J. King Saud Univ., Vol. 10, *Science* (1), pp. 53-59, Riyadh (A.H. 1418/1998)

First Record of Oviparous Females of *Lipaphis erysimi* in Saudi Arabia and Description of Its Morphs.

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(Received on 30/12/96; accepted for publication 12/10/97)

Abstract. The apterous oviparous female of *Lipaphis erysimi* was detected for the first time in Saudi Arabia from *Brassica rapa* on 21.I.1990. A detailed description of the apterous and alate viviparous females and oviparae of *L. erysimi* is given. Hind tibiae of oviparous female are swollen each with 110-120 scent plaques.

Introduction

Aphis erysimi was originally described by Kaltenbach in 1843. Davis in 1914 [1] described a new species, *Aphis pseudobrassicae*, which was later considered by Dobrovlianski [2] to be a synonym of *A. erysimi* Kaltenbach. Mordvilko erected a new genus *Lipaphis* taking *Aphis erysimi* as its type species [3].

Lipaphis erysimi is distributed virtually world-wide on many species of Brassicaceae [4]. Aldryhim and Khalil [5] collected *L. erysimi* from *Brassica rapa*, *B. oleracea* and *Raphanus sativus* in Riyadh.

L. erysimi is mainly anholocyclic, particularly in warm climates [4; pp. 291], but sexual morphs have been reported from Europe [6], India [7], Japan [8], and New Zealand [9]. The objectives of this study were to provide the first record of the oviparous female of *L. erysimi* in Saudi Arabia, and a detailed description of the morphs of *L. erysimi*.

Materials

Aphid samples were collected from naturally occurring colonies on host plants. Infested plant parts were detached and kept in plastic bags. Field notes such as date, plant name, locality and aphid colour were recorded. Specimens from the same colony were preserved together in 75% alcohol. Aphids were mounted singly on microscope slides. Fifteen specimens were used in this study. The morph, host plant, location and date of collection of each specimen are mentioned below.

Specimen examined: Four apterous viviparous females from *Raphanus sativus,* Hurymala, 11.I.1990.- apterous viviparous females from *Brassica rapa*, Riyadh, 26.III..1990.- apterous viviparous female from *B. rapa,* Riyadh, 21.I.1990.- apterous viviparous female from *B. rapa*, Al-Uyaynah, 11.I.1990.- 2 alate viviparous females from *B. rapa*, Riyadh, 21.I.1990.- alate viviparous female from *R. sativus,* Huraymala, 11.I.1990.- 2 alate viviparous females from *B. rapa*, Al-Uyaynah, 11.I.1990.- 2 oviparous females from *B. rapa*, Riyadh, 21.I.1990. Oviparous female (intermediate between oviparous and viviparous), from *B. rapa*, Riyadh, 21.I.1990.

Results

Apterous viviparous female (Table)

Living apterae are green in color , slightly coated with wax. Legs pale yellow except tarsi and apical part of tibia darker. Rostrum pale with darker ultimate segment. Antennal segments I, II and most of III pale yellow, IV, V and VI dark. Siphunculi dusky with dark apices. Cauda paler than siphunculi.

Length 1.85-2.52 mm. Antennal tubercles slightly developed. Antennal segments imbricated, without secondary rhinaria, hairs short inconspicuous. Antennae 0.43-0.62 times as long as body. Terminal process 1.85-2.60 times as long as basal part of segment VI, 0.67-0.83 times as long as III. Segment III 1.83-2.38 times as long as IV. Segment IV 0.91-1.28 times as long as V. Frontal hairs pointed, 4-6 hairs (13.80-25.31μm). Cephalic hairs short, a pair of anterior (8.0-17.36 μm), a pair of middle (6.90-15.62 μm) and two pairs of posterior (6.9-10.41 μm). Ultimate rostral segment with 4 hairs (10.41-13.88 μm), 0.69-0.85 times as long as the second segment of hind tarsi. First tarsal chaetotaxy, 3,3,2. Tergite VIII with 4 hairs (17.50 24.60 μm). Genital plate with 12-14 hairs, a pair of primary hairs (23.38-33.33 μm), one supplementary hair (7.2-9.09 μm) and 9-11 secondary hairs (14.34-16.50μm). Siphunculi imbricated, cylindrical to weakly clavate, 0.08-0.13 times as long as body, 1.17- 1.66 times as long as cauda, 1.46-1.92 times as long as the second segment of hind tarsi. Cauda with 4-6 hairs (31.03-37.90 μm).

