ANTHOPHORA CRASSIPES LEPELETIER, 1841 (HYMENOPTERA, APIDAE: ANTHOPHORIDAE) - НОВЫЙ ВИД ПЧЕЛ ДЛЯ ФАУНЫ БЕЛАРУСИ

ANTHOPHORA CRASSIPES LEPELETIER, 1841 (HYMENOPTERA, APIDAE: ANTHOPHORIDAE) – A NEW BEE SPECIES FOR THE FAUNA OF BELARUS

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Новый вид пчел *Anthophora crassipes* (Hymenoptera, Anthophoridae) отмечен в фауне Беларуси. Дано подробное описание вида с указанием морфологических признаков, которые могут быть полезны для идентификации видов с внешне схожими таксонами. Отмечена очень низкая степень осведомленности о биологии, экологии и опыляемой деятельности этого вида в регионе исследований.

New species of longhorn bee *Anthophora crassipes* (Hymenoptera, Anthophoridae) is noted for the fauna of Belarus. A detailed description of the species is given, indicating the morphological characters that can be useful for identification with externally similar taxa. Noted the very low degree of knowledge about biology, ecology and pollinated activities of this species in the region of research.

Ключевые слова: Aculeata, новый вид, опылители, фауна Беларуси.

Keywords: Aculeata, new record, pollinators, fauna of Belarus.

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The *Anthophorini* (Hymenoptera: Apidae) are a tribe of large to small bees (6–30 mm) known for their fast flight and generalist floral tendencies [1, 2]. A large number of synonymies were made in review of the tribe *Anthophorini* without any formal argument [3]. This family differs in typical features that make it possible to identify it very clearly from other bees from fauna of Belarus. They are primary large bees. The labrum is usually wider than its length or narrowed at the junction with the clypeus, tongue is long [1, 2]. The sub-sutures are directed to the inner edge of the antennal fossa. There is no subsonic field. The first two segments of the labial palp are elongated and flattened; the first segment is longer than the second. The eyes grooves are almost always absent. Gathering hairs of females of nesting species are located on the hind tibia, but do not form baskets [1, 2]. The family is dominated by parasitic forms. They nest, except for parasitic ones, in the ground, in burrows in clay walls in an old tree in dry stems of plants sometimes colonially.

Anthophora is a large genus that includes around 400 species all over the world. 178 species are presently known for West-Palaearctic region. They are all solitary species, most of them digging their simple nest in dry ground, giving their English name “digger bees”. They are specially abundant and diversified in arid or subarid biomes, e.g. in steppes and Mediterranean biota. Very few species cross the 50th parallell to the north and only two reach the Arctic Circle. They are foraging mainly flowers with long corollae, as Boraginaceae, Lamiaceae, Leguminosae, Scophulariaceae and Compositae from the Carduae tribe (thistles) [1]. All species are fast flyers. Some taxa are incredibly agile. For these reasons, they could be extremely difficult to sample. It leads to a clear underestimated abundance and distribution of most species. A lot of taxa are known just by their type-serie and few supplementary specimens. The taxonomic complexity of the Anthophorinae derives from a great variability of external morphological characters such as patterns of hairiness and coloration [2]. This has caused a great nomenclatorial confusion due to the high number of infraspecific forms described.

The Anthophorini tribe includes large bees hairy, robust, very fast flying. The representatives of this tribe are solitary and nest in the ground (except the species of the subgenus Clisodon Patton, 1879, which nest in rotten wood or dense stems) [2]. We count about 700 species and 7 genera [2]. The genus *Anthophora* Latreille, 1803, includes about 400 species and 14 subgenera [4]. It is abundant in the holarctic region and Africa, rare in the neotropical region and Southeast Asia and absent from the Indo Australian and Madagascar region [2]. This species has been found in most countries bordering the Mediterranean and here and there in Central Europe [4]. It is also found in Ukraine, in the south of Russia, in Caucasus, Turkey. In North Africa, it was not known so far only from Morocco and Egypt [5].

We collected one specimens of the species from purple flowers in Belarusian State University Botanical gardens in the end of July in 2018. Insect was catched using standard entomological sac.

