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The mature larva and imago of *Anisoxya fuscula* (ILLIGER, 1798) (*Coleoptera*: *Melandryidae*)

Larwa i postać dojrzała *Anisoxya fuscula* (ILLIGER, 1798) (*Coleoptera*: *Melandryidae*)

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ABSTRACT: The mature larva of the European melandryid species *Anisoxya fuscula* (ILL.) is described and illustrated. The larva lives in dead thin twigs of various deciduous trees. The knowledge of morphology of imagines is completed by drawings of the male and female copulative organs.

KEY WORDS: *Coleoptera*, *Melandryidae*, *Anisoxya fuscula*, larva, morphology, genital characters of male and female, ecology, distribution.

Introduction

The genus *Anisoxya* MULSANT, 1856 is included in the tribe *Serropalpini*, within the subfamily *Melandryinae*. It comprises 5 species, 3 of which have been described from Palaearctic and another 2 from Neotropical Region. In the Palaearctic Region there are 2 species recorded from Japan and one – *Anisoxya fuscula* (ILLIGER) is known from Central Europe; it was recorded also from Great Britain, Denmark, and four southern provinces of Sweden, in northern part of Italy, and Bihar Mts. in Romania. In Poland there are records only from 4 provinces: Mazurian Lakeland, Wielkopolska-Kujawy Lowland, Lower Silesia and Eastern Beskid Mts. (BURAKOWSKI et al. 1987). The species occurs locally and it is extremely rare in its entire range.

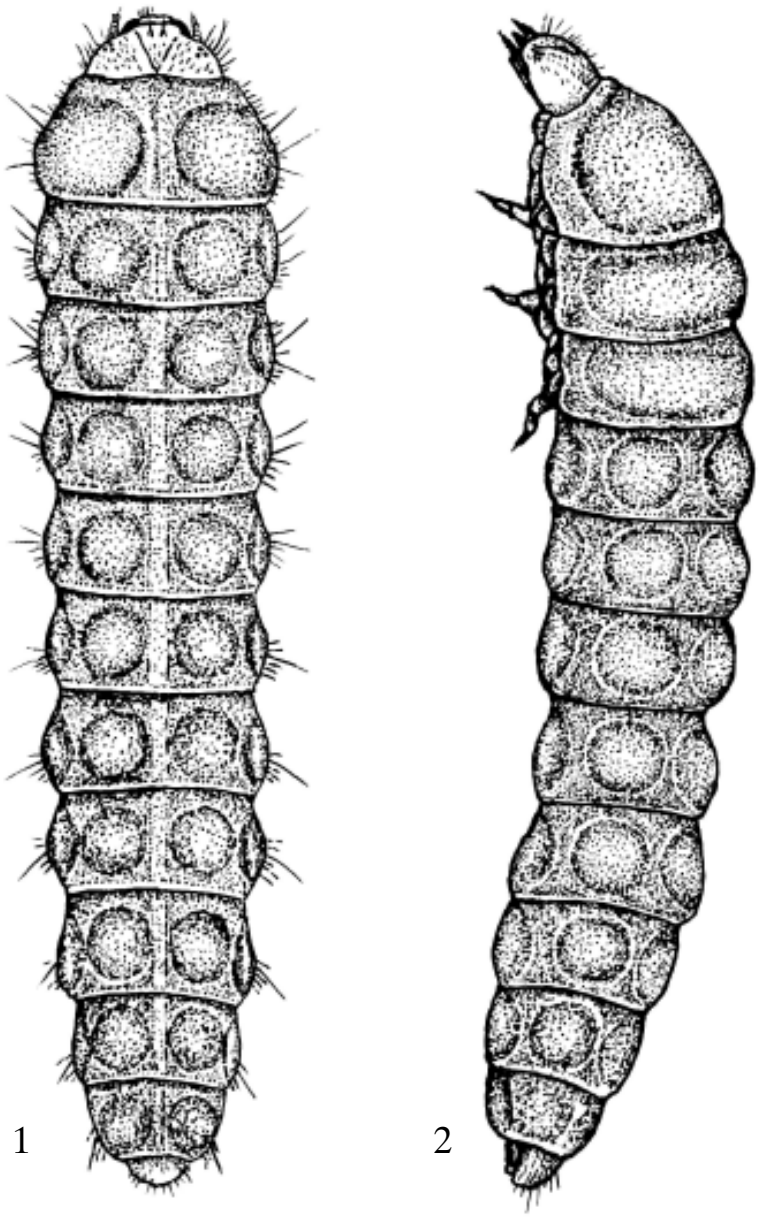
This species was described briefly in 1798 by ILLIGER in genus *Serropalpus*. The detailed redescription was published by SEIDLITZ (1898); a brief description and a few illustrations were provided by KASZAB (1969). The only, insuficient and incompletely illustrated description of a larva of *A. fuscula* was given by PERRIS (1878). In the years 1959, 1963, 1966, and 1996 I was lucky to find some larvae of *A. fuscula* in Central Poland. Now I am able to present detailed description and illustrations of the last larval instar.

