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香港昆蟲學會通訊
Hong Kong Entomological Society Newsletter

Anax indicus **Lieftinck, 1942** 黃斑偉蜓 Photo by Eddie YAM

Anax indicus Lieftinck, 1942 (Odonata: Aeshnidae, Anax) – a new record for Hong Kong

Lim Yung YAM[1]

1 - The Hong Kong Polytechnic University, Hung Hom, Hong Kong. eddieyly@yahoo.com.hk

Introduction:
During a general survey on the 25th September 2010 at Yuen Tun Ha (Tai Po, Hong Kong), the author found and photographed one male specimen of an *Anax* species that has never previously been recorded in Hong Kong. The specimen was observed between 11:51 till 11:57 hrs and photographed (Figs. 1 and 2) at Yuen Tun Ha.

The photographs were shown to Wen-Chi YEH of Taiwan (via private message) who confirmed the dragonfly as a male *Anax indicus* Lieftinck, 1942 (Odonata: Aeshnidae, Anax).

Anax indicus is a widely distributed species in Nepal (Vick, 1988), Pakistan (Chaudhury, 2010), Sri Lanka (Van der Poorten, 2011), India (Lieftinck, 1942 & 1955; Subramanian, 2009) and Thailand (Hämäläinen, 2002). This apparently represents the first record of *Anax indicus* from Chinese territory (Graham REELS, private message) and no official report has suggested the presence of *Anax indicus* in Taiwan yet (W.C. YEH, private message). There are holes in its known distribution but these are likely to be due to under sampling and misidentification as the closely related *Anax guttatus* (Burmeister, 1839), with which it has frequently been confused. *Anax indicus* was listed as Least Concern (ver 3.1) in the IUCN Red List 2011.1.

Suggested Chinese name:
No Chinese name is available for *Anax indicus* yet. The author would like to suggest "黃斑偉蜓" as a Chinese name in reference to its remarkable yellow to orange markings on abdomen.

Morphological description of a male *Anax indicus* (from Chaudhry, 2010):
Synthorax is leaf green in colour. There are 18-19 antenodal and 8-9 postnodal nerves present in forewings while hindwings with 11 antenodal and postnodal nerves can be found. Discoidal cells in forewing made up of six cells and in hindwing made up of five cells. Four cubital nerves are present in forewings and three in hindwings. A large pale brown patch is present on the bases of hindwings, membrane dark brown or blackish. Segment 2 of the abdomen has a blue dorsolateral spot, segment 3 without blue markings, segments 4-10 have large, bright dorsolateral yellow to orange markings. The anal appendages are reddish brown.

Measurements:
Forewing = 53mm
Hindwing = 50mm
Abdomen = 56-62 mm
(Chaudhry, 2010 and Bedjanic *et al*, 2007)

Key features to identify *Anax indicus* from *Anax guttatus* and *Anax parthenope julius*:

	Anax indicus	*Anax guttatus*	*Anax parthenope julius*
Last Abdominal Segment	Separated color spots present laterally	No marking in the last abdominal segment	A colored continual "U" shaped marking presents
Frons	No marking on the upper surface	Two pale blue spots and a small triangular black marking present on the upper surface	Black and pale blue transverse strip present behind the frons

Fig. 1 Patrolling *Anax indicus* at Yuen Tun Ha (lateral view)

Fig. 2 Patrolling *Anax indicus* at Yuen Tun Ha (front view)

Acknowledgement:

The completion of the article has been greatly assisted by Mr. Graham REELS, with his review and comments significantly enriching its contents. The author would also like to thank Mr. Wen-Chi YEH for his assistance in confirming the *Anax* species, as well as Mr. Vor YIU for his coordination.

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實驗報告 EXPERIMENT REPORT

Effect of artificial light on firefly flashing activity

饒戈 Vor YIU Email: yiuvor@hkentsoc.org

Introduction:

Most fireflies more or less rely on flash signals for sex communication. Although flash signals can be very spectacular in the dark, the light is far weaker than any commonly used artificial lighting appliance. Would artificial lighting have any effects on sex communication between fireflies? This question should have earned more attention in this densely populated city. Unfortunately, nothing has been done on this subject.

