

**THE HEMP RUSSET MITE *ACULOPS CANNABICOLA* (FARKAS, 1960)
(ACARI: ERIOPHYOIDEA) FOUND ON *CANNABIS SATIVA* L. IN SERBIA:
SUPPLEMENT TO THE DESCRIPTION**

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Abstract – The description of *Aculops cannabicola* (Farkas, 1960), a new species for the fauna of Serbia, is supplemented. The male and juveniles are described for the first time. This species was found as vagrants on leaves of hemp, *Cannabis sativa* L. A comparison of characters of the population from Serbia and the originally described samples from Hungary is given.

Key words: Eriophyoidea, hemp russet mite, *Cannabis sativa*, morphology, Serbia

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INTRODUCTION

Over 3600 species of eriophyoid mites are currently known in the world fauna, including one species from the plant family Cannabaceae and 18 species from the genera *Celtis* L. and *Trema* Lour. of the closely related plant family Ulmaceae (A m r i n e & S t a s n y, 1994; A m r i n e et al., 2003). Up to the present, no species from the plant family Cannabaceae and only three species of eriophyoid mites from *Celtis* spp. (Ulmaceae) were collected in Serbia. These belong to the genera *Aceria* Keifer, *Reckella* Bagdasarijan, and *Boczekiana* Petanović (P e t a n o v i ć, 2000/01, P e t a n o v i ć et al., 1997). The hemp russet mite *Aculops cannabicola* is the only eriophyoid species known from *Cannabis sativa* L.

A species new for the Serbian fauna, *Aculops cannabicola* (Farkas, 1960), was found recently on hemp in the Deliblato Sands. It was found on the same host plant in 1958 in Hungary and described as *Vasates cannabicola* (F a r k a s, 1960). *Cannabis sativa* L. is the only host plant for this species; the relation off the given russet mite to the host was defined as vagrant. A m r i n e & S t a s n y (1994) reassigned this species from the genus *Vasates* Shimer, 1869 to the genus *Aculops* Keifer, 1966.

M c P o r t l a n d & H i l l i n g recently (2006)

stressed that the hemp russet mite is a little-known, but potentially extremely harmful pest which primary feeds on leaves, petioles and meristems. Mites cause curling of leaf edges, followed by leaf russetting. The mites feed on inflorescences of both sexes, and on glandular trichomes, severely reducing resin production. According to these authors the hemp russet mite constitutes a real menace to world hemp cultivation.

Because the original description of *A. cannabicola* is not complete (descriptions of the male and juveniles are missing), the present paper is intended to give a supplementary morphological description of the species. A comparison of *A. cannabicola* collected in Serbia and the originally described samples from Hungary is given.

MATERIAL AND METHODS

Specimens of *A. cannabicola* were collected from *Cannabis sativa* L. originating from the Rošijana locality (Deliblato Sands, Northern Serbia) with a direct examination by stereo-microscope. The morphology of *A. cannabicola* was investigated using a phase-contrast microscope (Leica DMSL). Prior to light microscopy, the mites were cleared in lactic acid for several days and then mounted in Keifer's "F" medium. Measurements are based on study of six females, three males, three nymphs,

and two larvae. The terminology (notation) of setae in the description follows that of Lindquist (1996). Measurements are given in micrometers and refer to length of the structure, unless otherwise stated. Body length is measured from the anterior edge of prodorsal shield to the end of the anal lobe. The length of legs is taken from the posterior margin of the apodeme, between coxae I and II, to the apical margin of the tarsus (excluding empodium and solenidium).

All examined material from Serbia (15 females, seven males, six nymphs and seven larvae) is kept in the Acari collection, Department of Entomology, Faculty of Agriculture, University of Belgrade, Serbia.