Mature larva (Figs. 1–14)

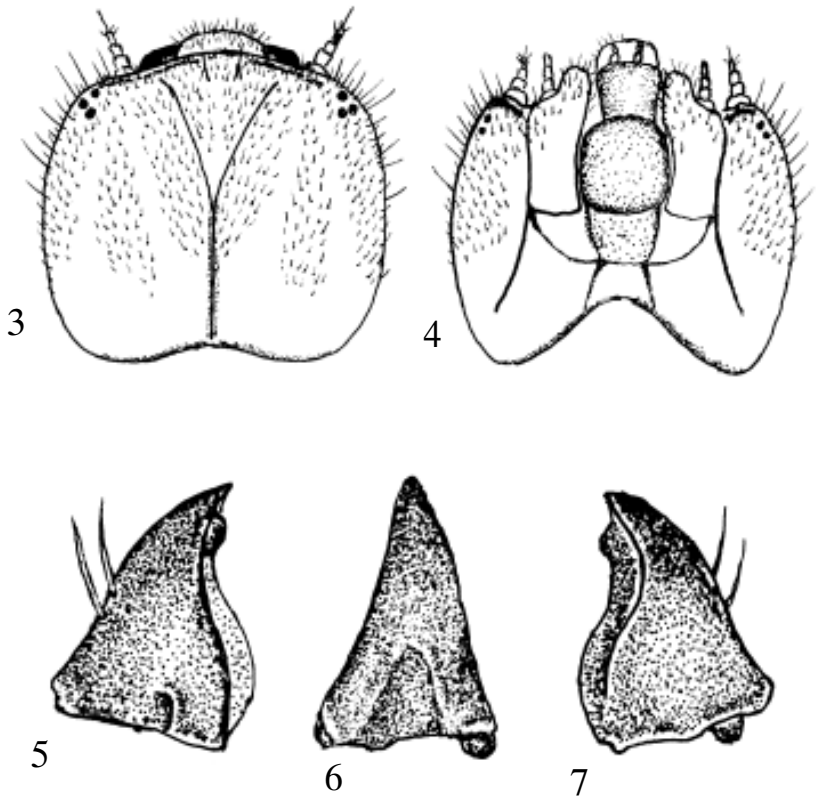
Fully-grown distended larva measured up to 6.5 mm; head width 0.6 mm; pronotum width 1.3 mm; width of 9th abdominal segment 0.4 mm. Body subcylindrical (Figs. 1, 2) with all segments broader than long, dorsum more convex than venter, feebly sclerotized except for head, shiny.

Colour of body whitish, head yellowish, apices of mandibles, talus and stemmata black; mouth frame, frontal suture, hypostoma reddish. Head with scattered simple elongate setae, and microsetae (visible under 80× magnification). Tergal plate of meso- and metanotum and terga I–VIII of abdominal segments with ambulacral ampullae.