Table. Biometric data (mm) for *Lipaphis erysimi*

Speci-mens No.	Body length	Antannal segments					Cauda	Siph.	Ht2	Urs
		Total	III	IV	V	VI				
1	1.88	1.03	0.30	0.14	0.13	0.108+0.23	0.16	0.24	0.14	0.11
2	1.85	0.98	0.30	0.13	0.12	0.090+0.20	0.14	0.22	0.13	0.10
3	2.00	1.07	0.30	0.13	0.14	0.108+0.25	0.15	0.25	0.13	0.11
4	1.97	0.97	0.30	0.11	0.12	0.108+0.20	0.17	0.20	0.13	0.09
5	1.85	1.07	0.31	0.15	0.13	0.108+0.22	0.15	0.19	0.13	0.11
6	1.91	1.19	0.33	0.18	0.14	0.120+0.27	0.14	0.23	0.15	0.11
7	2.52	1.09	0.31	0.13	0.13	0.096+0.25	0.18	0.21	0.13	0.11
8	1.73	1.22	0.35	0.18	0.16	0.110+0.28	0.15	0.17	0.13	0.11
9	1.97	1.35	0.39	0.20	0.17	0.140+0.32	0.15	0.18	0.13	0.12
10	2.11	1.32	0.41	0.19	0.18	0.130+0.28	0.14	0.19	0.14	0.12
11	1.85	1.29	0.39	0.21	0.16	0.120+0.28	0.15	0.16	0.13	0.09
12	2.10	1.19	0.36	0.18	0.16	0.109+0.27	0.16	0.19	0.13	0.11
13	2.05	1.05	0.28	0.13	0.12	0.138+0.21	0.15	0.21	0.13	0.11
14	2.20	1.07	0.33	0.14	0.15	0.125+0.25	0.16	0.21	0.14	0.10
15	1.80	0.98	0.26	0.12	0.12	0.102+0.25	0.18	0.19	0.13	0.11

Specimens 1-7 =apterous viviparous females, 8-12= alate viviparous females, 13-14= oviparous apterous females, 15= oviparous female-intermediate between oviparous and viviparous.
siph= siphunculi, Ht2= second segment of hind tarsi, Urs= ultimate rostral segment.

Alate viviparous female

Aphids of this morph are green in colour with dark head and thorax. Body length ranged between 1.85 to 2.11 mm. Antennae with six segments, imbricated, antennal hairs short, antennae 0.57-0.70 times as long as body. Terminal process 2.15-2.54 times as long as basal part of segment VI, 0.68-0.82 times as long as III. Segment III with 14-24 secondary rhinaria, 1.85-2.15 times as long as IV. Segment IV with 3-9 secondary rhinaria, 1.05-1.31 times as long as V. Ultimate rostral segment with 4-5 hairs (13.40-20.10 μm), 0.69-0.84 times as long as the second segment of hind tarsi. First tarsal chaetotaxy 3,3,2. Tergite VIII with 3-5 hairs (10.34-20.60 μm). Genital plate bearing 11-12 hairs, a pair of primary hairs (24.30-27.58 μm), 1-2 supplementary (12.06-13.80 μm), and 8-10 secondary hairs (6.90-13.70 μm). Siphunculi imbricated and clavate, 0.086- 0.091 times as long as body, 1.07-1.35 times as long as cauda, 1.23-1.46 times as long as the second segment of hind tarsi. Cauda with 4-5 hairs (31.90-37-93 μm).

