

Учреждение образования
«Барановичский государственный университет»

Вестник БарГУ

Ежеквартальный научно-практический журнал

Издаётся с марта 2013 г.

Выпуск 7, сентябрь, 2019.

Серия «Биологические науки (общая биология). Сельскохозяйственные науки (агрономия)»

Учредитель: учреждение образования «Барановичский государственный университет».

РЕДАКЦИОННАЯ КОЛЛЕГИЯ

Главный редактор журнала Кочурко Василий Иванович, доктор сельскохозяйственных наук, профессор, академик Белорусской инженерной академии, академик Международной академии технического образования, академик Международной академии наук педагогического образования, академик Академии экономических наук Украины, Заслуженный работник образования Республики Беларусь, ректор учреждения образования «Барановичский государственный университет» (Барановичи, Республика Беларусь).

Заместитель главного редактора журнала Климук Владимир Владимирович, кандидат экономических наук, доцент, проректор по научной работе учреждения образования «Барановичский государственный университет» (Барановичи, Республика Беларусь).

РЕДАКЦИОННАЯ КОЛЛЕГИЯ СЕРИИ

Главный редактор серии

Рындевич Сергей Константинович, кандидат биологических наук, доцент, доцент кафедры естественнонаучных дисциплин учреждения образования «Барановичский государственный университет» (Барановичи, Республика Беларусь).

Редактор текстов на английском языке

Карапетова Елена Геннадьевна, кандидат филологических наук, доцент, заведующий кафедрой теории и практики перевода №1 учреждения образования «Минский государственный лингвистический университет» (Минск, Республика Беларусь).

Абарова Елена Эдуардовна (*ответственный за направление «Агрономия»*), кандидат сельскохозяйственных наук, доцент, директор обособленного структурного подразделения «Ляховичский государственный аграрный колледж» учреждения образования «Барановичский государственный университет» (Ляховичи, Республика Беларусь);

Земоглядчук Алексей Владимирович (*ответственный за направление «Общая биология»*), кандидат биологических наук, доцент, заведующий кафедрой естественнонаучных дисциплин учреждения образования «Барановичский государственный университет» (Барановичи, Республика Беларусь);

Александрович Олег Родославович, доктор биологических наук, профессор, заведующий кафедрой зоологии Поморской академии в Слупске (Слупск, Польша);

Бизюкова Татьяна Тимофеевна, кандидат сельскохозяйственных наук, старший преподаватель кафедры естественнонаучных дисциплин учреждения образования «Барановичский государственный университет» (Барановичи, Республика Беларусь);

Бушуева Вера Ивановна, доктор сельскохозяйственных наук, профессор, профессор кафедры селекции и генетики учреждения образования «Белорусская государственная орденов Октябрьской Революции и Трудового Красного Знамени сельскохозяйственная академия» (Горки, Республика Беларусь);

Гриб Станислав Иванович, академик Национальной академии наук Беларуси, доктор сельскохозяйственных наук, профессор, главный научный сотрудник Республиканского унитарного предприятия «Научно-практический центр Национальной академии Беларуси наук по земледелию» (Жодино, Республика Беларусь);

Гричик Василий Витальевич, доктор биологических наук, доцент, заведующий кафедрой общей экологии и методики преподавания биологии Белорусского государственного университета (Минск, Республика Беларусь);

Джус Максим Анатольевич, кандидат биологических наук, доцент, доцент кафедры ботаники Белорусского государственного университета (Минск, Республика Беларусь);

Ерошов Анатолий Иванович, доктор биологических наук, профессор, академик Международной академии экологии, профессор кафедры энергоэффективных технологий учреждения образования «Международный государственный экологический университет имени А. Д. Сахарова» Белорусского государственного университета (Минск, Республика Беларусь);

Кильчевский Александр Владимирович, член-корреспондент Национальной академии наук Беларуси, доктор биологических наук, профессор, главный ученый секретарь Национальной академии наук Беларуси (Минск, Республика Беларусь);

Лукашевич Нина Петровна, доктор сельскохозяйственных наук, профессор, заведующий кафедрой кормопроизводства учреждения образования «Витебская ордена “Знак почёта” государственная академия ветеринарной медицины» (Витебск, Республика Беларусь);

Прокин Александр Александрович, кандидат биологических наук, старший научный сотрудник федерального государственного бюджетного учреждения науки «Институт биологии внутренних вод имени И. Д. Папанина Российской академии наук» (п. Борок, Российская Федерация);

Цзя Фенлонг, доктор, профессор, Институт энтомологии, факультет естественных наук, Университет имени Сунь Ятсена (Гуанчжоу, Китайская Народная Республика);

Шаманаев Виктор Анатольевич, доктор сельскохозяйственных наук, старший научный сотрудник, профессор кафедры агрономии и экологии федерального государственного бюджетного образовательного учреждения высшего профессионального образования «Смоленская государственная сельскохозяйственная академия» (Смоленск, Российская Федерация).

Шофман Леонид Исаакович, доктор сельскохозяйственных наук, старший научный сотрудник Республиканского унитарного предприятия «Минская областная сельскохозяйственная опытная станция Национальной академии наук Беларуси» (п. Натальевск, Республика Беларусь);

Янчуревич Ольга Викторовна, кандидат биологических наук, доцент, заведующий кафедрой зоологии и физиологии человека и животных учреждения образования «Гродненский государственный университет имени Янки Купалы» (Гродно, Республика Беларусь).

Адрес редакции:

ул. Войкова, 21, 225404 г. Барановичи.

Телефон: +375 (163) 45 46 28.

E-mail: vestnik@barsu.by.

Подписные индексы: 00993 — для индивидуальных подписчиков; 009932 — для организаций.

Свидетельство о регистрации средств массовой информации №1533 от 30.07.2012, выданное Министерством информации Республики Беларусь.

В соответствии с приказом Высшей аттестационной комиссии Республики Беларусь от 21 января 2015 г. № 16 научно-практический журнал «Вестник БарГУ» серия «Биологические науки (общая биология). Сельскохозяйственные науки (агрономия)» включён в Перечень научных изданий Республики Беларусь для опубликования результатов диссертационных исследований по биологическим наукам (общая биология), сельскохозяйственным наукам (агрономия).

Научно-практический журнал «Вестник БарГУ» включён в РИНЦ (Российский индекс научного цитирования), лицензионный договор № 06-1/2016.

Издатель: учреждение образования «Барановичский государственный университет».

Выходит на русском, белорусском и английском языках.

Журнал распространяется на территории Республики Беларусь.

Заведующий редакционно-издательской группой С. А. Березнюк

Технический редактор А. Ю. Сидоренко

Компьютерная вёрстка С. А. Березнюк

Корректор С. А. Березнюк

Подписано в печать 13.09.2019. Формат 60 × 84 ¹/₈. Бумага офсетная. Печать цифровая. Гарнитура Таймс. Усл. печ. л. 18,50. Уч.-изд. л. 14,10. Тираж 75 экз. Заказ

Цена свободная.

Полиграфическое исполнение: Гродненское областное унитарное полиграфическое предприятие «Слонимская типография». Свидетельство о государственной регистрации издателя, изготовителя, распространителя печатных изданий № 1/203 от 07.03.2014, № 2 от 25.02.2014.

Адрес: ул. Хлюпина, 16, 231800 Слоним, Гродненская обл.

© БарГУ, 2019

Установа адукацыі
«Баранавіцкі дзяржаўны ўніверсітэт»

Веснік БарДУ

Штоквартальны навукова-практычны часопіс

Выдаецца з сакавіка 2013 г. Выпуск 7, верасень, 2019.

Серыя «Біялагічныя навукі (агульная
біялогія). Сельскагаспадарчыя
навукі (аграномія)»

Заснавальнік: установа адукацыі «Баранавіцкі дзяржаўны ўніверсітэт».

