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Preliminary Study of the Life Cycle of *Aspidomorph indica* Boheman (Coleoptera: Chrysomelidae) 【Scientific note】

Y紋龜金花蟲 (*Aspidomorph indica* Boheman) (鞘翅目：金花蟲科) 生活史初探【科學短訊】

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Abstract

A preliminary study of the life cycle of *Aspidomorph indica* Boheman (Coleoptera: Chrysomelidae) feeding on sweet potato leaf was conducted in a 25°C incubator. Eggs were pinkish to light yellow in color, elliptical in shape, 0.13 cm long, and laid on the undersurface of the leaf. Females laid 2-6 eggs in brownish egg pods formed by the secretion of female accessory glands. The egg stage was 5-12 days long with a mean of 7.7 days. Larvae had five instars and were spindle shaped, with their periphery fringed with spines. For first to fifth instars, body length was 0.13, 0.18, 0.24, 0.29 and 0.43 cm, respectively and stadia duration was 4.0, 4.2, 4.1, 4.5 and 7.2 days, respectively. Lines appeared gradually on the back of 2nd instars and the exuvia remained attached at the tip of abdomen. Prepupae were fresh green in color, body length averaged 0.54 cm, and exuvia remained attached at the tails. Pupae were 0.54 cm long and the stage lasted 5-10 days, with a mean of 7.6 days. Notum was transparent and extended to the front. Adults had a body length of 1.40 cm. Adult longevity was 77-267 days with a mean of 165.3 days. The life cycle from egg to adult death was 109-299 days, with an average of 200.0 days. Adults had a metallic body color and a "Y" character on the back. Head was hidden under the prothoracic notum. Both larvae and adults fed on leaves of convolvulaceous plants. Females mated several times and laid 59.60 egg pods, and 4 individuals were emerged.

摘要

於25°C恆溫箱以甘藷葉飼育Y紋龜金花蟲 (*Aspidomorph indica* Boheman) 進行生活史之研究。結果顯示卵淡黃帶粉紅色，橢圓形，長0.13公分，產於葉背，雌蟲每次產2~6個卵粒，卵粒外表覆蓋由雌成蟲副腺分泌之淡黃褐色卵鞘；卵期5~12天，平均7.7天。幼蟲有五齡，體呈紡錘形兩側具棘毛；一至五齡幼蟲，體長分別為0.13、0.18、0.24、0.29及0.43公分。齡期平均4.0、4.2、4.1、4.5及7.2天。二齡幼蟲背部逐漸出現斑紋，並將一齡之蛻皮留在腹部末端。前蛹為鮮綠色長0.54公分，蛻仍留在腹末端。蛹長0.54公分，蛹期5~10天，平均7.6天，胸背板透明向前延伸。成蟲體長1.40公分，成蟲壽命約77~267天，平均165.3天，生活史全期約109~299天，平均200.0天；成蟲翅鞘光滑，透明淡黃色，具金屬光澤，翅鞘上有黃金色「Y」字斑紋，前胸背板發達略透明，頭部隱於前胸背板下。成、幼蟲皆取食旋花科植物葉片。雌成蟲一生交尾多次。雌成蟲平均可產下59.63個卵鞘，每個卵鞘平均孵化4隻幼蟲。

Key words: Tortoise beetle, *Aspidomorph indica* Boheman, life cycle, sweet potato

關鍵詞: 龜金花蟲、*Aspidomorph indica* Boheman、生活史、甘藷

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Y 紋龜金花蟲 (*Aspidomorph indica* Boheman) (鞘翅目：金花蟲科) 生活史初探