SUPPLEMENTARY DESCRIPTION OF
A. CANNABICOLA (FARKAS, 1960)

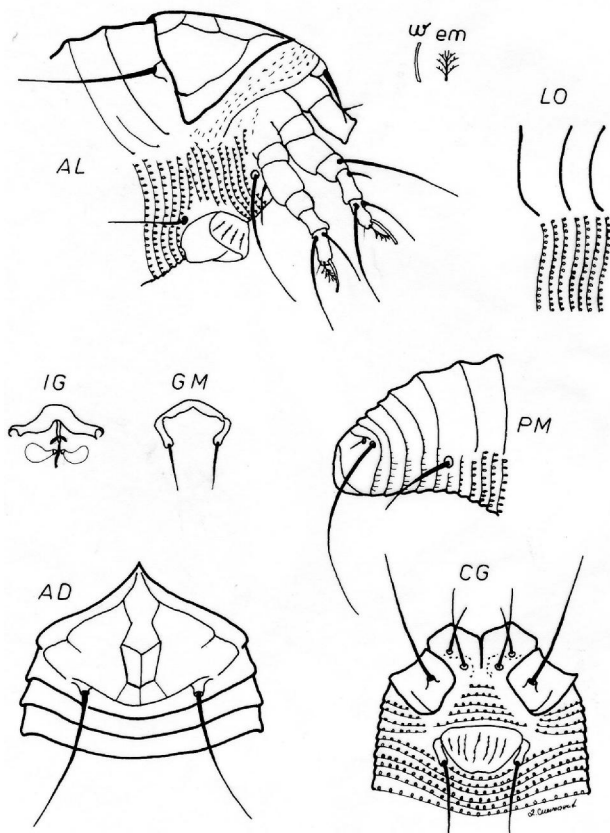


Fig. 1. *A. cannabicola* (Farkas): AD: antero-dorsal; AL: antero-lateral; CG: coxal-genital region; em: empodium; GM: male genital region; IG: internal genitalia (female); LO: lateral opisthosoma; PM: postero-ventral; ω- solenidium.

FEMALES (n = 6) : Body fusiform, 210 (195-210) long, 70 (62-70) wide, light orange in color. **Gnathosoma**: 22 (20-22) long, downcurved. Coxal setae (ep) 4 long, dorsal genual setae (d) 5 (4-5) long, apical setae (v) 2 long, cheliceral stylets 15 (15-17) long. **Prodorsal shield**: 34 (33-35) long, 52 (50-53) wide. Frontal lobe, acuminate. Dorsal tubercles well developed, on rear margin of prodorsal shield; scapular setae (sc) 35 (30-35) long, widely separated [26 (25-26) apart], directed to the rear divergently. Shield pattern consists of one median line over one half of the base and two admedian lines longer than the base of the frontal lobe; median and admedian lines are connected by two transverse lines. **Legs**: With all usual segments and setae. Legs I 38 (34-38) long, femora 12 (10-12) long, femoral setae (bv) 13 (12-14) long, genua 5 long, genual setae (1'') 30 (20-30) long, tibiae 9 (7-9) long, tibial setae (1') 6 (6-7) long, tarsi 8 (6-8) long, inner fastigial setae (ft') 17 (13-17) long, outer

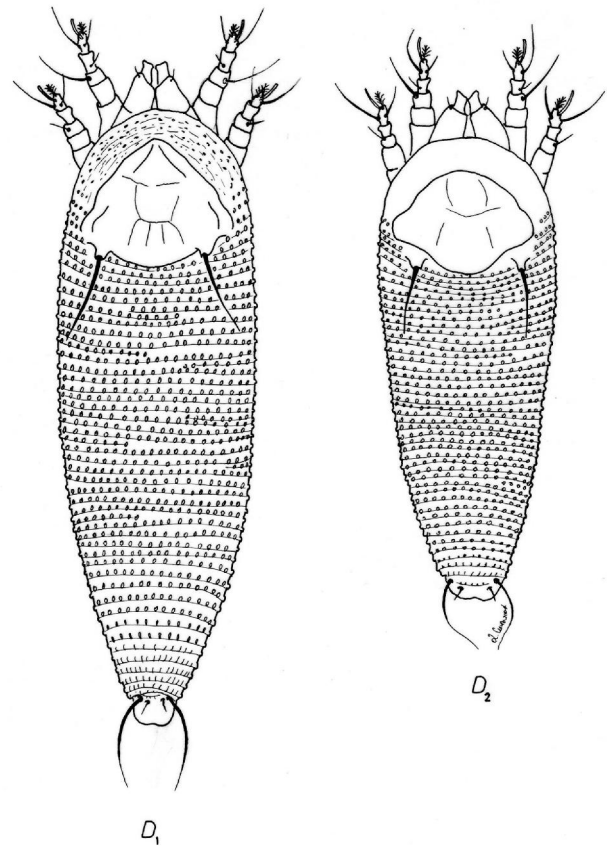


Fig. 2. D₁: Dorsal view of nymph; D₂- Dorsal view of larva.