РЭДАКЦЫЙНАЯ КАЛЕГІЯ

Галоўны рэдактар часопіса Качурка Васіль Іванавіч, доктар сельскагаспадарчых навук, прафесар, акадэмік Беларускай інжынернай акадэміі, акадэмік Міжнароднай акадэміі тэхнічнай адукацыі, акадэмік Міжнароднай акадэміі навук педагагічнай адукацыі, акадэмік Акадэміі эканамічных навук Украіны, Заслужаны работнік адукацыі Рэспублікі Беларусь, рэктар установы адукацыі «Баранавіцкі дзяржаўны ўніверсітэт» (Баранавічы, Рэспубліка Беларусь).

Намеснік галоўнага рэдактара часопіса Клімук Уладзімір Уладзіміравіч, кандыдат эканамічных навук, дацэнт, прарэктар па навуковай рабоце ўстановы адукацыі «Баранавіцкі дзяржаўны ўніверсітэт» (Баранавічы, Рэспубліка Беларусь).

РЭДАКЦЫЙНАЯ КАЛЕГІЯ СЕРЫІ

Галоўны рэдактар серыі

Рындзевіч Сяргей Канстанцінавіч, кандыдат біялагічных навук, дацэнт, дацэнт кафедры прыродазнаўчых дысцыплін установы адукацыі «Баранавіцкі дзяржаўны ўніверсітэт» (Баранавічы, Рэспубліка Беларусь).

Рэдактар тэкстаў на англійскай мове

Карапетава Алена Генадзьеўна, кандыдат філалагічных навук, дацэнт, загадчык кафедры тэорыі і практыкі перакладу № 1 установы адукацыі «Мінскі дзяржаўны лінгвістычны ўніверсітэт» (Мінск, Рэспубліка Беларусь).

Абаравы Алена Эдуардаўна (*адказы за напрамак «Аграномія»*), кандыдат сельскагаспадарчых навук, дацэнт, дырэктар адасобленага структурнага падраздзялення «Ляхавіцкі дзяржаўны аграрны каледж» установы адукацыі «Баранавіцкі дзяржаўны ўніверсітэт» (Ляхавічы, Рэспубліка Беларусь);

Земаглядчук Аляксей Уладзіміравіч (*адказы за напрамак «Агульная біялогія»*), кандыдат біялагічных навук, дацэнт, загадчык кафедры прыродазнаўчых дысцыплін установы адукацыі «Баранавіцкі дзяржаўны ўніверсітэт» (Баранавічы, Рэспубліка Беларусь);

Александровіч Алег Радаслававіч, доктар біялагічных навук, прафесар, загадчык кафедры заалогіі Паморскай акадэміі ў Слупску (Слупск, Польшча);

Біюкова Таццяна Цімафееўна, кандыдат сельскагаспадарчых навук, старшы выкладчык кафедры прыродазнаўчых дысцыплін установы адукацыі «Баранавіцкі дзяржаўны ўніверсітэт» (Баранавічы, Рэспубліка Беларусь);

Бушуева Вера Іванаўна, доктар сельскагаспадарчых навук, прафесар, прафесар кафедры селекцыі і генетыкі ўстановы адукацыі «Беларуская дзяржаўная ордэнаў Кастрычніцкай Рэвалюцыі і Працоўнага Чырвонага Сцяга сельскагаспадарчая акадэмія» (Горкі, Рэспубліка Беларусь);

Грыб Станіслаў Іванавіч, акадэмік Нацыянальнай акадэміі навук Беларусі, доктар сельскагаспадарчых навук, прафесар, галоўны навуковы супрацоўнік Рэспубліканскага ўнітарнага прадпрыемства «Навукова-практычны цэнтр Нацыянальнай акадэміі навук Беларусі па земляробстве» (Жодзіна, Рэспубліка Беларусь);

Грычык Васіль Вітальевіч, доктар біялагічных навук, дацэнт, загадчык кафедры агульнай экалогіі і методыкі выкладання біялогіі Беларускага дзяржаўнага ўніверсітэта (Мінск, Рэспубліка Беларусь);

Джус Максім Анатольевіч, кандыдат біялагічных навук, дацэнт, дацэнт кафедры батанікі Беларускага дзяржаўнага ўніверсітэта (Мінск, Рэспубліка Беларусь);

Ерашоў Анатоль Іванавіч, доктар біялагічных навук, прафесар, акадэмік Міжнароднай акадэміі экалогіі, прафесар кафедры энергаэфектыўных тэхналогій установы адукацыі «Міжнародны дзяржаўны экалагічны ўніверсітэт імя А. Д. Сахарова» Беларускага дзяржаўнага ўніверсітэта (Мінск, Рэспубліка Беларусь);

Кільчэўскі Аляксандр Уладзіміравіч, член-карэспандэнт Нацыянальнай акадэміі навук Беларусі, доктар біялагічных навук, прафесар, галоўны навуковы сакратар Нацыянальнай акадэміі навук Беларусі (Мінск, Рэспубліка Беларусь);

Лукашэвіч Ніна Пятроўна, доктар сельскагаспадарчых навук, прафесар, загадчык кафедры кормавытворчасці ўстановы адукацыі «Віцебская ордэна «Знак пашаны» дзяржаўная акадэмія ветэрынарнай медыцыны» (Віцебск, Рэспубліка Беларусь);

Прокін Аляксандр Аляксандравіч, кандыдат біялагічных навук, старшы навуковы супрацоўнік федэральнай дзяржаўнай бюджэтнай установы навукі «Інстытут біялогіі ўнутраных водаў імя І. Д. Папаніна Расійскай акадэміі навук» (п. Барок, Расійская Федэрацыя);

Цзя Фенлонг, доктар, прафесар, Інстытут энтамалогіі, факультэт прыродазнаўчых навук, Універсітэт імя Сунь Ятсена (Гуанчжоу, Кітайская Народная Рэспубліка);

Шаманаеў Віктар Анатольевіч, доктар сельскагаспадарчых навук, старшы навуковы супрацоўнік, прафесар кафедры аграноміі і экалогіі федэральнай дзяржаўнай бюджэтнай адукацыйнай установы вышэйшай прафесійнай адукацыі «Смаленская дзяржаўная сельскагаспадарчая акадэмія» (Смаленск, Расійская Федэрацыя).

Шофман Леанід Ісаакавіч, доктар сельскагаспадарчых навук, старшы навуковы супрацоўнік Рэспубліканскага ўнітарнага прадпрыемства «Мінская абласная сельскагаспадарчая доследная станцыя Нацыянальнай акадэміі навук Беларусі» (п. Натальеўск, Рэспубліка Беларусь);

Янчурэвіч Вольга Віктараўна, кандыдат біялагічных навук, дацэнт, загадчык кафедры заалогіі і фізіялогіі чалавека і жывёл установы адукацыі «Гродзенскі дзяржаўны ўніверсітэт імя Янкі Купалы» (Гродна, Рэспубліка Беларусь).

Адрас рэдакцыі:

вул. Войкава, 21, 225404 г. Баранавічы.

Тэлефон: +375 (163) 45 46 28.

E-mail: vestnik@barsu.by .

Падпісныя індэксы: 00993 — для індывідуальных падпісчыкаў; 009932 — для арганізацый.

Пасведчанне аб рэгістрацыі сродкаў масавай інфармацыі № 1533 ад 30.07.2012, выданае Міністэрствам інфармацыі Рэспублікі Беларусь.

У адпаведнасці з загадам Вышэйшай атэстацыйнай камісіі Рэспублікі Беларусь ад 21 студзеня 2015 г. № 16 навукова-практычны часопіс «Веснік БарДУ» серыя «Біялагічныя навукі (агульная біялогія). Сельскагаспадарчыя навукі (аграномія)» уключаны ў Пералік навуковых выданняў Рэспублікі Беларусь для апублікавання вынікаў дысертацыйных даследаванняў па біялагічных навуках (агульная біялогія), сельскагаспадарчых навуках.

Навукова-практычны часопіс «Веснік БарДУ» уключаны ў РІНЦ (Расійскі індэкс навуковага цытавання), ліцэнзійны дагавор № 06-01/2016.

Выдавец: установа адукацыі «Баранавіцкі дзяржаўны ўніверсітэт».