Head (Figs. 3, 4) prognathous, partially retracted into prothorax, with hind margin emarginate basally, upper surface flattened, ventral surface concave for reception of ventral mouth parts. Epicranial plates densely covered with fine minute setae, and scattered long setae on lateral sides. Frontoclypeus subtriangular with longitudinal markedly frontal suture, and with two setiferous thorns near anterior margin; frontal arms V-shaped, its basal angle about 35°, coronal suture long. Stemmata (Fig. 11) with 5 spots on each side, of which dorsal one is well separated. Labrum transverse, almost semicircular, distinctly separated from frontoclypeus, about twice as broads long, closely beset with stiff setae of varying length. Epipharynx (Fig. 10) forming the interlining of the labrum, membranous, 1.7 as long as wide as of labrum, with a pair obscure longitudinal rods approaching each other at base, furnished with numerous microtrichia densely and longitudinally distributed, obliquely directed to midline. Antenna (Fig. 8) 3-segmented, short, slender, fairly prominent, situated on large circular membrane; relative length of antennomeres as 1.0 : 0.7 : 0.6, sensory appendage cone-shaped slender, arising slightly distally to base of AIII, about 0.6x as long as antennomere II; AI and AII lacking in setae; AIII dome shaped with 3 long setae and one solenidium arising on apex. Mandible (Figs. 5–7) subtriangular, symmetrical, with smooth sharp incisor edge, unidentate apically, on dorsal cutting edge with a single obtuse subapical tooth; outer side convex with profound antennal fossa, external margin with 2 long setae. Ventral mouth-



Figs. (Ryc.) 1, 2. *Anisoxia fuscula*, larva (larwa). 1 – dorsal view (od strony grzbietowej), 2 – lateral view (z boku).

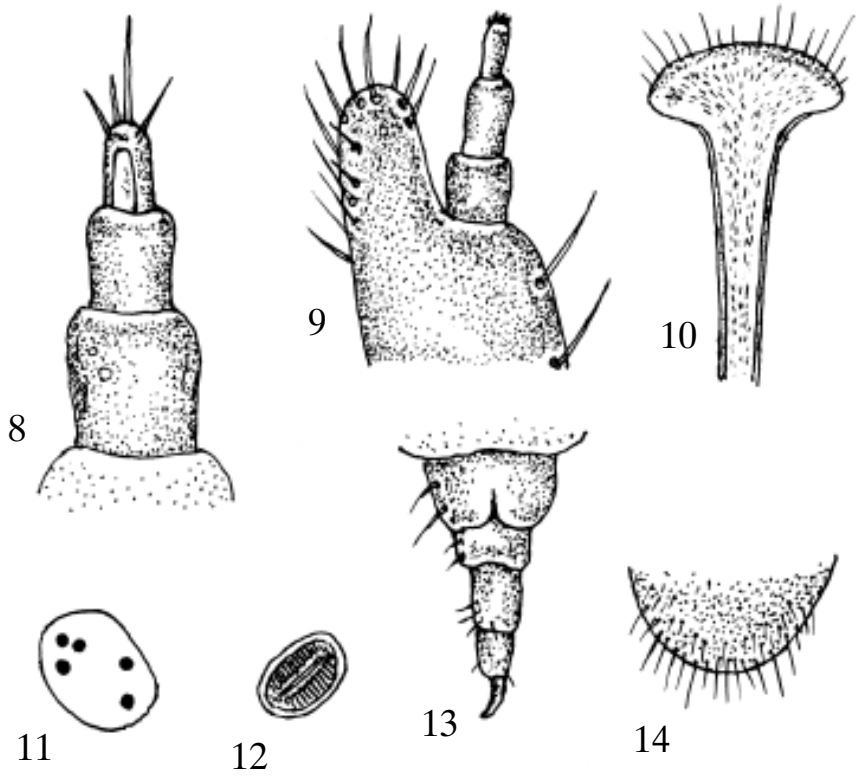


Figs. (Ryc.) 3–7. *Anisoxia fuscula*, larva (larwa). 3, 4 – head (głowa): 3 – dorsal (od strony grzbietowej), 4 – ventral (od strony brzusznej), 5–7 – left mandible (lewa żuwaczka): 5 – dorsal (od strony grzbietowej), 6 – lateral (z boku), 7 – ventral (od strony brzusznej).

parts (Figs. 4–9) movable, excluding appendages jointly about as long as wide; maxilla (Fig. 9) with slender stipes, each bearing few setae situated at the outer lateral margin; mola 2× as long as wide, rounded at apex, with a few bristles at innerdistal part and apical margin; maxillary palpomere 3-segmented, based on membranous palpifer, subequal in length, without in setae, the terminal segment with minute papillae apically; cardo undivided, subtriangular, slightly obliquely oriented. Labium (Fig. 4) with well separate trapeziform submentum, circular mentum marking at basal margin and submentum strikingly constricted at basal region, and a pair of 2-segmented

palps. Ligula distinctly membranous, obtusely rounded, covered, with minute hairs in the anterior region. Gula distinct, invaginate and glabrous; hypostomal rods long and significantly diverging posteriorly.