Pteroptyx maipo Ballantyne, 2011 is so far only known in the 15 square km Ramsar Site (Mai Po) in Hong Kong, and is concentrated within about 3 square km of river banks covered by mangrove (Yiu, 2011). There are two proposed large scale residential land development projects near a breeding site of this endemic firefly. *Pteroptyx maipo* was not known at the time when the corresponding environmental assessment reports were done. In order to get some ideas on the the possible effects of the potential increase in environmental light caused by the proposed development on the firefly, two quick trial tests was done.

Materials and methods:

Shortly before the end of the flight period of *Pteroptyx maipo* in the year, two quick *in situ* experiments were done at a location in Tin Shui Wai where *Pteroptyx maipo* has been constantly recorded. The habitat is a section of a stream with dense cover of mangrove plants along its sides (Fig. 1), which make most regions of the place hardly accessible. Observations and experimental setup could only be restricted to a small bridge crossing the stream.

Fig. 1 The experiment site at night. Background is Tin Shui Wai town. Photo by V. YIU.

A TES-1332 Lux meter (resolution 0.1 lux) was used to measure the changes in light intensity at the site on 8th October, 2011 while a TES-1334A Light meter (resolution 0.01 lux) was used to measure the changes in light intensity at the site on 13th October, 2011. Measurements began shortly after sunset. Air temperature and wind speed were also measured.

After the flashing activity of fireflies became constant, a 20W compact fluorescent lamp (warm white) was used as the artificial light source to shine into the habitat. Fluorescent lamps are most commonly used in residential buildings in Hong Kong. The source of electricity was a 12 V lead acid battery connected to an inverter which steps up the voltage to 220V AC. A vertically adjustable cover was used to control the amount of light emitted. The fluorescent lamp was raised to 1.5 m above the ground by a tripod, such that the emitted light was not obstructed by the mangrove plants close to the lamp (Fig. 2). Light intensity at different distances from the light source was measured.

Fig. 2 The light source setup. Photo by V. YIU.

Number of visible flashes (not pulses) per minute within observer's eye view (~120 degree), within the radius of 10 m from the observer, at a fixed direction, were counted under different conditions with the lamp on and off. In the first test, counting was done as soon as the light was switched on or off. In the second test, after the lamp was switched on or off, a period of two minutes was allowed before counting was done, so that there was more time for the fireflies to response to the sudden change of light intensity.

Results:

1st test on 8th October, 2011

Sunset time: 1805h

Air temperature: 24.8 - 27.0^{o}C

Wind speed: 0.6 - 1.2 ms^{-1}

Moon phase: Waxing gibbous moon

Sky condition: Clear

Light intensity measured at different distance from the lamp when the ambient light intensity was 0.1 lux:

2.0 lux at 3 m, 1.0 lux at 5 m, 0.5 lux at 7m, 0.3 lux at 10 m.

Records of flashing activity of *P. maipo*

Time	Light intensity in the counting area (Lux)	Lamp	Firefly flashing activity
1815h	70.0	off	No flash observed
1825h	3.1	off	No flash observed
1830h	1.0	off	No flash observed
1838h	0.2	off	No flash observed
1840h	0.2	off	1st flash observed
1910h	0.1	off	20 flashes per min.
1915h	0.1	off	23 flashes per min.
1925h	0.1	off	21 flashes per min.
1930h	0.3 - 2.0	on	7 flashes per min.
1932h	0.1	off	18 flashes per min.
1933h	0.3 - 2.0	on	8 flashes per min.
1934h	0.1	off	18 flashes per min.
1935h	0.3 - 2.0	on	11 flashes per min.