Выходзіць на рускай, беларускай і англійскай мовах.

Часопіс распаўсюджваецца на тэрыторыі Рэспублікі Беларусь.

Загадчык рэдакцыйна-выдавецкай групы С. А. Беразнюк

Тэхнічны рэдактар Г. Ю. Сідарэнка

Камп'ютарная вёрстка С. А. Беразнюк

Карэктар С. А. Беразнюк

Падпісана да друку 13.09.2019. Фармат 60 × 84 ¹/₈. Папера афсетная. Друк лічбавы. Гарнітура Таймс. Ум. друк. арк. 18,50. Ул.-выд. арк. 14,15. Тыраж 75 экз. Заказ

Кошт свабодны.

Паліграфічнае выкананне: Гродзенскае абласное ўнітарнае паліграфічнае прадпрыемства «Слоніўская тыпаграфія». Пасведчанне аб дзяржаўнай рэгістрацыі выдаўца, вытворцы, распаўсюджвальніка друкаваных выданняў № 1/203 ад 07.03.2014, № 2 ад 25.02.2014.

Адрас: вул. Хлюпіна, 16, 231800 Слонім, Гродзенская вобл.

© БарДУ, 2019

Education institution
“Baranovichi State University”

BarSU Herald

A quarterly scientific-and-practical journal

Published since March 2013

Volume 7, September 2019.

Series “Biological sciences
(general biology). Agricultural
sciences (agronomy)”

Promoter: educational institution “Baranovichi State University”.

EDITORIAL BOARD

Editor-in-Chief Vasilii I. Kochurko, Doctor of Agriculture, Professor, Member of the Belarusian Academy of Engineering, Member of the International Academy of Technical Education, Member of the International Academy of Pedagogical Education, Member of the Academy of Economic Sciences of Ukraine, Distinguished Educator of the Republic of Belarus, Rector of Baranovichi State University (Baranovichi, the Republic of Belarus).

Deputy Editor-in-Chief Vladimir V. Klimuk, Ph. D. in Economic Sciences, associate professor, Vice-rector for Scientific Work of Baranovichi State University (Baranovichi, the Republic of Belarus).

EDITORIAL BOARD OF THE SERIES

Editor of the issue

Sergey K. Ryndevich, Ph. D. in Biology, associate professor at the Department of Sciences, the Education Institution “Baranovichi State University” (Baranovichi, the Republic of Belarus).

English Text Editor

Yelena G. Karapetova, Ph. D. in Philology, Head of the Translation and Interpreting Department No 1 at the Education Institution “Minsk State Linguistic University” (Minsk, the Republic of Belarus).

Yelena E. Abarova (*responsible for the topic area “Agronomy”*), Ph. D. in Agriculture, associate professor, Head of the economically autonomous structural subdivision “Lyakhovichi State Agricultural Colledge” at the Education Institution “Baranovichi State University” (Lyakhovichi, the Republic of Belarus);

Aleksey V. Zemoglyadchuk (*responsible for the topic area “General Biology”*), Ph. D. in Biology, associate professor, Head of the Department of Sciences, the Education Institution “Baranovichi State University” (Baranovichi, the Republic of Belarus);

Oleg R. Alexandrovich, D. Sc. in Biology, Professor, Head of the Department of Zoology at Pomorsk Academy in Slupsk (Slupsk, Poland);

Tatyana T. Bizyukova, Ph. D. in Agriculture, Senior Lecturer of the Department of Sciences, the Education Institution “Baranovichi State University” (Baranovichi, the Republic of Belarus);

Vera I. Bushueva, D. Sc. in Agriculture, professor at the Department of Selection and Genetics, the Education Institution “The Belarusian State Agricultural Academy in the name of order of the October Revolution and Labor Red Banner” (Gorki, the Republic of Belarus);

Stanislav I. Grib, D. Sc. in Agriculture, member of the National Academy of Sciences of Belarus, Head Researcher at the Republican Unitary Enterprise “The Scientific-and-Practical Centre of the National Academy of Sciences of Belarus for Arable Farming” (Zhodino, the Republic of Belarus);

Vitaly V Grichik, D. Sc. in Biology, Head of the Department of General Ecology and Methods of Teaching Biology the Belarusian State University (Minsk, the Republic of Belarus);

Maxim A. Dzhus, Ph. D. in Biology, associate professor at the Department of Botany the Belarusian State University (Minsk, the Republic of Belarus);

Anatoly I. Eroshov, D. Sc. in Biology, Member of the International Academy of Ecology, Professor at the Department of Energy Efficient Technologies, at the Education Institution “The International State University of Ecology named after A. D. Sakharov” the Belarusian State University (Minsk, the Republic of Belarus);

Alexander V. Kilchevskiy, D. Sc. in Biology, corresponding member of the National Academy of Sciences of Belarus, Chief Scientific Secretary of the National Academy of Sciences of Belarus (Minsk, the Republic of Belarus);

Alexander A. Prokin, Ph. D. in Biology, Senior Researcher at the Papanin Institute for Biology of Inland Waters Russian Academy of Sciences (Borok, the Russian Federation);

Nina P. Lukashevich, D. Sc. in Agriculture, Head of the Department of Fodder Cropping at the Education Institution “Vitebsk of the Badge of Honor Order State Academy of Veterinary Medicine” (Vitebsk, the Republic of Belarus);

Fenglong Jia, Ph. D. in Biology, Institute of Entomology, School of Life Sciences, Sun Yat-sen University (Guangzhou, China);
Viktor A. Shamanayev, D. Sc. in Agriculture, Senior Researcher at the Department of Agronomical Science and Ecology, the Federal State Education Institution of Higher Vocational Education “Smolensk State Academy of Agriculture” (Smolensk, the Russian Federation).

Leonid I. Shofman, D. Sc. in Agriculture, Senior Researcher at the Republican Unitary Enterprise “Minsk Regional Agricultural Experimental Station” of the National Academy of Sciences of Belarus (Natalyevsk, the Republic of Belarus);

Olga V. Yanchurevich, Ph. D. in Biology, Head of the Department of Zoology and Physiology of Man and Animals, the Education Institution “Grodno State University named after Yanka Kupala” (Grodno, the Republic of Belarus).

Editorial address:

21 Voykova Str., 225404 Baranovichi. Phone: +375 163 45 46 28.

E-mail: vestnik@barsu.by .

Subscription indexes: 00993 — for individual subscribers; 009932 — for companies.

The certificate of the registration of mass media № 1533 of 30.07.2012 issued by the Ministry of Information of Belarus.

In accordance with the order of the board of the Higher Attestation Commission of the Republic of Belarus on January 21, 2015 № 16 the scientific-and-practical journal “BarSU Herald”, the series “Biological sciences (general biology). Agricultural sciences (agronomy)” was included on the list of the scientific publications of the Republic of Belarus for publishing the results of dissertation research in biological sciences (general biology), agricultural sciences (agronomy).

Scientific-and-practical journal “BarSU Herald” is included into RSCI (Russian Science Citation Index), license agreement № 06-01/2016.

Published: educational institution “Baranovichi State University”.

Issued in Russian, Belarusian and English.

The journal is distributed on the territory of the Republic of Belarus.

Managing editor S. A. Bereznyuk
Technical editor A. Y. Sidorenko
Desktop Publishing S. A. Bereznyuk
Proofreader S. A. Bereznyuk

Signed to print 13.09.2019. Format 60 x 84 ¹/₈. Offset paper. Digital printing. Headset Times. Cond. print. l. 18.50. Acc.-pub. l. 14.15.
Circulation: 75 copies. Order

Free price.

Printing performance: Grodno Regional Printing Unitary Enterprise “Slonim printing establishment”. The state registration certificate of the publisher, manufacturer and publications distributor № 1/203 of 07.03.2014, № 2 of 25.02.2014.

Address: 16 Hlyupin St., 231800 Slonim, Grodno region.