Thorax about 0.3 times as long as the body lenght (Figs. 1, 2), each tergum divided by a narrow longitudinal furrow; each half of a tergite with some long and many more short pointed setae. Prothorax about 0.5 times as long as wide, widest at posterior part, anterior angles broadly rounded; mesothorax about 0.4 times as long as wide, with sides rounded; metathorax similarly developed as mesothorax. Legs (Fig. 13) with coxal cavities far remote from each other; coxa strongly elevated, femur and tibia about 1.4 times as long as wide, segments of each leg armed with of fine short setae, claw curved, acuminated, devoid setae. Spiracles (Fig. 12) very small, oval, an-



Figs. (Ryc.) 8–14. *Anisoxia fuscula*, larva (larwa). 8 – antenna (czułek), 9 – maxilla (żuchwa), 10 – labrum (warga górna i nadgębie), 11 – stemmata (oczka), 12 – spiracle (przetchlinka), 13 – leg (noga), 14 – abdominal tergite IX (IX tergit odwłoka).

nular-multifrous, each situated in a membranous field beneath tergal lobes of abdominal segments I–VIII; mesothoracic spiracle larger than that of other segments.

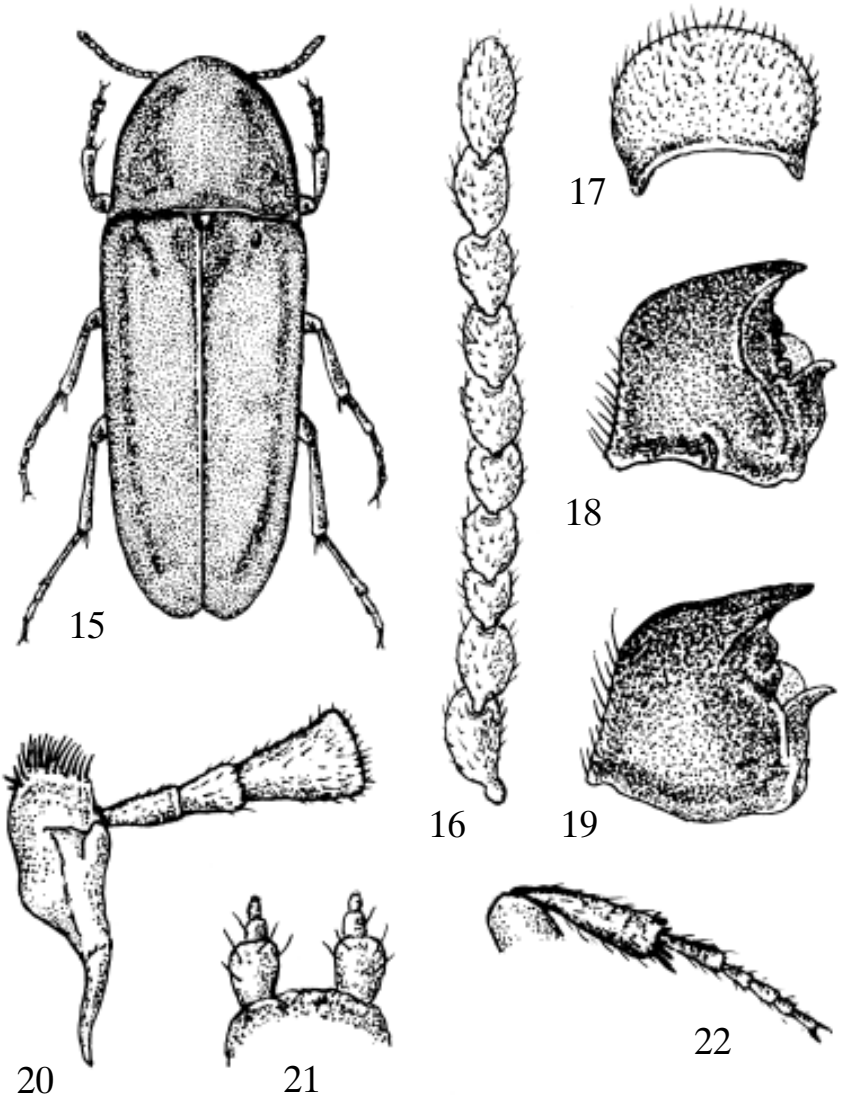
Abdomen (Figs. 1, 2) about 2.5 times as long as thorax, composed of 10 segments. Abdominal segment I–VIII similar in shape and structure to each other, divided by a longitudinal furrow, each terga and sterna with ambulacral ampullae; lateral side of each roundly swollen and protuberant, and provided with few long and short setae. Tergite IX (Figs. 1, 2, 14) small, suboval in outline, covered with radially arranged long setae. Segment X very short and ring-like.