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摘 要

於 25°C 恆溫箱以甘藷葉飼育 Y 紋龜金花蟲 (*Aspidomorph indica* Boheman)，進行生活史之研究。結果顯示卵淡黃帶粉紅色，橢圓形，長 0.13 公分，產於葉背，雌蟲每次產 2~6 個卵粒，卵粒外表覆蓋由雌成蟲副腺分泌之淡黃褐色卵鞘；卵期 5~12 天，平均 7.7 天。幼蟲有五齡，體呈紡錘形兩側具棘毛；一至五齡幼蟲，體長分別為 0.13、0.18、0.24、0.29 及 0.43 公分。齡期平均 4.0、4.2、4.1、4.5 及 7.2 天。二齡幼蟲背部逐漸出現斑紋，並將一齡之蛻皮留在腹部末端。前蛹為鮮綠色長 0.54 公分，蛻仍留在腹末端。蛹長 0.54 公分，蛹期 5~10 天，平均 7.6 天，胸背板透明向前延伸。成蟲體長 1.40 公分，成蟲壽命約 77~267 天，平均 165.3 天，生活史全期約 109~299 天，平均 200.0 天；成蟲翅鞘光滑，透明淡黃色，具金屬光澤，翅鞘上有黃金色「Y」字斑紋，前胸背板發達略透明，頭部隱於前胸背板下。成、幼蟲皆取食旋花科植物葉片。雌成蟲一生交尾多次。雌成蟲平均可產下 59.63 個卵鞘，每個卵鞘平均孵化 4 隻幼蟲。

關鍵詞：龜金花蟲、*Aspidomorph indica* Boheman、生活史、甘藷。

食葉用甘藷全年均可栽培，除可紓解夏季蔬菜短缺之壓力，並提供消費者新鮮口感之蔬菜另一選擇。葉用甘藷栽種方法簡單，人們可採其嫩莖葉當蔬菜用 (Huang, 1994; Cheng and Lai, 1997)。甘藷屬於旋花科作物，因其價格低廉，農民用藥較少，因此常見金花蟲危害，若在葉片上發現蟲孔，翻開葉背，即可看到此蟲自卵至成蟲各齡期。

Y 紋龜金花蟲 (*Aspidomorph indica* Boheman) 屬鞘翅目 (Coleoptera)，多食亞目 (Polyphaga)，金花蟲科 (Chrysomelidae)，龜金花蟲亞科 (Cassidinae) (Yen, 1973; Hill, 1983; Jansson and Raman, 1991; Huang, 1994; Cheng and Lai, 1997; Chalfant, 1999; Ho and Lin, 1999)。Ho and Lin (1999) 曾對此蟲做過簡單介紹，可惜未對生活史作詳盡描述，故擬對其生活史進行初步探討。

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於 1999 年 2 月中旬，自嘉義縣新港鄉新庄地區甘藷田植株上採回約 30 隻 Y 紋龜金花蟲成蟲，攜回實驗室後，以未噴灑藥劑之食葉用甘藷葉片飼育一代後，再進行以下生活史之探討。

有關 Y 紋龜金花蟲形態、發育及習性之觀察，係自培育蟲源中逢機選取 10 對雌、雄成蟲，以每對方式個別放入養蟲的塑膠圓筒（直徑 9 cm，高 30 cm）內，並以養樂多瓶為容器，取未噴藥的甘藷藤蔓插入內注入 80~90 ml 的自來水之養樂多瓶，供成蟲取食及產卵；每天更換新鮮的甘藷藤蔓並檢視產卵情形。於成蟲產卵後，取下產於葉背之卵，移至底部鋪有一濾紙，上有一未噴藥之甘藷葉片之直徑 9 cm 高 1 cm 之塑膠培養皿內，滴 1 ml 的水於濾紙上以防葉片枯萎，爾後再移入生長箱內（ $25 \pm 1^\circ\text{C}$ ，光週期 12 L : 12 D）；每天觀察卵孵化之情形，俾便計算卵期。以一個卵粒為一重複，共 100 個重複。