fastigial setae (ft'') 25 (20-25) long, ventro-mesal setae (u') 7 (5-7) long, solenidia 9 (9-10) long and tapered, empodia 6 (6-8) long and 4-rayed. Legs II 32 (30-32) long, femora 11 (10-11) long, femoral setae (bv) 10 (10-15) long, genua 5 long, genual setae (l'') 10 (10-15) long, tibiae 6 (5-6) long, tarsi 7 long, inner fastigial setae (ft') 10 (9-10) long, outer fastigial setae (ft'') 25 (24-25) long, ventro-mesal setae (u') 6 (4-6) long, solenidia 9 long and tapered, empodia 6 long and four-rayed. **Coxae:** Coxae I almost smooth, with some granulae around the forecoxal tubercles, coxae II smooth. Sternal line 8 long, unforked; coxal setae 1b 12 (10-12) long, 15 (14-17) apart; coxal setae 1a 20 (18-22) long, 9 (7-9) apart, coxal setae 2a 35 (30-35) long, 23 (20-23) apart. Coxisternal area with five (5-6) microtuberculated annuli. **Genitalia:** 12 (12-14) long, 22 (20-23) wide, with eight longitudinal ridges. Coxal setae 3a 22 (20-22) long and 16 (15-18) apart. **Opisthosoma:** Setae c2 22 (20-22) long, 60 (55-60) apart, on annulus 11 (11-12); setae d 65 (50-65) long, 42 (40-42) apart, on annulus 25 (25-27), setae e 20 (15-20) long, 23 (20-23) apart, on annulus 40 (40-46); setae f 20 (20-25) long, 15 (15-20) apart, on annulus 62 (62-71). Total dorsal annuli 24 (22-24), smooth; total ventral annuli 69 (67-76). Setae h2 45 (45-60) long, 7 (6-11) apart, setae hl 3 (2-3) long, 7 (6-7) apart.

MALES (n = 3): Smaller than female 165 (160-165) long, 57 (55-57) wide. **Gnathosoma:** 20 (19-20) long, downcurved. Coxal setae (ep) 3 long, dorsal genual setae (d) 4 long, subapical tarsal setae (v) 1 (1-2) long, cheliceral stylets 14 (14-17) long. **Prodorsal shield:** 32 (30-32) long, 48 (45-48) wide. Dorsal tubercles well developed, on rear margin of prodorsal shield; scapular setae (sc) 25 long, 25 (22-25) apart, directed to the rear divergently. **Legs:** With all usual segments and setae. Legs I 37 (36-37) long, femora 10 (9-10) long, femoral setae (bv) 13 (10-13) long, genua 4 (4-5) long, genual setae (l'') 22 (20-22) long, tibiae 6 (6-7) long, tibial setae (l') 6 (5-6) long, tarsi 7 long, inner fastigial setae (ft') 15 (14-15) long, outer fastigial setae (ft'') 20 (19-20) long, ventromesal setae (u') 5 long, solenidia 8 (7-8) long and tapered, empodia 4 (4-5) long and four-rayed. Legs II 28 (27-28) long, femora 10 long, femoral setae (bv) 10 long, genua 4 (4-5) long, genual setae (l'') 10 (10-15) long, tibiae 5 (5-6) long, tarsi 6 long, inner fastigial setae (ft') 10 (10-11) long, outer fastigial setae (ft'') 20 (20-22) long, ventromesal setae (u') 4 long, solenidia 9 (8-9) long and tapered, empodia 4 (4-6) long and four-rayed. **Coxae:** Sternal line 6 long, unforked; coxal setae 1b 8 (5-8) long, 13 (11-13) apart; coxal setae 1a 15 long, 7 (5-7) apart;