2nd test on 13th October, 2011
Sunset time: 1801h
Air temperature: 25.0^{o}C
Wind speed: 0.7 - 1.1 ms^{-1}
Moon phase: Full moon
Sky condition: Covered by large amount of thin clouds
Light intensity measured at different distance from the lamp when the ambient light intensity was 0.13 lux: 0.71 lux at 3 m, 0.52 lux at 5 m, 0.39 lux at 7m, 0.21 lux at 10 m.

Records of flashing activity of *P. maipo*

Time	Light intensity in the counting area (Lux)	Lamp	Firefly flashing activity
1810h	17.90	off	No flash observed
1820h	1.65	off	No flash observed
1830h	0.32	off	No flash observed
1836h	0.25	off	1st flash observed
1850h	0.13	off	14 flashes per min.
1855h	0.13	off	17 flashes per min.
1857h	0.13	off	15 flashes per min.
1858h - 1900h	0.21 - 0.71	on	Not counted
1900h	0.21 - 0.71	on	7 flashes per min.

1901h - 1904	0.13	off	Not counted
1904h	0.13	off	21 flashes per min.
1906h - 1908h	0.21 - 0.71	on	Not counted
1908h	0.21 - 0.71	on	2 flashes per min.
1910h - 1911h	0.30*	off	Not counted
1912h	0.30	off	16 flashes per min.
1914h - 1915h	Not measured. Same lamp setting was used	on	Not counted
1916h	Not measured. Same lamp setting was used	on	5 flashes per min.
1918h - 1919	0.17	off	Not counted
1920h	0.17	off	20 flashes per min

* Sky turned cloudy. Clouds reflected light emitted from Tin Shui Wai Town and other residential buildings, the ambient light intensity increased.

Discussion:

From the results, *Pteroptyx maipo* started to flash at 35 minutes after sunset when the ambient light intensity dropped to about 0.2 lux. The timing is consistent with the records by Ballantyne *et al*, 2011. The flashing activity would stop at around 3 hours after sunset (Ballantyne *et al*, 2011). It is likely that males would try to start their light display after sunset as soon as possible in order to win the competition for female attention. Therefore 0.2 lux could be considered as the maximum light intensity below which *P. maipo* would display their flash signals for sex communication, and above which *P. maipo* would be reluctant to display flash signals. This is supported by the 2 preliminary tests. In the first test, when the light intensity was 0.1 lux, the average flashing frequency was 20 flashes per minute in the 5 counts. When the light intensity in the counting area was increased to 0.3 - 2.0 lux by application of fluorescent lamp, the average flashing frequency dropped to 8.7 flashes per minute in the 3 counts. In the second test, when the light intensity was 0.13 to 0.30 lux, the average flashing frequency was 17.2 flashes per minute in the 6 counts. When the light intensity in the counting area was increased to 0.21 - 0.71 lux, the average flashing frequency dropped to 4.7 flashes per minute in the 3 counts. The decreases were significant and may largely reduce the successful mating rate.

Why did the fireflies not stop flashing completely when the light intensity increased? A possible explanation is that they need a longer time to respond to the change of ambient light intensity; this could be further tested by shining light into the environment for a longer time period. Another possible explanation is that although the light intensity had increased, the spectrum of light emitted by the fluorescent lamp was different from that of the natural environment and the fireflies show different response. This could be further tested by increasing the light intensity and using different light sources. Unfortunately, almost no fireflies were observed in the week after the second test was done. The flight period of this year had come to an end.

It is unfortunate that the period of flashing activity of *P. maipo* overlaps with the period when there are the most lighting appliances switched on in ordinary families. How much light will be introduced by the two large proposed residential sites is not clear at present, but it should be noticed that in cloudy nights, the ambient light intensity in the area is already 0.3 lux, much higher than the situation when the sky is clear . It should also be noticed that although the increase of light intensity by applying fluorescent lamp in the second test was slight, the drop in flashing frequency is still significant, and the slight change could be fatal to the population in the long run.

