in the joint to go inside. Larvae feed on the inside tissue of a bamboo. Larvae become pupae in about 10 months. Pupae collectively hang from the joint of a bamboo, and emerge as adults after 40 to 60 days.



17 Nov. 2008 Laos



10,000kip

11 Nov. 2008 Dong Makkai Market,
Vientiane Capital, Laos

Use

Larvae are one of the frequently used edible insects, and often found in the markets. It is widely used in Laos and Thailand. In Cambodia, it is not a common edible insect, but it is popular near the border of Thailand. It is usually fried to be eaten. It is popular as a snack to go with a beer. Its collection takes place in a bamboo forest. First a collector looks for a dying bamboo stem due to the infection by this species. If there is a hole of about 2mm in diameter near the bamboo root, he would cut open the joint to check for the presence of larvae. If there are larvae, the joint one below where the larvae are is cut to fell the bamboo and extract the larvae. From one bamboo, about a cup full of larvae can be collected.



19 Nov. 2009 Dong Makkai Market, Vientiane Capital, Laos



19 Sep. 2009 Thung Yao, Lamphun, Thailand



11 Nov. 2008 Dong Makkai Market, Vientiane Capital, Laos



20 Sep. 2009 Bokeo, Laos



21 Sep. 2009 Huay Khom Nok, Chiang Rai, Thailand



21 Sep. 2009 Huay Khom Nok, Chiang Rai, Thailand



21 Sep. 2009 Huay Khom Nok, Chiang Rai, Thailand



21 Sep. 2009 Huay Khom Nok, Chiang Rai, Thailand

Bombyx mori

Order: Lepidoptera
Family: Bombycidae

LA	<u>Duck dae morn</u>	_____
KH	<u>Dok dua</u>	_____
TH	<u>Duk dae mai</u>	_____
VN	<u>Nhong tam</u>	<u>Nhông Tằm</u>
JP	<u>Kaikoga</u>	<u>カイコガ</u>

Remarks

Basic Information

Adult wingspan is 180 to 230mm. Its body and wings are covered with white scales. Larvae of popular breeds have a white body, and at full growth, they are 6 to 7cm long and weigh 5 to 6g. Larvae exclusively feed on mulberry leaves, and they molt 4 times before making a cocoon and become a pupa. Pupae emerge in about 2 weeks

Use

It is one of the most popular edible insects, and its pupa is found in the markets throughout a year. It is fried, roasted, or boiled to be served. It has distinct aroma.

In Laos, a tea made out of dried larvae dungs are sold, but it is not very popular. The pupa after having taken the silk is supplied steadily.



12 Sep 2007 Hou Kua Market, Vientiane Capital, Laos



21 Jun. 2009 Hou Kua Market, Vientiane Capital, Laos



03 Nov. 2008 Central Market, Phnom Penh, Cambodia



10 Jun. 2007 Dong Makkai Market, Vientiane Capital, Laos



21 Sep.2011 Talat Sao, Vientiane Capital, Laos, Laos



21 Sep.2011 Talat Sao, Vientiane Capital, Laos, Laos

Saturniidae sp.

Order: Lepidoptera
Family: Saturniidae

LA	<u>Douang, Duck dae morn ka beua, Ka beua</u>	_____
KH	_____	_____
TH	<u>Duk dae mai pa</u>	_____
VN	_____	_____
JP	<u>Yamamayu</u>	<u>ヤマムユガ属の一種</u>

Remarks

Basic Information

Adult wingspan is about 130mm. Its body and wings are covered with yellowish brown scales. Full grown larvae are measured 70 to 80mm, and weigh 17 to 20g. Its cocoon is milk white in color and 18mm in length. Pupae are yellowish brown to dark brown in color and 14 to 15mm in length. From one cocoon, 600 to 700m of silk thread can be produced.

Use

In Laos, pupae are used as food.

Although it is not a popular insect as food, pupae in the cocoon and pupae without cocoon are sold in the market. It is mainly fried to eat.



26 May 2009 Tha Heua Market, Louang Phrabang, Laos



26 May 2009 Tha Heua Market, Louang Phrabang, Laos

Sphingidae spp.

Order: Lepidoptera
Family: Sphingidae

LA	<u>Ka bee, Cha ruad</u>	_____
KH	_____	_____
TH	<u>Pee seu cha ruad</u>	_____
VN	_____	_____
JP	<u>Suzumega</u>	<u>スズメガ科の複数種</u>

Remarks

Basic Information

It is a medium to large sized moth, with adult wingspan measuring about 30 to 150mm. Wings are slender and long, with the forewings considerably longer than the hindwings. Its thorax is stout and streamline shaped. Its pectoral muscle is well developed, and provides strength for its ability to fly. Its body is covered with hair-like scales, and they are easily scraped off when touched. It has a long and thin mouthpart like that of butterflies, which are adapted to suck flower nectar. There are varieties of patterns on its prothorax and wings, depending on the species. In general, its forewings have dull color and patterns, while hindwings have brighter colors.

Larvae have classic shape of worms and lack major hair. They are characterized by a distinctive spiny protuberance on the posterior abdomen. Adults of many species are nocturnal, but there are species which are active during daytime or in the evening. It can fly very fast, with some species reach a speed of 50km per hour. Many are attracted to lights at night, and many are found staying there even after sunrise due to drop of temperature. Larvae live a solitary life since their early stages. They feed on various plant leaves. When touched, larvae take threatening position by raising their head and thorax high and swinging them right to left. At full growth, larvae bury themselves in the ground and become pupae without making a cocoon.

Use

In Laos, adult use was confirmed, but it is rarely seen in the markets. It is fried or stir-fried to be served. People capture the moth with other insects by using a light trap. *Sphingidae* spp. is not intended to be eaten solely but rather, cooked as mixture with other insects.



31 Jun. 2010 Dong Borng, Vientiane
Capital, Laos



01 Mar. 2009 Dong Makkai Market,
Vientiane Capital, Laos

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