coxal setae 2a 32 (25-32) long, 21 (19-21) apart. Coxisternal area with five (5-7) microtuberculated annuli. **Genitalia:** 18 (17-18) wide. Coxal setae 3a 12 (12-13) long and 15 (15-16) apart. **Opisthosoma:** Setae c2 11 (10-11) long, 45 (44-45) apart, on annulus 13 (11-13), setae d 30 (30-35) long, 32 (30-32) apart, on annulus 25 (22-25), setae e 12 (7-12) long, 18 apart, on annulus 39 (39-43); setae f 15 (11-15) long, 12 (12-13) apart, on annulus 59 (59-63). Total dorsal annuli 22, total ventral annuli 64 (64-68). Setae h2 40 long, 10 (10-12) apart; setae hl 2 long, 6 (6-7) apart.

NYMPHS: (n = 3): 170 (170-172) long, 60 wide. **Gnathosoma:** 15 (14-15) long, downcurved. Coxal setae (ep) 3 (3-4) long, dorsal genual setae (d) 4 (4-5), subapical tarsal setae (v) 1 long, cheliceral stylets 13 (11-13) long. **Prodorsal shield:** 34 (34-35) long, 35 wide. Scapular setae (sc) 20 (20-22) long, 17 (17-21) apart, directed to the rear divergently. **Legs I** 20 (20-21) long, femora 8 (7-8) long, femoral setae (bv) 4 (4-5) long, genua 2 (2-3) long, genual setae (l'') 12 (10-12) long, tibiae 5 long, tibial setae (l') 4 (3-4) long, tarsi 3 long, inner fastigial setae (ft') 8 (7-8) long, outer fastigial setae (ft'') 13 (13-14) long, ventromesal setae (u') 4 (3-4) long, solenidia 7 (5-7) long and tapered, empodia 4 long and four-rayed. **Legs II** 17 long, femora 6 (5-6) long, femoral setae (bv) 4 (4-5) long, genua 2 (2-3) long, genual setae (l'') 6 (6-12) long, tibiae 4 (3-4) long, tarsi 4 (4-5) long, inner fastigial setae (ft') 10 long, outer fastigial setae (ft'') 15 (15-16) long, ventro-mesal setae (u') 3 long, solenidia 8 (7-8) long and tapered, empodia 4 long and four-rayed. **Coxae:** Sternal line 3 long, unforked; coxal setae 1b 6 (5-6) long, 10 (10-12) apart; coxal setae 1a 15 (10-15) long, 5 (5-6) apart; coxal setae 2a 20 long, 17 (17-18) apart. Coxisternal area with eight (8-9) microtuberculated annuli. Coxal setae 3a 7 (7-10) long and 10 (8-10) apart. **Opisthosoma:** Setae c2 15 long, 45 apart, on annulus 12 (11-12); setae d 17 (17-18) long, 30 apart, on annulus 22 (22-24); setae e 10 long, 17 (16-17) apart, on annulus 36 (36-43); setae f 12 (12-13) long, 14 (14-15) apart, on annulus 52 (47-52). Total dorsal annuli 56 (52-56). Setae h2 25 (25-27) long, 10 (10-12) apart, setae hl 2 long, 6 apart.

LARVAE: (n = 2): 110 (110-112) long, 45 (45-47) wide. **Gnathosoma:** 12 (12-13) long; dorsal genual setae (d) 2 long, cheliceral stylets 13 (10-13) long. **Prodorsal shield:** 31 (30-31) long, 42 (30-42) wide. Scapular setae (sc) 16 (15-16) long, 20 (15-20) apart, directed to the rear. **Legs I** 18 (18-20) long, femora 7 (5-7) long, femoral

Table 1. Comparison of measurements (in micrometers) of *Aculops cannabicola* (Farkas, 1960) females collected in Hungary and Serbia