This study is brief and only preliminarily shows the effect of fluorescent lighting on flashing activity. Beside, the study was not done during the most active flight period. How it may be applied to the actual situation after the residential sites are completed in the future is not certain. Furthermore, the effects of artificial night lighting on firefly larvae also deserves attention.

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Notes on predation of *Vespula flaviceps* by the hornet *Vespa velutina*

John X. Q. LEE[1] & Kam Wah CHAN[2]

1 - Email:vespa_bicolor@yahoo.com.sg

2 - Email:mantis13222@yahoo.com.hk

Many hornets (*Vespa* sp.) are known to prey on honeybees (*Apis* sp.) at their nests. While large species such as *Vespa mandarinia* Smith 1852 and *Vespa soror* du Buysson, 1905 are known to mount group attacks and destroy entire colonies, smaller hornets such as *Vespa bicolor* Fabricius, 1787, *Vespa velutina* Lepeletier, 1836 (Lee, 2009; Tan *et al*, 2007) and *Vespa multimaculata* Pérez,1910 (Koeniger et al, 1996) instead loiter outside the nest entrance and attempt to capture individual foragers returning to the nest.

Observations on the smaller hornets preying on other species of social wasps generally involve chance encounters away from either party's nests. This report documents an interesting observation involving *V. velutina* returning to a nest of *Vespula flaviceps* (Smith, 1870) and preying on returning foragers.

The genus *Vespula* consists of small wasps known as yellowjackets, many species of which usually nest underground and have highly developed social structures and large colonies. *Vespula flaviceps* has a wide distributional range through China, Taiwan, Japan and Korea, and is presently the only regularly seen species in Hong Kong, but even so it cannot be considered common and its nests are rarely found. On 16 December 2011, at around 3:20p.m., we found an active colony in an ornamental flowerbed at Sha Tin Central Park. The actual nest was located underground and could not be photographed. While photographing the nest entrance and taking videos of the nest activity, an individual of *V. velutina* appeared at the nest site around 3:50p.m. It hovered around the nest entrance, in the same way as it would at a honeybee nest, and in less than a minute successfully captured a *V. flaviceps* worker. Over a period of two hours, the *V. velutina* worker (probably the same individual) returned to the nest site another five times, with an interval of ten to twenty minutes between each successful capture. The last appearance at the nest and capture of prey took place at approximately 5:50 p.m., after which the sky darkened and the hornet did not appear again. Unfortunately the nest, being located in a public park, was subsequently destroyed and no further observations could be made on subsequent days.

Fig. 1 A *V. velutina* forager hovering just outside the nest entrance of *Vespula flaviceps*.

It never took more than a minute for the *V. velutina* worker to successfully catch a *V. flaviceps* worker; in fact, on three occasions a successful capture took less than twenty seconds following its arrival at the nest site. The time taken to capture a *V. flaviceps* worker at the nest entrance is therefore much shorter and the success rate much higher than that of *V. velutina* preying on the common Asian honeybee *Apis cerana* Fabricius, 1793. Compared to most Asian honeybee species, which have developed various forms of defensive behaviour against hornets, such as "shimmering" and recruiting more guards outside the entrance to protect returning foragers, *V. flaviceps* does not seem to have developed any form of defense against predation by hornets at the nest entrance. Also, the flight of *V. flaviceps* workers returning to the nest is possibly more predictable than that of Asian honeybees, which appear to change their flight pattern when the presence of a hornet is noticed (Tan et al, 2007).

Fig. 2 A closer view of the nest entrance of *Vespula flaviceps*.