СОДЕРЖАНИЕ

БИОЛОГИЧЕСКИЕ НАУКИ

Общая биология

Заика Ю. В., Аникина Н. Ю. О новых местонахождениях микроостатков морских организмов в отложениях верхнего кайнозоя Беларуси	9
Земоглядчук К. В. Стациональное распределение особей <i>Succinea putris</i> (L.) (Gastropoda, Succineidae) в Борисовском районе	26
Крылов А. В. Новые ордовикские трилобиты из Ленинградской и Архангельской областей (Trilobita: Phacopida: Pterygometeropidae; Asaphida: Nielidae, Niobidae; Agnostida: Agnostidae)	34
Крылов А. В., Марке Р. Новые данные по кайнозойским моллюскам родов <i>Mya</i> , <i>Cyrtodaria</i> и <i>Neptunea</i> (Mollusca: Niatellidae, Myidae, Buccinidae) полуостровов Канин и Югорский	45
Лукашэня М. А. Жесткокрылые — обитатели плодовых тел ксилотрофных грибов (Insecta: Coleoptera) Национального парка «Беловежская пушча»	59
Лундышев Д. С. Жесткокрылые семейств Histeridae и Silphidae (Coleoptera) Барановичской равнины (Беларусь)	66
Мороз Д. С., Шпак М. Ю., Петровская Е. А., Медведик С. Е. Особенности адаптации меристемных растений земляники садовой <i>Fragaria</i> × <i>Ananassa</i> Duch. в условиях светодиодного освещения	73
Плакс Д. П. Новый вид акантодовой рыбы из Костюковичского горизонта (средний девон, эйфель) Беларуси	83
Рындэвич С. К. Энтомофауна (Insecta: Ephemeroptera, Odonata, Plecoptera, Hemiptera, Coleoptera, Megaloptera, Trichoptera) ненарушенных водных экосистем некоторых особо охраняемых природных территорий Беларуси.	98

СЕЛЬСКОХОЗЯЙСТВЕННЫЕ НАУКИ

Агрономія

Абраскова С. В., Шишлова Н. П. Изменение кормовой ценности зерна тритикале в зависимости от сортовых различий и условий выращивания.	108
Бученков И. Э., Рышкель И. В. Анализ признаков селекционного материала <i>Ribes Nigrum</i> L., <i>R. Rubrum</i> L., <i>Grossularia Reclinata</i> MILL., созданного на основе метода автополиплоидии.	116
Поух Е. В. Оценка интродуцированных клоновых подвоев яблони в маточнике в южной зоне плодоводства Республики Беларусь	124
Релина Л. И., Вечерская Л. А., Голик О. В. Содержание белка и минералов в зерне некоторых видов редких тетраплоидных пшениц	130
Шнянова Т. П., Супрун О. Г., Богуславский Р. Л. Жирнокислотный состав масла эндоспермальных мутантов кукурузы в связи с долговечностью семян при хранении	139

ЗМЕСТ

БІЯЛАГІЧНЫЯ НАВУКІ

Агульная біялогія

Заіка Ю. У., Анікіна Н. Ю. Аб новых месцазнаходжаньнях мікрарэшткаў марскіх арганізмаў у адкладах верхняга кайназоя Беларусі	9
Земаглядчук К. У. Стацыяльнае размеркаванне асобін <i>Succinea putris</i> (L.) (Gastropoda, Succineidae) у Барысаўскім раёне	26
Крылоў А. У. Новыя ардовікскія трылабіты з Ленінградскай і Архангельскай абласцей (Trilobita: Phacopida: Pterygometeropidae; Asaphida: Nielidae, Niobidae; Agnostida: Agnostidae)	34
Крылоў А. У., Марке Р. Новыя звесткі па кайназойскіх малюсках родаў <i>Mya</i> , <i>Cyrtodaria</i> і <i>Neptunea</i> (Mollusca: Niatellidae, Myidae, Buccinidae) паўастравой Канін і Югорскі	45
Лукашэня М. А. Цвёрдакрылыя — насельнікі пладовых целаў ксілатрофных грыбоў (Insecta: Coleoptera) Нацыянальнага парка «Белавежская пушча»	59
Лундышаў Д. С. Цвёрдакрылыя сямействаў Histeridae і Silphidae (Coleoptera) Баранавіцкай раўніны (Беларусь)	66
Мароз Д. С., Шпак М. Ю., Пятроўская Е. А., Мядзведзік С. Я. Асаблівасці адаптацыі мерыстэмных раслін суніц садовых <i>Fragaria</i> × <i>Ananassa</i> Duch. ва ўмовах светадыёднага асвятлення	73
Плакс Д. П. Новы від акантодавай рыбы з Касцюковіцкага гарызонту (сярэдні дэвон, эйфель) Беларусі	83
Рындзевіч С. К. Энтамафаўна (Insecta: Ephemeroptera, Odonata, Plecoptera, Hemiptera, Coleoptera, Megaloptera, Trichoptera) непарушаных водных экасістэм некаторых асабліва ахоўваемых прыродных тэрыторый Беларусі	98

СЕЛЬСКАГАСПАДАРЧЫЯ НАВУКІ

Аграномія

Абраскова С. В., Шышлова Н. П. Змяненне кармавой каштоўнасці зерня трыцікале ў залежнасці ад сартавых адрозненняў і ўмоў вырошчвання	108
Бучанкоў І. Э., Рышкель І. В. Аналіз прыкмет селекцыйнага матэрыялу <i>Ribes Nigrum</i> L., <i>R. Rubrum</i> L., <i>Grossularia Reclinata</i> Mill., створанага на аснове метаду аўтаполіплаіды	116
Поух А. В. Ацэнка інтрадуцыраваных клонавых падвояў яблыні ў матачніку ў паўднёвай зоне пладаводства Рэспублікі Беларусь	124
Рэліна Л. І., Вячэрская Л. А., Голік А. В. Утрыманне бялку і мінералаў у зерні некаторых відаў рэдкіх тэтраплоідных пшаніц	130
Шыянава Т. П., Супрун А. Г., Багуслаўскі Р. Л. Тлустакіслотны склад алею эндаспермальных мутантаў кукурузы ў сувязі з даўгавечнасцю насення пры захоўванні	139

CONTENTS

BIOLOGICAL SCIENCES

General Biology

Zaika Yu. U., Anikina N. Yu. On new localities of marine microfossils in Upper Cenozoic deposits of Belarus	9
Zemoglyadchuk K. V. Station distribution of <i>Succinea putris</i> (L.) (Gastropoda, Succineidae) individuals in Borisov area	26
Krylov A. V. New ordovician trilobites from Leningrad and Arkhangelsk regions (Trilobita: Phacopida: Pterygomotopidae; Asaphida: Nielidae, Niobidae; Agnostida: Agnostidae)	34
Krylov A. V., Marquet R. New data on the Cenozoic molluscs of the genera <i>Mya</i> , <i>Cyrtodaria</i> and <i>Neptunea</i> (Mollusca: Hiatelidae, Myidae, Buccinidae) of the Kanin and Jugorskii peninsulas	45
Lukashenia M. A. Beetles (Insecta: Coleoptera) inhabiting the fruiting bodies of xylophilic fungi in the National park "Belovezhskaya pushcha"	59
Lundyshev D. S. Beetles of families of Histeridae and Silphidae (Coleoptera) of the Baranovichy plain (Belarus)	66
Moroz D. S., Shpak M. Y., Petrovskaya E. A., Medvedik S. E. The adaptation features of strawberry <i>Fragaria</i> × <i>Ananassa</i> Duch. meristemic plants under led lighting conditions	73
Plax D. P. A new species of the acanthodian fish from the Kostyukovichy regional stage (Middle Devonian, Eifelian) of Belarus	83
Ryndevich S. K. Entomofauna (Insecta: Ephemeroptera, Odonata, Plecoptera, Hemiptera, Coleoptera, Megaloptera, Trichoptera) of intact water ecosystems of some specially protected natural areas of Belarus	98