Apterous oviparous female

Length 2.13-2.28 mm, body elongated oval, green in colour covered with wax. Antennal tubercles slightly developed. Antennae with six segments, imbricated without secondary rhinaria, 0.48-0.51 times as long as body, antennal hairs short inconspicuous at most 6 μm. Terminal process 1.52-2.0 times as long as basal part of segment VI, 0.75 times as long as III. Segment III 2.15- 2.53 times as long as IV. Segment IV 0.93-1.15 times as long as V. Frontal hairs pointed, 4-5 hairs (17-20 μm). Cephalic hairs short, a pair of anterior (12.6-17.24μ), a pair of middle (6.80-20.0 μm) and two pairs of posterior (6.80-13.79 μm). Ultimate rostral segment with 4 hairs (13.7-18.8μm), 0.71-0.84 times as long as the second segment of hind tarsi. First tarsal chaetotaxy 3,3, 2. Tergite VIII with 4 hairs (14.8-27.28 μm). Genital plate with 20-23 hairs (17.24-44.82 μm). Siphunculi imbricated, weakly clavate, 0.09-0.10 times as long as body, 1.31-1.40 times as long as cauda, 1.50-1.61 times as long as the second segment of hind tarsi. Hind tibiae swollen and with 110-120 scent plaques (Fig. 1). Cauda with 6 hairs (28.77-34.48 μm).

The individual intermediate between an ovipara and a vivipara is most similar to the ovipara but with a shorter body (1.80 mm), 80 scent plaques only on the hind tibiae, and with a single egg that was wrinkled marginally.

Eggs

Eggs of *L. erysimi* are 0.58-0.62 mm long and 0.26-0.29 mm wide

Discussion

Cyclical parthenogenesis is characteristic of aphids [10]. However, in warm climates, aphids usually reproduce parthenogenetically [4]. Aldryhim and Khlail [5] collected viviparous females of several aphid species during the winter, from different parts of Saudi Arabia. The detection of oviparous females of *L. erysimi* in Saudi Arabia is surprising, because *L. erysimi* is anholocyclic in North America and in the subtropics and tropics [6].

Males of *L. erysimi* were not detected probably because males are generally less common than sexual females in aphids. The sex ratio of females to males is about 20:1 in the host-alternating Aphidinae and less than 10:1 in aphid species that live on a single plant species [10].

The detection of apterous oviparous females of *L. erysimi* in Saudi Arabia, and an alate male of *Pseudaphis abyssinica* in Yemen [11, pp. 55] , suggests a high probability that other aphid species can complete their life cycle holocyclically in this region.