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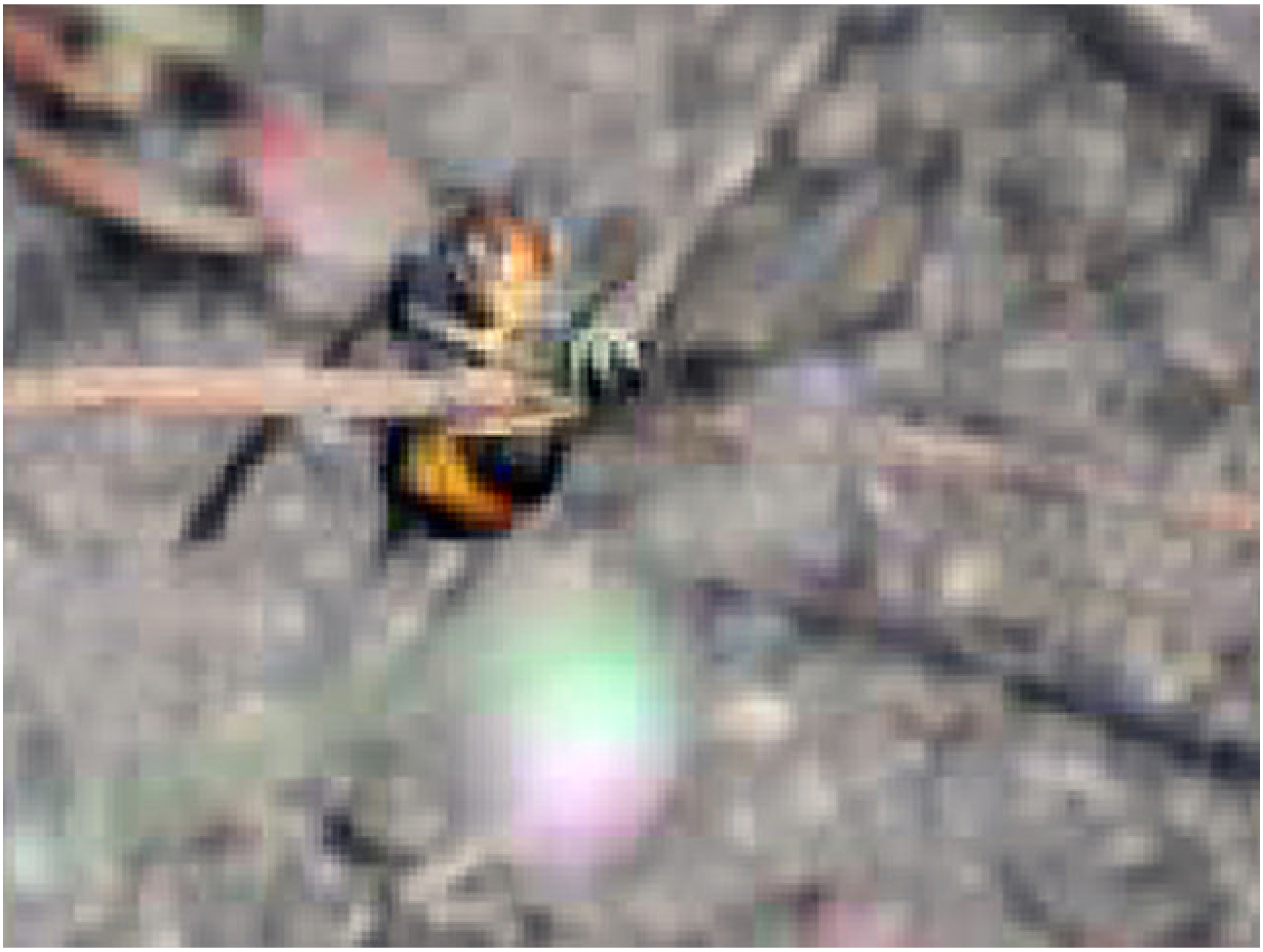

Fig. 3 A *V. velutina* successfully capturing a returning *V. flaviceps* worker (taken from a screenshot of a recorded video clip)

The curious case of the cannibal coenagrionid*

G. T. REELS Email:gtreels@gmail.com

It has often struck me that members of the coenagrionid genus *Ceriagrion* appear to be unusually voracious predators of other zygopterans. However, an observation that I made two years ago indicated that one species, at least, is even capable of reckless acts of cannibalism.