AGRICULTURAL SCIENCES

Agronomy

Abraskova S. V., Shishlova N. P. Change of fodder value of grain of triticale depending on high-quality distinctions and conditions of cultivation	108
Butschenkov I. E., Ryshkel I. V. The analysis of the features of breeding material <i>Ribes Nigrum</i> L., <i>R. Rubrum</i> L., <i>Grossularia Reclinata</i> Mill. created on the basis of the auto-polyploidy method	116
Поух А. В. Evaluation of introduced apple clonal rootstocks in mother plantings in the Southern zone of fruit growing of the Republic of Belarus	124
Relina L. I., Vecherska L. A., Golik O. V. Protein and mineral contents in the grain of some underutilized tetraploid wheats	130
Shyianova T.P., Suprun O.G., Boguslavskiy R.L. Fatty acid composition of oil of maize endospermal mutants in connection with seed longevity in storage	139

UDC 551.734.3; 567.42 (476)⁸**D. P. Plax**

Belarusian National Technical University, Ministry of Education of the Republic of Belarus,
Nezavisimosti Ave., 65, 220013 Minsk, Republic of Belarus, +375 (17) 292 77 84, agnatha@mail.ru

A NEW SPECIES OF THE ACANTHODIAN FISH FROM THE KOSTYUKOVICH I REGIONAL STAGE (MIDDLE DEVONIAN, EIFELIAN) OF BELARUS

A new species of the acanthodian of *Cheiracanthoides pinskensis* sp. nov. has been described on the basis of some isolated scales from the Kostyukovich deposits of the Eifelian Stage of the Middle Devonian of Belarus. The photographs of the external appearance of the scales and their thin sections are given in the Plates. Additionally, the paper presents the data of the associated organic remains found together with the scales of the new acanthodian representative. A detailed lithological description of the enclosing rocks is also provided. The correlation of the Kostyukovich deposits of Belarus with the coeval sediments widespread in the adjacent territories is given. The described new species complements the taxonomic composition of the ichthyofauna known from the deposits of the Upper Eifelian of the Middle Devonian of the west of the East European platform.

Key words: Belarus; acanthodians; *Cheiracanthoides pinskensis* sp. nov.; Kostyukovich Regional Stage; Eifelian; Middle Devonian; scales.

Table 1. Fig. 23. Ref.: 35 titles.

Д. П. Плакс

Белорусский национальный технический университет, Министерство образования Республики Беларусь,
пр. Независимости, 65, 220013 Минск, Республика Беларусь, +375 (17) 292 77 84, agnatha@mail.ru

НОВЫЙ ВИД АКАНТОДОВОЙ РЫБЫ ИЗ КОСТЮКОВИЧСКОГО ГОРИЗОНТА (СРЕДНИЙ ДЕВОН, ЭЙФЕЛЬ) БЕЛАРУСИ

Из отложений костюковичского горизонта эйфельского яруса среднего девона Беларуси описан новый вид акантода *Cheiracanthoides pinskensis* sp. nov. на основе изолированных чешуй. Фотографии внешнего вида чешуй и их шлифов приводятся в фототаблицах. Отдельно в статье указываются данные по сопутствующим органическим остаткам, обнаруженным совместно с чешуями этого нового представителя акантодов. Дополнительно дается подробная литологическая характеристика вмещающих пород. Приводится корреляция костюковичских отложений Беларуси с одновозрастными образованиями, широко развитыми на сопредельных территориях. Описанный новый вид дополняет таксономический состав ихтиофауны, известной из отложений верхнего эйфеля среднего девона запада Восточно-Европейского платформы.

Ключевые слова: Беларусь; акантоды; *Cheiracanthoides pinskensis* sp. nov.; костюковичский горизонт; эйфельский ярус; средний девон; чешуи.

Табл. 1. Рис. 23. Библиогр.: 35 назв.

Introduction. In the Devonian deposits of Belarus the acanthodian skeletal elements are usually represented by isolated scales and fin spines. V. N. Karatajūtė-Talimaa and L. A. Lyarskaya were the first researchers who initiated their study within the country territory. In the early seventies of the past century they determined for the first time the acanthodian remains in the Lower and Middle Devonian deposits and made their identifications [1—3]. However, the most detailed study of the diversity of the Early and Middle Devonian acanthodians of Belarus and an analysis of their assemblages for the stratigraphic purposes had been carried out by J. J. Valiukevičius from the beginning of the eighties of the 20th century till 2000 [4—12]. As a result of these studies a zonal subdivision of the Lower and Middle Devonian deposits of Belarus

was developed on the basis of the acanthodians [11; 12]. In 2002 the author of this paper began the study of various Devonian ichthyofauna representatives including the acanthodians. The study of the Middle Devonian acanthodians in the territory of Belarus by the earlier researchers over a rather long period of time does not exclude the discovery of their new taxa. The repeated study of some acanthodian scales from the Kostyukovich deposits of Belarus has demonstrated that the scales previously defined by the author as *Cheiracanthoides* sp. [13] refer to a new species.

It is also worth noting that the genus *Cheiracanthoides* known only from scales and it is characterized by a rather wide distribution throughout the world. The separate scales of this genus are found in the deposits of the Upper Silurian, Lower and Middle Devonian in the territory of the Baltic States, Belarus, Russia, Ukraine, Poland, Germany, Spitsbergen, Canada, USA, China, Australia and some other countries. The description of a new species of this genus of acanthodians is presented below.

Geological setting and stratigraphy. The deposits of the Kostyukovich Regional Stage are rather widespread in the territory of Belarus [14; 15]. These are exposed in numerous boreholes within the southern part of the Baltic Syncline, in the territory of the Orsha Depression, within the Latvian, Zhlobin and Bragin—Loyev Saddles, within the limits of the Vileyka and Bobruysk Buried Ridges of the Belarusian Antecline, in the territory of the northwestern slope of the Voronezh Antecline and within the Pripyat Trough. According to the latest Stratigraphic Chart of the Devonian deposits of Belarus (2010) [15] and the paper by T. G. Obukhovskaya with co-authors [16], dedicated to the substage division of the deposits of the Eifelian Stage of the Middle Devonian of Belarus, the deposits of Kostyukovich Regional Stage belong to the Upper Substage of the Eifelian Stage of the Middle Devonian.

These deposits correspond in their miospores composition to the *Rhabdosporites langii* — *Chelinospora timanica* zone [15], in the acanthodians — to the *Nostolepis kernavensis* zone [5; 11; 12; 17; 18], and in the conodonts — to the *Polygnathus xylus ensensis* zone [19] (Table 1). Within the territory of the Volyn-Podolia region an age analogue of the Kostyukovich Regional Stage are the sediments of the Veliky Most Subformation of the lower part of the Lopushany Formation of the Eifelian Stage [20—22], in the territory of the central Russia — the deposits of the Chernyi Yar Regional Stage of the Eifelian Stage [12; 23], and in the territory of the Baltic States — the sediments of the Kernavé Regional Substage of the Narva Regional Stage of the Eifelian Stage [5; 24; 25].

Table 1. — The Upper Eifelian deposits of Belarus and their correlation with the synchronous deposits in the adjacent territories (according to [15; 16], with minor clarifications)

Таблица 1. — Верхнеэифельские отложения Беларуси и их корреляция с одновозрастными образованиями на сопредельных территориях (согласно [15; 16], с небольшими уточнениями)

System	Series	Stage	Substage	Standard Conodont Zone	Belarus		Regional zones		Main Devonian Field (Baltic)	Central Devonian Field (Russia)	Volyn-Podolia region (Ukraine)
					Regional Superstage	Regional Stage	Miospores	Acanthodians			
Devonian	Middle	Eifelian	Upper	<i>Polygnathus xylus ensensis</i>	Narva	Kostyukovich	<i>Rhabdosporites langii</i> – <i>Chelinospora timanica</i>	<i>Nostolepis kernavensis</i>	Kernavé	Chernyi Yar	Veliky Most