幼蟲形態及其發育之觀察，係自蟲源中取出約 300 粒卵待其孵化後，逢機選取 100 隻同一天初孵化的幼蟲，採單隻飼育方式，以毛筆小心地將幼蟲移到底部已置有一濕潤之濾紙及置放甘藷葉片之小培養皿（直徑 5.5 cm，高 1 cm）內，再放入 $25 \pm 1^\circ\text{C}$ ，光週期 12 L : 12 D 恆溫箱進行飼育。每天更換新鮮的甘藷葉片及添加約 1 ml 的蒸餾水，以防止葉片枯萎或乾燥，以一隻幼蟲為一個重複，計 100 重複。每天觀察每隻幼蟲存活與生長情況及蛻皮情形，蛻皮後測量幼蟲體長並記錄齡期。當末齡幼蟲進入前蛹時，仍繼續觀察，記錄前蛹期和蛹期變化情形。

初羽化之成蟲先量其體長後，再將同一天羽化之雌、雄成蟲一對放入塑膠圓筒內，觀察紀錄交尾產卵情形，同時每天提供新鮮之食葉用甘藷並計數所產之卵數。每對雌、雄蟲視為

一重複，計 10 重複。

飼育觀察生活史結果顯示，Y 紋龜金花蟲該蟲的卵呈橢圓形長 0.13 cm，為淡黃帶粉紅色，產於葉背，此與 Ho and Lin (1999) 數據相近。雌成蟲一次可產 2~6 粒卵，卵粒數量高於 Ho and Lin (1999) 報告的 3~4 粒。卵粒外覆卵鞘，係由雌成蟲生殖器副腺分泌之黃褐色物質所形成，於乾燥後呈鱗片狀，半透明（圖 1A）可將卵粘附在葉下表面。卵期為 5~12 天，平均 7.7 ± 1.4 天。

幼蟲期具五齡，體呈紡錘形，兩側具棘毛（圖 1B），幼蟲取食量及體長隨著齡期增加而增大。初孵化一齡幼蟲，頭部先掙出卵鞘，藉身體上下擺動將卵鞘排離，體乳白色，咀嚼式口器，無腹足，行動極為緩慢，胸足發達，具趾鉤，協助身體附著於葉面上便於取食，腹部末端有時留有剛排出之黑色糞便，一段時間後才自動排掉。體長 0.13 ± 0.02 cm，一齡幼蟲期約 2~8 天，平均 4.0 ± 1.00 天；二齡幼蟲亦為乳白色，體長 0.18 ± 0.03 cm，體背部逐漸出現白色左右對稱之斑紋，蛻皮留在腹部末端；身體遇到外力碰觸或驚嚇時，會將腹部往上舉。二齡幼蟲期約 3~7 天，平均 4.2 ± 0.9 天；幼蟲體色開始轉為黃綠色，體型較大，體長 0.24 ± 0.03 cm，取食量增加，三齡幼蟲期約 2~7 天，平均 4.1 ± 1.0 天。第四齡幼蟲體色亦為黃綠色，除了體型增大，外部形態與第三齡幼蟲極為相似，體長 0.29 ± 0.03 cm，齡期約 3~8 天，平均 4.5 ± 1.3 天。第五齡幼蟲外部形態特徵與第四齡幼蟲極為相似，體長 0.43 ± 0.05 cm，齡期約 4~11 天，平均 7.2 ± 7.90 天。

幼蟲一至五齡之體長分別為 0.13、0.18、0.24、0.29 及 0.43 cm，相較於 Ho and Lin (1999) 所記錄的 0.16、0.19、0.34、0.58 及 0.68 cm 較小，Ho and Lin (1999) 並未提



A	B
C	D
E	

圖一 Y 紋龜金花蟲。 *Aspidomorph indica* 之形態。 A. 卵鞘及卵； B. 幼蟲； C. 蛹之背面； D. 蛹之腹面； E. 成蟲。
 Fig. 1. The morphology of the tortoise beetle, *Aspidomorph indica*. A. egg ootheca and egg; B. larva; C. pupa ventral view; D. pupa dorsal view; E. Adult.