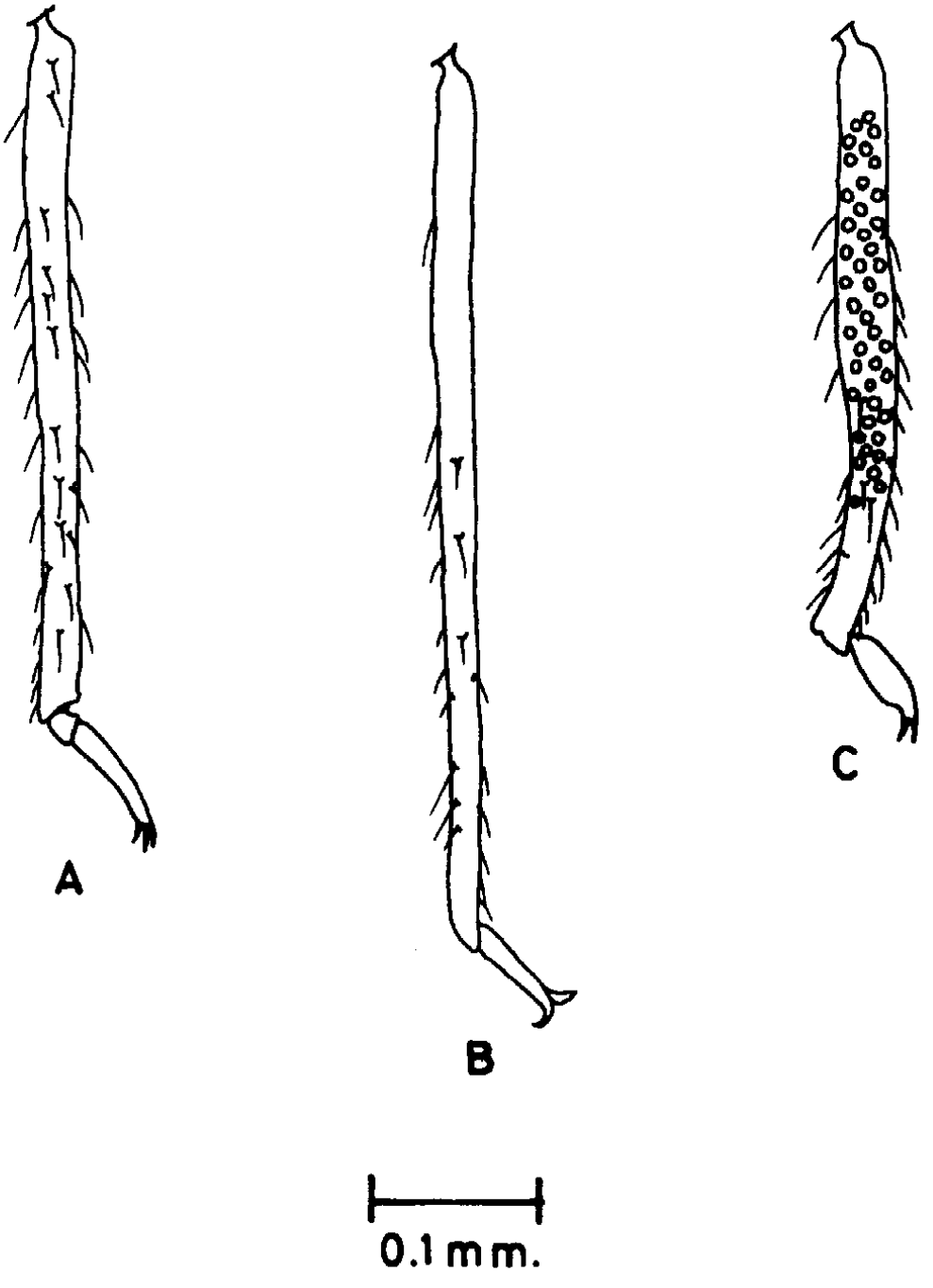

Fig. 1. Hind tibiae of *Lipaphis erysimi*, A= apterous viviparous, B= alate viviparous female, C=apterous oviparous female.

Acknowledgement. I would like to thank Prof. F. A. Ilharco for his confirmation of the identification of the oviparous female.

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ظهور الإناث الجنسية لحشرة المن *Lipaphis erysimi* في المملكة العربية السعودية لأوّل مرّة ووصف أشكال الحشرة

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(استلم في ١٤١٧/٨/٢٠ هـ ، وقبل للنشر في ١٤١٨/٦/١١ هـ)

ملخص البحث. تتكاثر حشرات المن لاجنسيا في المناطق الحارة والدافئة من العالم حيث توجد فقط إناث غير جنسية تلد حوريات. بينما تتكاثر حشرات المن في المناطق الباردة لا جنسيا لعده أجيال يعقبها ظهور إناث جنسية و ذكور قبل حلول الشتاء حيث تضع الأنثى عدد محدود من البيض الذي يقاوم انخفاض درجة حرارة الشتاء في تلك المناطق.

لقد تم العثور على إناث جنسية لحشرة المن *Lipaphis erysimi* ، ويعتبر هذا تسجيلاً للمرة الأولى للأفراد الجنسية لحشرات المن من المملكة العربية السعودية. وقد جمعت الإناث الجنسية لهذه الحشرة من على نبات اللفت *Brassica rapa* في ١٩٩٠/١/٢١ في الرياض. وتم وصف كل من الإناث الجنسية ولإناث غير الجنسية غير المجنحة والإناث غير الجنسية المجنحة. وتتميز الإناث الجنسية لهذه الحشرة بانتفاخ وتضخم الساقين الخلفيين ووجود خلايا حسية ثانوية عليهما.