So, fifteen scales of a new acanthodian species were found in the Pinsk 26 borehole (Figure 1) drilled within the northwesternmost part of the Turov Centrocline of the Pripyat Trough in the depth range of 420.1—422.4 m in the grey, greenish-grey, creamy-grey, dirty-grey, unclearly layered, strong, massive, platy, fine-grained, in places, cryptocrystalline, finely porous and slightly fissured clayey dolomites belonging to the deposits of the Kostyukovich Regional Stage. Some worm tubules of *Spirorbis* sp., scolecodonts, isolated corals, numerous shell fragments of the articulate and inarticulate brachiopods, some shell fragments of the bivalves, crinoid segments, numerous conodonts of *Polygnathus* sp., *P. linguiformis klapperi* Clausen, Leuteritz et Ziegler, 1979, *P. linguiformis linguiformis* Hinde, 1879, *Tortodus* sp., *Icriodus* sp., *I. stephensoni* Sparling, 1983, *I. orri* Barrick et Klapper, 1983, *I. struvei* Weddige, 1977, *Belodella* sp., *Neopanderodus* sp., as well as the ichthyofauna remains represented by small fragments of an articular process of *Antiarcha* gen. indet., a spinal plate of *Actinolepis* sp., the scales of *Cheiracanthoides proprius* Valiukevičius, 1985, *Cheiracanthus* sp., *C. brevicostatus* Gross, 1973, *Markacanthus costulatus*

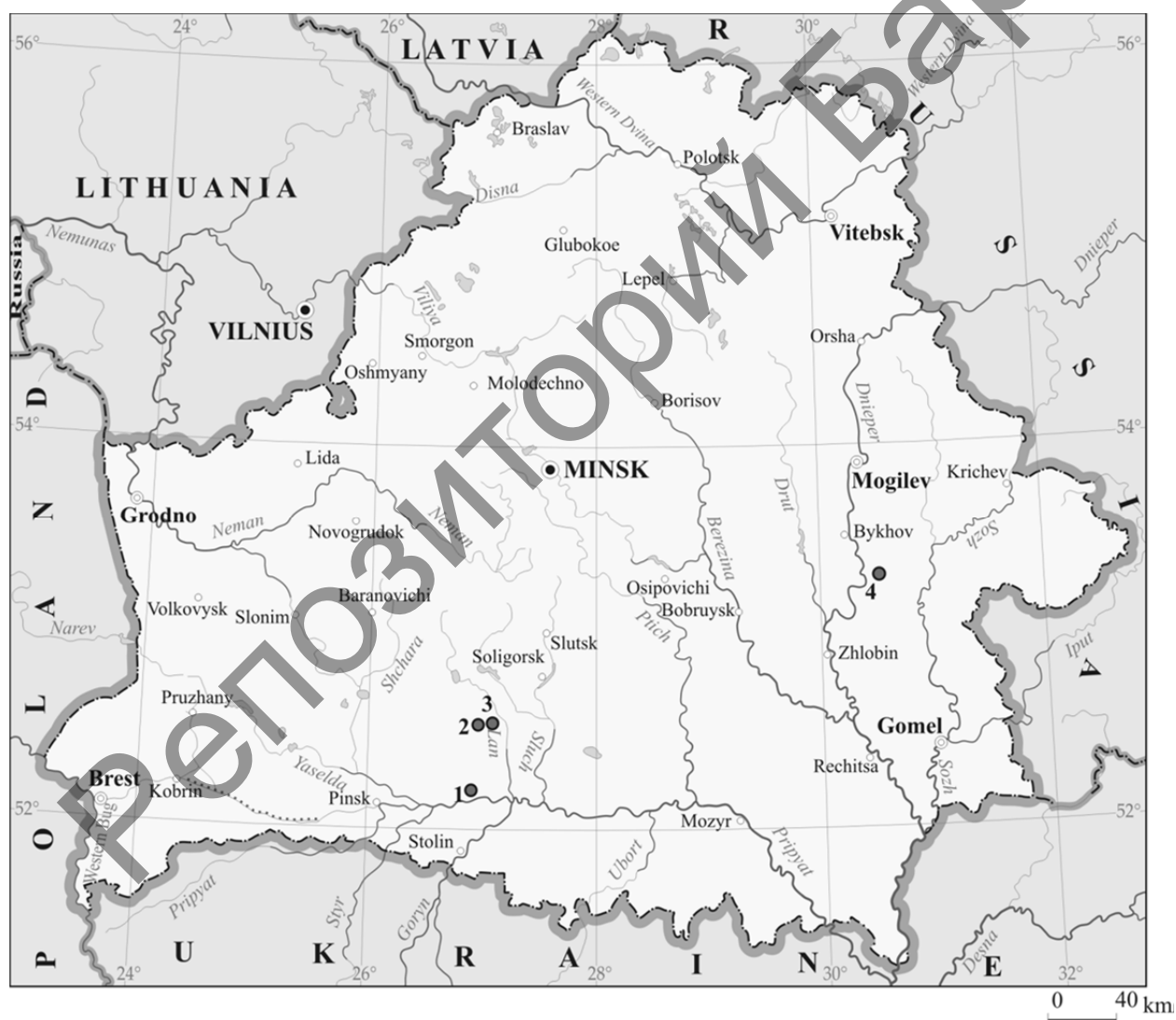


Figure 1. — Map of the location of the borehole sections where the scales of a new representative of the acanthodian fish were found. Boreholes: 1 — Pinsk 26; 2 — Pinsk 10; 3 — Zhitkovichi 2; 4 — Bykhov 1

Рисунок 1. — Карта расположения разрезов скважин, в которых были найдены чешуи нового представителя акантодов. Скважины: 1 — Пинск 26; 2 — Пинск 10; 3 — Житковичи 2; 4 — Быхов 1

Valiukevičius, 1985, *Ptychodictyon* sp., “*Acanthoides*” sp., *Karksilepis* sp., Chondrichthyes indet., Osteolepididae gen. indet., *Orvikuina* sp., *O. vardiaensis* Gross, 1953, “*Moythomasia*” sp., Actinopterygii indet., teeth of Sarcopterygii indet., Actinopterygii indet. and indefinable skeletal elements of Osteichthyes indet. were also found in these clayey dolomites [13; 26]. In the Pinsk 10 borehole (Figure 1) confined to the southwestern part of the Starobin Centrocline of the Pripyat Trough more than fifteen scales of the new taxon described below were found in the depth range of 241.6—245.2 m in grey, light grey, pelitomorphous, platy, strong, massive, in places, with rare solution cavities, unclearly layered clayey dolomites belonging to the deposits of the Kostyukovich Regional Stage. Along with them some rare fragments of the lingulid shells, rare scolecodonts, tubules of the worms of *Spirorbis* sp., some segments of the crinoids, conodonts and vertebrates represented by the dentine tubercles of *Ganosteus* sp., a tritor of Ptyctodontida gen. indet., the scales of *Cheiracanthus* sp., *C. brevicostatus* Gross, 1973 *Cheiracanthoides proprius* Valiukevičius, 1985, “*Acanthoides*” sp., Osteolepididae gen. indet., *Orvikuina* sp., *O. vardiaensis* Gross, 1953, Actinopterygii indet., the teeth of *Onychodus* sp., Sarcopterygii indet. and Actinopterygii indet. were also found in these clayey dolomites [13; 26]. Five scales of a new representative of the acanthodians were found in the Zhitkovichi 2 borehole (Figure 1) drilled in the southwestern part of the Starobin Centrocline of the Pripyat Trough in the depth range of 190.5—191.0 m in the light grey, platy, strong, massive, unclearly layered clayey dolomites belonging to the deposits of the Kostyukovich Regional Stage. Together with them small plate fragments of *Schizosteus striatus* (Gross, 1933), the scales of *Cheiracanthus longicostatus* Gross, 1973, *Orvikuina vardiaensis* Gross, 1953 and Actinopterygii indet. were also found in these clayey dolomites [13; 27]. And finally, two scales of a new species of acanthodians were discovered in the Bykhov 1 borehole (Figure 1) drilled in the Orsha Depression and Zhlobin Saddle junction zone in the depth range 201.4—202.4 m in the light grey, dense, unclearly layered, platy, clayey limestones also belonging to the deposits of the Kostyukovich Regional Stage. Along with them numerous small fragments of the inarticulate brachiopod shells, rare segments of the crinoids, some single scolecodonts, one fragment of a fin spine of *Haplacanthus* cf. *marginalis* Agassiz, 1845, a few isolated scales of “*Acanthoides*” sp., *Nostolepis kernavensis* Valiukevičius, 1985, one tooth of Chondrichthyes indet., rare teeth of Onychodontidae gen. indet., some small isolated plate fragments of Placodermi indet., some scale fragments of Actinopterygii indet., *Orvikuina* sp., one indefinable bone fragment of Pisces indet., as well as the conodonts of *Icriodus stephensoni* Sparling, 1983, *Polygnathus linguiformis klapperi* Clausen, Leuteritz et Ziegler, 1979, *P. linguiformis* Hinde, 1879 and *P. webbi* Stauffer, 1938 were revealed in this interval [28].