及採用何種寄主餵食及飼養溫度，故無從比較。

前蛹鮮綠色，體形較圓胖，形態與末齡幼蟲極為相似，足會縮起來，腹部固著於葉面上，前蛹為靜止期，不取食不活動，蛻仍留在腹部末端，前蛹長 0.54 ± 0.7 cm，前蛹期約 2~5 天，平均 2.9 ± 0.6 天。蛹為裸蛹，翠綠色(圖 1C)，長 0.54 ± 0.05 cm，胸背板透明，腹部具金黃色紋，呈「 \cap 」字型(圖 1D)，有時腹部末端的蛻皮隨之脫落；羽化前，體色由綠色轉為黃色；蛹期約 5~10 天，平均 7.6 ± 0.8 天。

成蟲體長 1.0 ± 0.34 cm，較 Ho and Lin (1999) 報告較長，成蟲體色呈黃色，翅鞘光滑，具金屬光澤，翅鞘上有黃金色「Y」字斑紋，餘為透明淡黃色(圖 1E)；前胸背板發達略透明；頭部隱於前胸背板下；複眼及咀嚼式的口器均為黑色；觸角為絲狀，末端黑色；足末端呈橙色。整體觀之，體周圍扁平，朝中央漸漸向上突起。成蟲遇驚嚇時，具有明顯的假死現象，此時足與觸角內縮，全身躲在鞘質之前胸背板與翅鞘下，成蟲壽命約 77~267 天，平均 165.3 ± 52.9 天。

Y 紋龜金花蟲自卵至成蟲死亡約 109~299 天，平均 200.0 ± 50.4 天。雌、雄成蟲外形大小極為相似，難以辨識，交尾時，雄成蟲會爬至雌蟲上方，伸出交尾刺插進雌蟲腹部生殖器內，成蟲一生交尾多次，交尾時間並不固定。如配對之雄成蟲先死亡，而雌成蟲亦可繼續產下有效卵，推測雌成蟲體內有貯精囊已先貯有足夠精子，若精子用完後，雌成蟲產下的卵則為無效卵，即使外覆卵鞘，仍無法孵化。另逢機選取 10 對成蟲之成蟲，觀察其所產之卵鞘數及幼蟲孵化情形，結果為 10 對成蟲產下之卵鞘數約為 27~94 個，平均為 59.6 ± 22.3 個，幼蟲孵化數約為 47~226 隻，每個

卵鞘孵化蟲數約 1~6 隻，平均則為 4 ± 2 隻。

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ABSTRACT

A preliminary study of the life cycle of *Aspidomorph indica* Boheman (Coleoptera: Chrysomelidae) feeding on sweet potato leaf was conducted in a 25°C incubator. Eggs were pinkish to light yellow in color, elliptical in shape, 0.13 cm long, and laid on the undersurface of the leaf. Females laid 2-6 eggs in brownish egg pods formed by the secretion of female accessory glands. The egg stage was 5-12 days long with a mean of 7.7 days. Larvae had five instars and were spindle shaped, with their periphery fringed with spines. For first to fifth instars, body length was 0.13, 0.18, 0.24, 0.29 and 0.43 cm, respectively and stadia duration was 4.0, 4.2, 4.1, 4.5 and 7.2 days, respectively. Lines appeared gradually on the back of 2nd instars and the exuvia remained attached at the tip of abdomen. Prepupae were fresh green in color, body length averaged 0.54 cm, and exuvia remained attached at the tails. Pupae were 0.54 cm long and the stage lasted 5-10 days, with a mean of 7.6 days. Notum was transparent and extended to the front. Adults had a body length of 1.40 cm. Adult longevity was 77-267 days with a mean of 165.3 days. The life cycle from egg to adult death was 109-299 days, with an average of 200.0 days. Adults had a metallic body color and a "Y" character on the back. Head was hidden under the prothoracic notum. Both larvae and adults fed on leaves of convolvulaceous plants. Females mated several times and laid 59.60 egg pods, and 4 individuals were emerged.

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