Imago (Figs. 15–28)

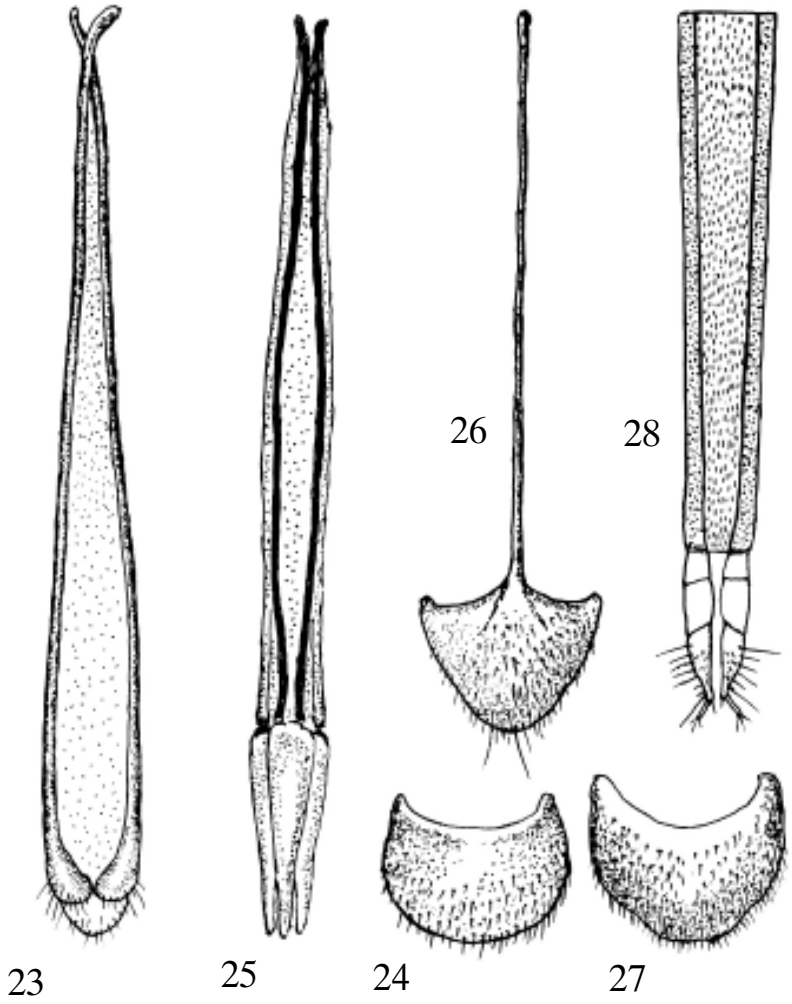
Shape elongate, subcylindrical, very convex, size 2.5 to 4.0 mm in length, breadth 1.0–1.3 mm. Color of dorsum brown, scarcely shining; antennae and legs yellow; labrum, maxillae and labium membranous, mandibles well sclerotized, reddishbrown, with black base, apice and retinaculum. Integument covered with densely yellowish-grey adpressed pubescence, and with very fine and subrugose punctation.

Head convex, strongly deflexed, completely covered by pronotum. Eyes weakly convex, slightly emarginated internally. Labrum (Fig. 17) is small piece, prominent, suboval, and setose. Antennae (Fig. 16) eleven-segmented, submoniliform, bead-like, inserted close on the front between the eyes, reaching to about base of thorax; antennomere 1 pear like, about 2.2 as long as wide, antennomere 3 small, subtriangular. Mandibles (Figs. 18, 19) characteristic; stout, widely subtriangular, very large curved, unidentate with acute apex; incisor area with a deep notch at middle, and with 2–3 obtuse additional subapical teeth, at thin, translucent prostheca and acute retinaculum; the outer edge setose. Maxilla (Fig. 20) with longitudinal cardo, rounded mala and four slender palps, from which apical one securiform; mala with tuft of black thorns apically. Prementum with 3-segmented palps, pear-shaped, the terminal subcylindrical.