Date and locality of collecting samples	27.08.1958. Osca, Hungary	03.07.2006. Rošijana, Serbia
length of the body	170-210	195-210
width of the body	50	62-70
length of prodorsal shield	35	33-35
length of setae <i>sc</i>	38	30-35
tubercles of <i>sc</i> apart	28	25-26
length of gnathosoma	21	20-22
length of sternum	7	7-8
length of legs I	48	34-38
length of tibia	5	7-9
length of tarsus	8	6-8
length of solenidion	11	9-10
length of empodium	8	6-8
number of rays of tarsal empodium	4	4
length of legs II	46	32
length of setae <i>c2</i>	25	20-22
length of setae <i>d</i>	45	50-65
length of setae <i>e</i>	21	15-20
length of setae <i>f</i>	30	20-25
length of setae <i>h2</i>	60	62-71
length of setae <i>h1</i>	3	2-3
width of genitalia	25	20-23
number of striae	6-8	8
length of setae <i>3a</i>	22	20-22
number of dorsal annuli	22-32	22-24

setae (bv) 3 long, genua 2 long, genual setae (*l*^u) 10 (9-10) long, tibiae 3 long, tibial setae (*l*^t) 3 (2-3) long, tarsi 4 long, inner fastigial setae (*ft*ⁱ) 4 long, outer fastigial setae (*ft*^o) 5 (5-10) long, solenidia 6 (5-6) long and tapered, empodia 3 long and four-rayed. **Legs II** 16 (15-16) long, femora 6 (4-6) long, femoral setae (bv) 4 long, genua 2 (2-3) long, genual setae (*l*^u) 6 long, tibiae 3 long, tarsi 3 (3-4) long, inner fastigial setae (*ft*ⁱ) 6 long, outer fastigial setae (*ft*^o) 10 long, ventro-mesal setae (*u*^v) 1 long, solenidia 6 (5-6) long and knobbed, empodia 3 long and four-rayed. **Coxae:** Sternal line 2 (2-4) long; coxal setae 1b 6 long, 11 (10-11) apart; coxal setae 1a 12 long, 6 apart; coxal setae 2a 15 (14-15) long, 20 (16-20) apart. Coxisternal area with eight (6-8) microtuberculated annuli. Coxal setae 3a 4 (4-6) long and 9 apart. **Opisthosoma:** Setae *c2* 10 (10-15) long, 40 (40-45) apart, on annulus 9 (9-10); setae *d* 10 (10-15) long, 27

(24-27) apart, on annulus 18 (16-18); setae *e* 4 long, 12 apart, on annulus 27 (22-27); setae *f* 11 (10-11) long, 14 (13-14) apart, on annulus 42 (30-42). Total annuli 47 (34-47). Setae *h2* 30 (27-30) long, 10 (8-10) apart, setae *h1* 1 long, 4 (4-5) apart.

REMARKS

Females of *Aculops cannabicola* (Farkas, 1960) from Hungary and Serbia are similar in morphology; however, in the original description only 24 morphometric characteristics are given; males, nymphs, and larvae were not seen. It is therefore difficult to compare the Hungarian and Serbian populations of this species. Significant differences are evident in the length of both legs (Table 1).

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**ДОПУНА ОПИСА РЈАСТЕ ГРИЊЕ КОНОПЉЕ *ACULOPS CANNABICOLA* (FARKAS, 1960)
(ACARI: ERIOPHYOIDEA) НАЂЕНЕ У СРБИЈИ НА *CANNABIS SATIVA* L.**

РАДМИЛА ПЕТАНОВИЋ, БИЉАНА МАГУД и ДРАГИЦА СМИЉАНИЋ

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Рђаста гриња конопље *Aculops cannabicola* (Farkas, 1960) (Acari: Eriophyoidea) регистрована је као нова врста за фауну Србије на локалитету Рошијана у Делиблатској пешчари, јула 2006. године. Први пут је нађена на истој биљци домаћину, *Cannabis sativa* L. (Cannabaceae) 1958. године у Мађарској када је описана под називом *Vasates cannabicola* (Farkas, 1960). Amrine and Stransky (1994) су је пребацили у род *Aculops* Keifer. *Cannabis sativa* L. је једини до сада познати домаћин ове врсте гриње.

Будући да оригинални опис обухвата само 24 морфометријске и меристичке карактеристике, а да се савремени описи заснивају на око 70 карактеристика, у овом раду је допуњен опис ове врсте. Такође се први пут описује мужјак и јувенилни стадијуми, чиме се комплетирају морфолошки опис и таксономски статус *A. cannabicola*. Поређењем расположивих морфолошких карактеристика популација из Мађарске и Србије установљена је разлика једино у дужини оба пара ногу.