Materials and methods. The standard rock dissolution technique with formic 5 % and acetic 9 % acids was used to recover scales from the rocks. After rock dissolving the sediment was repeatedly washed with water from the clayey particles and then dried. The dried sediment was viewed using a stereoscopic binocular microscope MBS-1. The acanthodian scales were picked manually and the selected scales were morphologically and histologically studied. The electron microphotographs of the scales were made with a microscope JSM-5610 LV (JEOL, Japan). The photographs of thin sections were taken with Axioskop 40 A Pol and B-1000POL-1 microscopes using anise oil as an immersion liquid. The photographs were processed with Adobe Photoshop CS6, the figures were created with CorelDRAW X3. The Stratigraphic Chart of the Devonian deposits of Belarus (2010) was used as the stratigraphic basis. The described specimens are stored in the Belarusian National Technical University (BNTU), Department of Mining (the collection number BNTU 2).

Results and discussion

Class ACANTHODII Owen, 1846
Order Climatiiformes Berg, 1940
Family indeterminate
Genus *Cheiracanthoides* Wells, 1944

Diagnosis. See in papers by R. Denison [29] and J. Valiukevičius [5].

Type species. *Cheiracanthoides comptus* Wells, 1944 [30].

Remarks. The phylogenetic studies that have been recently carried out cast doubt on the assignment of the genus *Cheiracanthoides* to the Climatiidae family and the Climatiiformes order. Thereby, partially considering these views of the classification in this paper the genus *Cheiracanthoides* is conventionally assigned only to the Climatiiformes order based on the characteristic external morphology of scales and the histological structure of the “*Nostolepis*” type. The additional skeletal materials are needed to substantiate the assignment of this genus to the concrete family.

Cheiracanthoides pinskensis sp. nov.

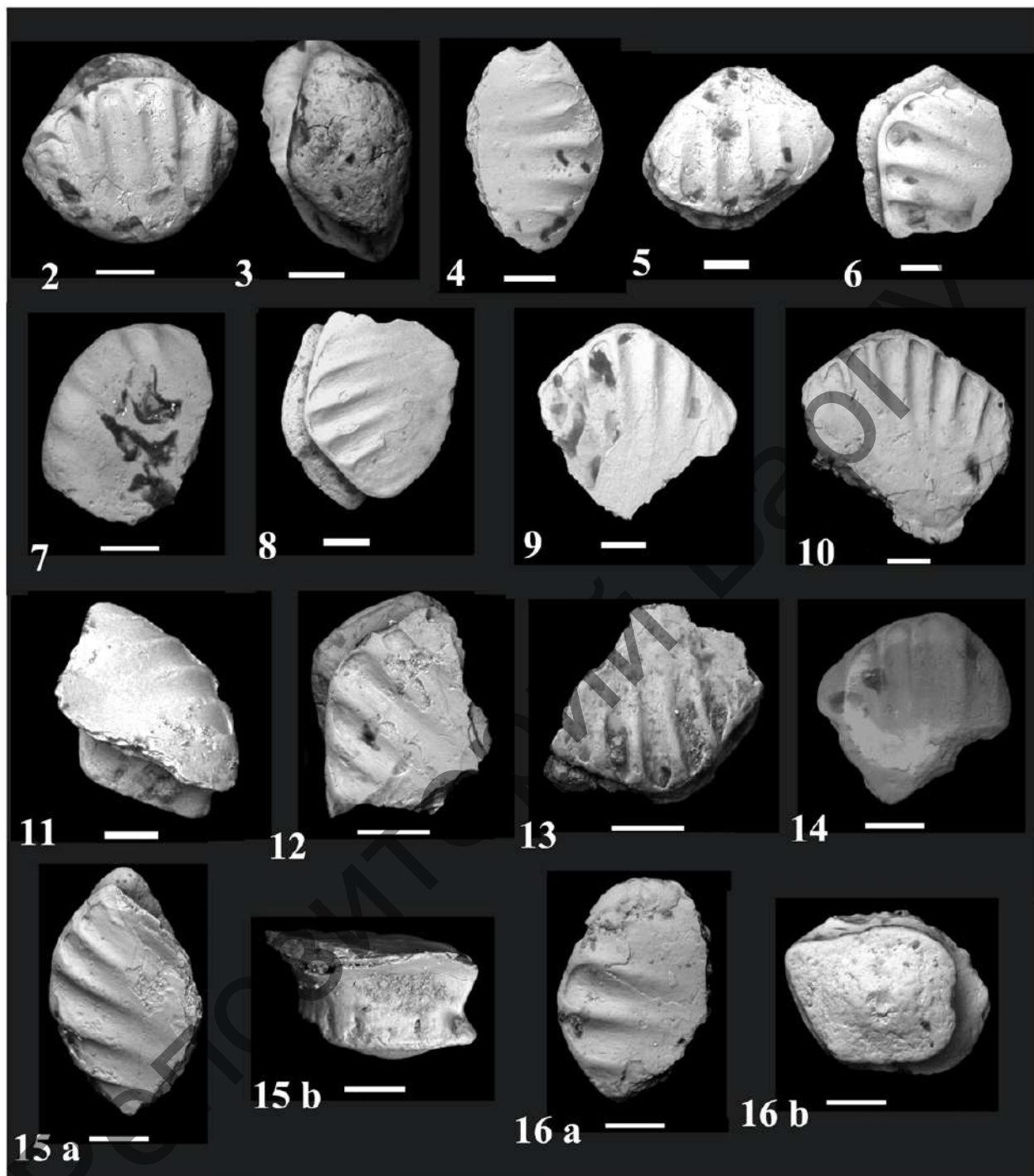
Figures 2—23

Type material. *Holotype.* Specimen № 85/7a-4d, scale (Figure 9). Pinsk 10 borehole, depth 245.2 m; northern outskirts of the village of Kormuzh, Luninets district, Brest region, Belarus; Middle Devonian, Eifelian Stage, Upper Substage, Narva Regional Superstage, Kostyukovich Regional Stage (BNTU. Department of Mining).

Paratypes. 38 scales. Pinsk 10 borehole, depth 245.2 m; northern outskirts of the village of Kormuzh, Luninets district, Brest region, Belarus; Pinsk 26 borehole, depth range of 420.1—422.4 m; near the town of Luninets, Luninets district, Brest region, Belarus; Zhitkovichi 2 borehole, depth 191.0 m; north of the village of Gotsk, Soligorsk district, Minsk region, Belarus; Bykhov 1 borehole, depth range 201.4—202.4 m; near the village of Bolshaya Zimnitsa, Slavgorod district, Mogilev region, Belarus; Middle Devonian, Eifelian Stage, Upper Substage, Narva Regional Superstage, Kostyukovich Regional Stage. Borehole № 6629, depth 180.5 m; southwestern outskirts of the village of Novostav, Volyn region, Ukraine; Middle Devonian, Eifelian Stage, Veliky Most Subformation (BNTU. Department of Mining).