Pronotum (Fig. 15) subtrapezoidal, about 1.3 as broad as long, convex, anteriorly arcuate, widest posteriorly, borders margined laterally, posterior borders slightly sinuate, on both sides with two shallow impressions at base, surface finely microrugose punctate. Prosternum very short, narrow, V-like, pointed posteriorly. Legs long, slender; front coxae contact together, tibia armed with two spurs, the mid tibia stout, flat, with internal spur 0.3 as long as tarsomere 1, penultimate tarsomere small, truncate. Scutellum small, subtriangular. Elytra entire, about 2× as long as wide and 2.7× as long as



Figs. (Ryc.) 15–22. *Anisoxia fuscula*, adult (postać dojrzała). 15 – general habitus (widok ogólny od strony grzbietowej), 16 – antenna (czułek), 17 – labrum (warga górna), 18 – left mandible dorsal (lewa żuwaczka od strony grzbietowej), 19 – right mandible ventral (prawa żuwaczka od strony brzusznej), 20 – maxilla (żuchwa), 21 – prementum (podbródek), 22 – mid tibia and tarsus (goleń i stopa środkowej pary).



Figs. (Ryc.) 23–28. *Anisoxia fuscula*, imago (postać dojrzała). 23–25 - male (samiec): 23 – abdominal sternite IX–X (IX–X sternity odwłoka), 24 – abdominal tergite IX (IX tergit odwłoka), 25 – aedeagus (aparat kopulacyjny), 26–28 – female (samica): 26 – abdominal sternite VIII (VIII sternit odwłoka), 27 – abdominal tergite VIII (VIII tergit odwłoka), 28 – ovipositor (pokładełko).

pronotum, rouded apically, subparallel for two-third of their length and thence gradually narrowed to apex, surface finely punctate, without striae; epipleural area well narrowed, decayed about hind coxae.

Abdomen with five visible sternites III–VII, sternites I–III fused in one unit, IV–VI semirectangular, VII suboval, VIII–X concealed in abdomen. Retractile segments of male (Figs. 23–25). Sternite IX (Fig. 23) membranous, slender, with two rods contact apically, about 13× as long as width posterior plates, covered by fine setae, sternite IX and X fused. Tergite I (Fig. 24) suboval, setose.

Aedeagus (Fig. 25) of trilobate type, elongate and thin, with basal piece about 3.5× as long as penis; parameres separate, with narrowly elongate, flattened horizontally lobes; penis long, slightly sinuous, supported by semichitinous parallel rods about 3.2× as long as penis.

Retractile of female (Figs. 26–28). Sternite VIII (Fig. 26) subtriangular, rounded apically, with a median process (spiculum gastrale) prolonged in a well sclerotized rod, about 3.6× as long as sternal plate. Tergite VIII (Fig. 27) subtriangular, rounded apically, setose. Ovipositor (Fig. 28) bears large valvifers with baculi, about 4× as long as coxites; styli narrow borne on the end of two-segmented, membranous, setose coxites.

Biology

In the literature few data are avaible on the biology of *Anisoxya fuscula*. Fragmentary observations are related mainly to imagines, and are limited to the date and place of finding.

HORION (1956) reported that *A. fuscula* occurs in uplands and lower mountain zones. It was found in deciduous forests, parks and gardens. HORION states on the base of informations from Germany, that many investigators have collected adults on dry twigs and branches, also under loose bark-tree. Generally the species is rare and met usually in single specimens, because it is active at nights, and it is a perfect flyer; the specimens were collected by sweeping from shrubs and herbs under trees, on forest edges, and sometimes sifted from brush-wood. PALM (1959) has taken only the adult in Sweden from June to August, only single specimens; he found beetles on dry trunks and branches, measured below 20 cm in diameter, in decayed wood of *Carpinus* L. and *Fagus* L., and also under loose tree-bark and in holes in trees.