To the identification of the specimens was used the key of European part of the USSR hymenoptera insects [4] and key for bees of Germany. Anthophora females can be distinguished using criteria from hairs colour patterns and punctation. Some of the males identification criteria are facial yellow patterns, shape of posterior legs, hairs of the median legs, and may require genitalia comparisons. Photomicrographs were prepared by author using Canon 1100D digital camera attached to microscope lens and employing a Xenon flash.

One of the difficulties in defining this type is that synonyms (Synonyms: *Podalirius* Latreille, 1802; *Lasius* Panzer, 1804; *Megilla* Fabricius, 1804; *Saropoda* Latreille, 1809; *Micranthophora* Cockerell, 1906; *Solamegilla* Marikovskaya, 1980.) of this species are often used in books and keys, which makes identification difficult [4]. Also this species more close to *Habropoda* species but they are have some small differences. Anthophora species have a distinctly short marginal cell, as well as recurrent veins reaching the middle of submarginal cell 2 and an interfurcal nervulus.

Habropoda species have a more elongated tip of marginal cell (the apex of the anterior margin of submarginal cell 3 reaches only the middle of the marginal cell), a recurrent vein reaching the apex of submarginal cell 2 and a post-furcal nervulus.

Fig. 1 – Dorsal, lateral and face view of Anthophora crassipes

Female length approximately 9 millimeters. Head all black. There is no development of the malar area. The jaws are bidentate. Integument of the legs dark. Rounded patela. White scoop present on hind tibia. Integument dark and abdomen with yellowish hairs. Pygidial plate elongated. Head has white hairs, it has many black hairs on the vertex. The thorax has whitish hairs, on the disc there are many black hairs. The third antenna segment is almost as long as the following four segments together [2]. Males have yellow facial markings. They are mainly hairy whitish but the crown and the mesonotum are mixed with black hair. The second to seventh tergites have short black hairs, the first five tergites also have white hair bands on the rear edge. The tarsi of the middle legs are not noticeably hairy. The

seventh tergites has two teeth at the end [4]. The thighs (femora) of the hind legs have a flat cusp on the underside and a pointed spine in the middle. The rails (tibia) of the hind legs are drawn out into a strong point at the front end [4].

Geographic distribution. The species is widespread in Southern Europe, occasionally in Central Europe and the Aosta Valley . It flies from late May to mid-October [2]. The females create their nests in the ground. Pollen is collected from different plant families. This species gives more abundant in the center and south of Europe for example, localities cited only for Spain are. Barcelona, Cáceres, Ciudad Real, Cuenca, Gerona, Guipúzcoa, Huesca, La Coruña, Logroño, Madrid, Orense, Pontevedra, Teruel, Valencia, Valladolid and Vizcaya [4].

Anthophora crassipes usually nests gregariously in vertical soil profiles, such as coastal cliffs and, inland, in sand pits, soft mortar joints and cob walls. Such sites are used annually, so that with time and erosion old cells are occasionally brought to the surface. Individual cells are pitcher-shaped, the walls and closing lid being fashioned from compacted soil which is almost certainly impregnated with a secretion from the Dufour's gland [2]. The cells can be readily extracted from the surrounding substrate when it excavated. Both sexes pass the winter newly emerged in their sealed cells which can be confirmed for Belarus by further research. This is the common host of the cleptoparasitic bee *Melecta albifrons* [5]. Parasitoids of *Anthophora* genera are the eurytomid chalcid *Monodontomerus obsoletus* and an unidentified eulophid chalcid in the genus *Melittobia* (a hyperparasitoid of the *M. obsoletus* larva). Females of the bee-fly *Bombylius discolor* have been seen about the nest burrows of the bee in Western Europe, and thus this fly may prove to be a cleptoparasite of *A. crassipes* [5].

All species from genus *Anthophora* are fast flyers. Some of them are incredibly agile. For these reasons, they could be extremely difficult to sample. It leads to a clear underestimated abundance and distribution of this species. The bees prepare food for the larvae, usually in the form of a mixture of pollen and nectar. The ratio of these components in different species varies greatly, as a result of which the consistency of the feed can be from pasty to almost liquid [4]. *Anthophora* bees add the secretions of the gland to the food for the larvae Dufour and mandibular glands [6, 7, 8]. These secrets, in addition, have a fungicidal effect, protecting the pollen in the cells from mold, as well as inhibiting, sharply reducing the ability of pollen grains to germinate already on the body of bees immediately after taking pollen from flowers [5].