At ca 1030h on 25 July 2008 I was walking along a small stream at Luk Keng, N.T., Hong Kong (altitude ca. 20 m asl) when I noticed a male *Ceriagrion auranticum* (Zygoptera: Coenagrionidae) grappling with a mature female of the same species. The male had seized the female's thorax just above the wing bases with his mandibles (Figure 1). At first I assumed that this was simply a clumsy mating attempt, particularly since the female was making little obvious effort to free herself. However, in the ensuing five minutes, the male, rather than letting go and trying to mate, proceeded to munch his way up the female's thorax, until he reached the pronotum. The entangled pair made several short flights during this period, possibly because I was disturbing them while trying to photograph the action, or maybe because the female, having realised she was not hosting an amorous suitor, was belatedly attempting to escape. The male then spent some time chewing through the female's head attachment until her head fell off (Figure 2). Then he dragged the body to another perch to devour the thorax (Figure 3). Gruesome stuff.

Fig. 1 Male *Ceriagrion auranticum* seizes female. Photo by G.T. Reels.

Fig. 2 Male *Ceriagrion auranticum* attacks female. Photo by G.T. Reels.

This act of intraspecific predation (or, more simply, cannibalism) was, I believe, quite remarkable. As briefly summarised by Corbet (1999; p. 368), intraspecific predation in Odonata usually involves a mature adult predating a teneral individual that is unable to perform threat behaviour, with males predominating as prey. In this instance, the victim was a fully mature female; slightly larger than its attacker. Unexpectedly, the male's desire to obtain a good meal seems to have overridden its mating instinct. Did it fail to recognise its victim as a viable mate? Did it start off with mating intentions and then suddenly decide it fancied a snack? Whatever the reason, it seems that sexual predators are not confined to *Homo sapiens*.

Fig. 3 Male *Ceriagrion auranticum* consumes female. Photo by G.T. Reels.

Reference:

Corbet, P.S. 1999. Dragonflies – Behaviour and Ecology of Odonata. Cornell University Press, Ithaca, New York.

*Note: This article was originally published in Agrion, the newsletter of the Worldwide Dragonfly Association, issue 14(2), 2010, p. 27. It is reproduced here with permission.

食肉昆蟲展覽 Predatory Insects Show

饒戈 Vor Yiu　　Email:yiuvor@hkentsoc.org

香港昆蟲學會第三年參與《北區花鳥蟲魚展覽會》，展覽會於2011年12月23至28日期間開放予公眾參觀。香港昆蟲學會是次展覽主題為「食肉昆蟲」，共展出13幅大型資料海報和九個活體展示。13幅大型資料海報於展覽完畢後在不同的中小學輪流展出。

This is the third year that Hong Kong Entomological Society participated in the North District Flowers Birds Insects Fishes Show. The show was open to public in the period from December 23 - 28, 2011. The theme of our exhibition was “Predatory Insects”. 9 live display and 13 large information banners were included in the exhibition booth. The information banners would be circulated in secondary and primary schools after the show.

展館內 Inside the exhibition booth

徵稿 CALL FOR ARTICLES

Contributions are invited for the 4th issue of the "INSECT NEWS", due for publication end of July 2012. We are looking for items corresponding to the following non-exclusive topics:

1. Accounts of interesting or unusual insect observations;
2. Entries for the Newsletter cover photograph;
3. Reviews of new books on insects of the bioregion (Hong Kong, Macau, tropical southern China, Indochina);
4. List of recent publications on insects of the bioregion;
5. News of insect research (academic or amateur) being conducted locally
6. Requests for information by individuals interested in particular insect groups.
7. Summaries of recent papers published by Society members in other journals;
8. Reports on various Society activities;
9. List of new Society members;
10. Reports on insect recording schemes;
11. etc.

INSECT NEWS is an online, biannual newsletter (January and July) published by the Hong Kong Entomological Society (HKES). It is open to contributions from members and non-members alike. Articles could be written in English or in Chinese accompanied by English summary. Please send your article and photos to:yiuvor@hkentsoc.org