The knowledge of larva *A. fuscula* is very fragmentary. It has been described more than 125 years ago by PERRIS (1878). The authors paper is hitherto to the only containing the original data of the larval morphology of this species, however, because this paper contains a very short and incomplete de-

scription of the larva, and poore schematic drawings. He found the larvae in France during July on branches of *Castanea* MILL., *Malus* MILL., *Robinia* L. and *Corylus* L.

I succeeded in finding the younger and full grown larvae *A. fuscula* in the field and rearing them in laboratory until the imaginal stage. During the spring and autumn 1959, 1963, 1966, 1996 I collected in four Masovian Upland localities some hibernating larvae – by cutting and splitting open the fallen slender twigs *Quercus* sp. 1–2 cm in diameter, and sprouting stalks *Acer negundo* L. 6–10 cm in diameter.

The younger larvae burrow into the inner bark in which they overwinter. In the spring they start to tunnel into sapwood, where they make excavate longitudinal galleries extend upward, parallel to the grain. Each gallery is packed throughout its length with fine woodenshawings and powdery frass. Larvae feed usually subcortically, superficially grazing the cambium and sapwood. The body of the larva is apparently adapted to bore in wood, because of its subcylindrical form, protracted head, stout mandibles, relatively short legs and abdominal ambulacral ampullae. Pupation take place in oval chamber that has been prepared earlier by the larva; under laboratory conditions the pupae emerged from April to August. The pupal stage lasts about 10–14 days. After emergence the adult stays in the pupal cell until it is fully sclerified; it going out from stalk using strong mandible as chisel. From the fact that the larvae of various sizes (3–6 mm in length) were collected on April and November, it is safely assumed that the life cycle of *A. fuscula* requires at least two years.

Collecting and rearing data

Larvae of *A. fuscula* were obtained by cutting and splitting the dry fallen twigs of *Quercus* L. and sproudings of *Acer* L., which were growing in a sunny exposed place. Several larvae were brought to the laboratory, and four cultures have been established. The breeding was carried out in stoppered glass jars of 2 liter capacity, containing the segments of twigstalks 15–20 cm length with infested larvae. The material was kept in laboratory where the temperature was about 15–20° C.

– Kampinos National Park: Narty (UTM: DC69), 12 IV 1959, at wood land edge, in fallen dry thin, slightly decayed twigs of *Quercus* L., diameter 1–2 cm, laying on ground under trees – 4 mature larvae, one larva preserved, the remainder reared in laboratory, one pupa taken out 16 IV 1959, of which adult emerged 25 IV 1959; 2 larvae died 1 VI 1960.
– Kampinos National Park: Dziekanów Leśny (DC89), 7 IV 1963, 4 mature larvae, of which 2 larvae conserved, of the remainder obtained adults on 5 V 1963.

– Kampinos National Park: Sieraków (DC89), 13 XI 1966, 2 larvae, of which one conserved, of the other reared adult on 22 V 1967.
– Warszawa, „Ogród Saski" [„Saxen Garden"] (EC08), 11 XI 1996, at edge park, in dry and hard wood of sproudings, about 10–40 cm length and 5–12 mm in diameter, grooved from base of trunk *Acer negundo* L. – some larvae 3–6 mm of length; 2 larvae preserved, the remainder reared in laboratory; 2 adults emerged 3 VII and 18 VIII 1997; 3 younger larvae seen together in one breeding twig 3 X 1997, however, I have not, unfortunately, not succeeded in rearing and these died by spring 1998, that were killed by the drying.

All material is kept in the collection of the Museum and Institute of Zoology, Polish Academy of Sciences in Warszawa.