Although these models have identified several important factors for these bees, additional variables may prove useful for future investigations. Given that *Anthophora* are almost all ground nesters, it would be interesting to incorporate soil parameters into future analyses to determine if this would refine the habitat suitability models. This study demonstrates the value in taxonomic studies where molecular data are not available and suggests its usefulness in future studies. As mentioned above, females often use old passages of other insects, and sometimes spiders [4]. In these cases, the entrance to the socket may be atypical for bees. For example, a nest of *Anthophora* was found, built using the top of an old spider burrow; walls of the entrance to this nest was made from dry blades of grass held together by cobwebs [5, 9, 10].

Visiting only one species of flowers allows you to quickly master the techniques the most effective work on it and the best to remember them. The possibility of a more dense packing of homogeneous pollen in pollen cargo apparently [4, 8]. Although polylectic bees usually prefer visit the most abundantly flowering plant species and among them those whose flowers have the largest pollen reserves, some individuals of honey bees and bumblebees can show constancy to plants with less pollen and or nectar in flowers [4]. This feature of *Anthophora crassipes* makes them very promising species for pollination of economically important plants and requires further study.

The protection of the loosestrife stocks is therefore the most important and urgent protective measure for this solitary oligolectic bee. Of particular importance is the fact that these bees use extremely limited resources for their nesting [11]. As important and promising pollinators, these bees need further research in Belarus.

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ДИФФЕРЕНЦИАЦИЯ СОСНЯКОВ, ПРОИЗРАСТАЮЩИХ В ДОЛГОМОШНОМ И БАГУЛЬНИКОВОМ ТИПАХ ЛЕСА ПО МОРФОЛОГО-АНАТОМИЧЕСКИМ ПАРАМЕТРАМ ГОДИЧНЫХ СЛОЕВ

DIFFERENTIATION OF PINE GROWING IN WILD ROSEMARY AND POLYTRIC FOREST TYPES BY MORPHOLOGICAL-ANATOMIC PARAMETERS OF ANNUAL LAYERS

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В работе проведен сравнительный анализ морфолого-анатомических структур годичных слоев у сосняка долгомошного (*Pinetum polytrichosum*) и сосняка багульникового (*Pinetum ledosum*). Установлено, что радиальный диаметр ранних и поздних трахеид и их полостей, площадь клеточной стенки и площадь полости ранних и поздних трахеид, а также количество поздних трахеид в радиальном ряду годичного слоя могут служить маркерами для проведения дифференцирования данных типов леса, даже несмотря на довольно схожие условия произрастания.

The article provides a comparative analysis of the morphological and anatomical structures of annual layers in the long moss pine forest (*Pinetum polytrichosum*) and the wild rosemary pine forest (*Pinetum ledosum*). It has been established that the radial diameter of the early and late tracheids and their cavities, the area of the cell wall and the area of the cavity of the early and late tracheids, as well as the number of late tracheids in the radial row of the annual layer can serve as markers for differentiating these forest types, even in spite of fairly similar conditions growth.

Ключевые слова: тип леса, сосна обыкновенная, микроанатомическая структура, трахеиды, метод главных компонент.

Keywords: forest type, Scots pine, microanatomical structure, tracheids, principal component analysis.

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Лесоматериалы относятся к группе товаров, установить происхождение которых зачастую бывает проблематично, что затрудняет контроль за их оборотом и препятствует раскрытию правонарушений, связанных с нелегальными рубками и продажей древесины.

Наиболее точным и доступным инструментом для установления территориальной принадлежности древесины на сегодняшний день остается дендрохронологический анализ [1]. Однако, существуют такие серии типов леса и условий местопроизрастания, в пределах которых изменчивость радиального прироста насаждений сравнительно мало отличается, например сосняки, произрастающие на почвах избыточного увлажнения.