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STRESZCZENIE

Rodzaj *Anisoxya* MULSANT zaliczany jest do plemienia *Serropalpini* w podrodzinie *Melandryinae*. Obejmuje on 5 gatunków, z których 3 opisano z Palearktyki, a 2 z Obszaru Neotropikalnego. W Palearktyce znany z 2 gatunków występujących w Japonii, a 1 z Europy Środkowej; na północ docierający do Wielkiej Brytanii, czterech południowych prowincji Szwecji i Danii, a na południe do północnej części Włoch i gór Bihar w Rumunii. W Polsce notowany z Pojezierza Mazurskiego, Niziny Wielkopolsko-Kujawskiej, Dolnego Śląska i Beskidu Wschodniego (BURAKOWSKI i in. 1987), na całym obszarze poławiany nadzwyczaj rzadko. *A. fuscula* został opisany (krótko i lakonicznie) przez ILLIGERa w 1798 roku, w rodzaju *Serropalpus*; sto lat później nieco dokładniejszy opis podał SEIDLITZ (1898), a KASZAB (1969) podał krótką diagnozę tego gatunku. W rodzaju *Anisoxya* poznano dotychczas tylko larwę *A. fuscula*, opisaną bardzo krótko i niekompletnie zilustowaną przez PERRIS'a (1878).

Na podstawie larw tego gatunku znalezionych w latach 1959, 1963, 1966 i 1996 w Kampinoskim Parku Narodowym (Narty, Dziekanów Leśny, Sieraków) i w Warszawie (Ogród Saski) oraz wyhodowanych z części z nich imagines, przedstawiono szczegółowy opis i ilustracje larwy *Anisoxya fuscula* (ILL.) (Ryc. 1–14), oraz uzupełnienie znajomość morfologii postaci dojrzałej (Ryc. 15–28).

Biologia *A. fuscula* poznana była dotychczas nadzwyczaj słabo; fragmentaryczne informacje dotyczyły wyłącznie postaci dojrzałej i ograniczały się najczęściej do dat i miejsc znalezienia. HORION (1956) donosił (głównie na podstawie obserwacji z Niemiec), że omawiany gatunek występuje na niżu i w niższych położeniach górskich, w lasach liściastych, parkach i ogrodach, a postacie dojrzałe były zbierane na opadłych suchych gałęziach różnej grubości (na ogół rzadko i pojedynczo na skutek skrytego trybu życia). PALM (1959) prowadząc obserwacje

w Szwecji, znajdował chrząszcze od czerwca do sierpnia na pniach i gałęziach o średnicy do około 20 cm, w próchniejącym drewnie graba i buka, pod obluźnioną korą i w dziuplach (próchnowiskach). PERRIS (1878) – autor wspomnianego, pierwszego niekompletnego opisu larwy *A. fuscula* podał, że we Francji osobniki tego gatunku zbierane były na gałęziach kosztana jadalnego, jabłoni, robinii akacjowej i leszczyny.

W Polsce, na czterech stanowiskach zlokalizowanych na Nizinie Mazowieckiej, larwy *A. fuscula* znaleziono w opadłych, suchych gałązkach dębu i uschniętych odroślach klonu polnego. Larwy te hodowano w laboratorium do uzyskania postaci dojrzałych, dzięki czemu uzyskano szereg interesujących informacji o biologii omawianego gatunku (hodowlę prowadzono w słojach Wecka o pojemności 2 l, przykrytych wieczkami bez gumek; temperatura podczas hodowli wahała się od 15 do 20° C).

Młode larwy drążą chodniki pod korą, gdzie przezimowują. Wiosną wygryzają w miazdze (kambium) podłużne korytarze, które ściśle zapełniają drobnymi trocinkami, mączką i przetrawionym materiałem. Larwa jest przystosowana do przesuwania się w drążonych korytarzach – ciało ma cylindryczne i miękkie, posiada mocne żuwaczki, krótkie nogi, oraz „nabrzmiałe" brodawki na tergitach i sternitach wspomagające przesuwanie się. Przepoczwarczenie następuje w owalnej komorze wydrążonej uprzednio przez larwę. W warunkach laboratoryjnych przepoczwarczenie następowało w okresie od kwietnia do sierpnia. Stadium poczwarki trwa około 10–14 dni. Wylęgnięte imago przebywa w komorze poczwarkowej kilka dni do momentu pełnego zesklerytyzowania (wybarwienia), po czym przy pomocy żuwaczek wygryza się z komory poczwarkowej na zewnątrz. Ponieważ w tym samym czasie znajdowano larwy w różnym wieku (różnej wielkości), sądzić można, że cykl rozwojowy *A. fuscula* trwa dwa lata.

Materiał wykorzystany w pracy (zarówno zakonserwowane larwy, jak i osobniki dojrzałe pochodzące z hodowli) przechowywany jest w kolekcji Muzeum i Instytutu Zoologii PAN w Warszawie.

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