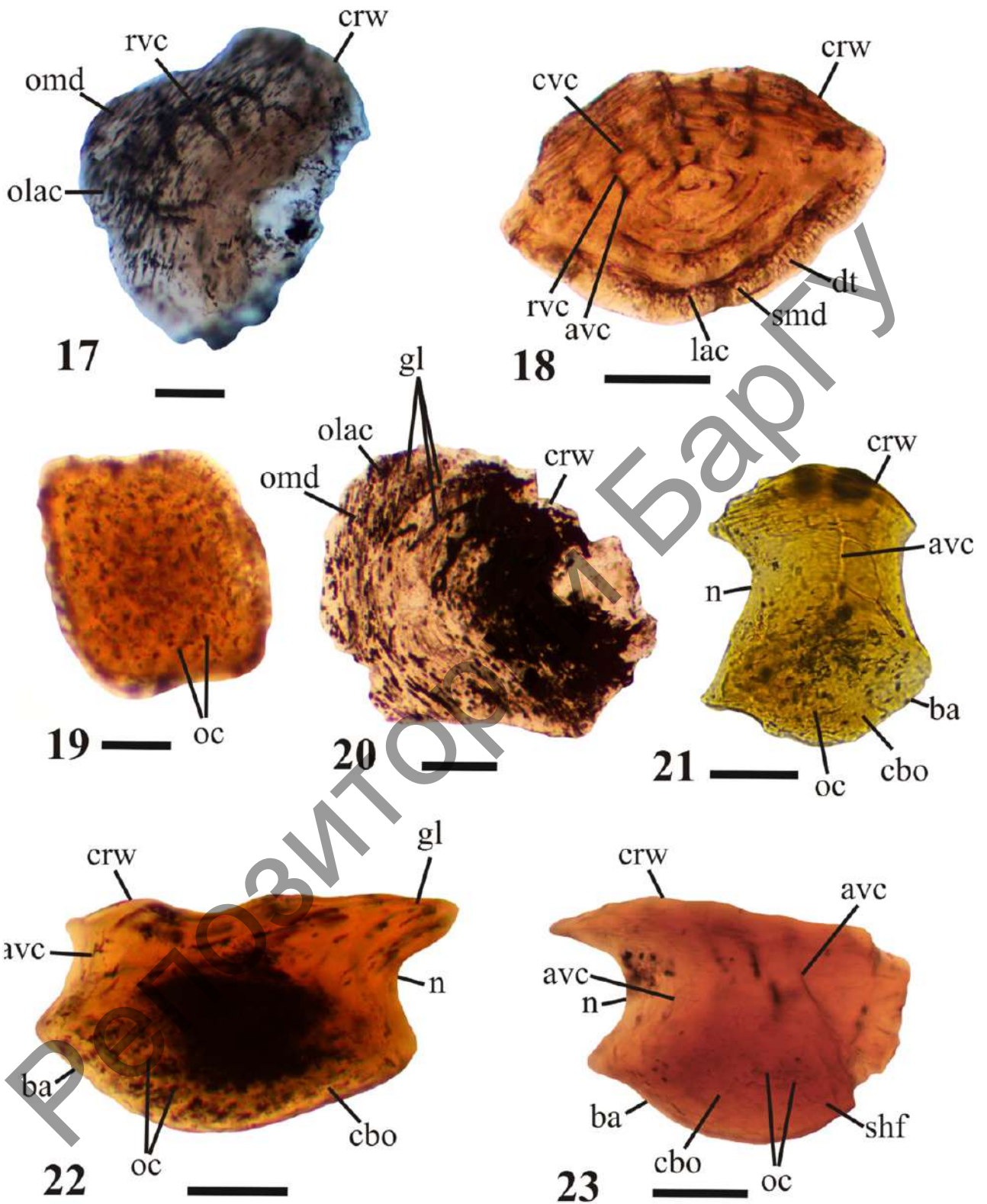
Remarks. In earlier works of the author [13, p. 26, Text-Figure 2; p. 27, Text-Figure 3; p. 35, Plate III, Figures 4, 5, 9, 10—13] and [26, Text-Figure 2; p. 38] the single scales described here as belonging to a new species were originally identified as *Cheiracanthoides* sp. because of their small number. The scales previously defined as *Cheiracanthoides proprius* Valiukevičius ([22], p. 17, Plate II, Figure 3) in the territory of Volyn region (Ukraine) in the borehole № 6629 belong to a new species.

Diagnosis. Scales up to 0.5 mm long. The crown is rhomboid, rounded-rhomboid, ovate-oblong or oval. The ridges and grooves on the crown are located fan-shaped round and clearly expressed in its anterior part, usually gradually fade out towards the central part and completely disappear in the posterior part. Along the front margin of the crown the grooves form something like a narrow border. The neck is relatively thick and of medium height. The anterolateral walls of the neck in some scales may be penetrated by few pores slightly below the midline. The base is moderately or slightly convex, rounded-rhomboid, elongated oval, elliptical, with a weakly expressed apex usually shifted forward. The crown shows up to six growth lamellae. The anterior part of the crown is composed of simple mesodentine, is penetrated with some narrow branching dentine tubules with lacunae. The posterior part of the crown is composed of the mesodentine tissue with large oriented lacunae covering the entire body of the growth lamellae. The radial, circular and ascending vascular canals are large and distinct. The neck and base are described by a moderate amount of the osteocytes.



Figures 2—16. — Scales of *Cheiracanthoides pinskensis* sp. nov. All the found scales come from the Upper Eifelian deposits of the Middle Devonian. **2** — Specimen № 57/6-1, scale in oblique crown view, × 200, Zhitkovichi 2 borehole, depth 191.0 m, Kostyukovichi Regional Stage; **3** — Specimen № 57/6-1a, scale in basal view, × 200, Zhitkovichi 2 borehole, depth 191.0 m, Kostyukovichi Regional Stage; **4** — Specimen № 41/26-1d, scale in crown view, × 180, Pinsk 26 borehole, depth 422.4 m, Kostyukovichi Regional Stage; **5** — Specimen № 41/66-1a, scale in anterior crown view, × 150, Pinsk 26 borehole, depth 415.7 m, Kostyukovichi Regional Stage; **6** — Specimen № 85/7a-4b, scale in oblique crown view, × 150, Pinsk 10 borehole, depth 245.2 m, Kostyukovichi Regional Stage; **7** — Specimen № 57/6-2, scale in crown view, × 200, crown slightly abraded; Zhitkovichi 2 borehole, depth 191.0 m, Kostyukovichi Regional Stage; **8** — Specimen № 85/7a-4a, scale in oblique crown view, × 160, Pinsk 10 borehole, depth 245.2 m, Kostyukovichi Regional Stage; **9** — Specimen № 85/7a-4d (holotype), scale in crown view, × 150, Pinsk 10 borehole, depth 245.2 m, Kostyukovichi Regional Stage; **10** — Specimen № 41/66-1q, scale in crown view, × 150, Pinsk 26 borehole, depth 415.7 m, Kostyukovichi Regional Stage; **11** — Specimen № 41/26-1b, scale in posterior crown view, × 150, Pinsk 26 borehole, depth 422.4 m, Kostyukovichi Regional Stage; **12** — Specimen № 116/16-15, scale in oblique crown view, × 250, Bykhov 1 borehole, depth 201.4 — 202.4 m, Kostyukovichi Regional Stage; **13** — Specimen № 41/66-1w, scale in anterior crown view, × 250, Pinsk 26 borehole, depth 415.7 m, Kostyukovichi Regional Stage; **14** — Specimen № 41/4a-1f, scale in crown view, × 200, Pinsk 26 borehole, depth 421.2 m, Kostyukovichi Regional Stage; **15** — Specimen № 85/7a-4s: a — scale in oblique crown view, × 180, b — scale in lateral view, × 200, Pinsk 10 borehole, depth 245.2 m, Kostyukovichi Regional Stage; **16** — Specimen № 85/7a-4w: a — scale in crown view, × 200, b — scale in basal view, × 200, Pinsk 10 borehole, depth 245.2 m, Kostyukovichi Regional Stage. All scale bars are 100 µm

Рисунки 2—16. — Чешуи *Cheiracanthoides pinskensis* sp. nov. Все найденные чешуи происходят из верхнеэйфельских отложений среднего девона. **2** — Экземпляр № 57/6-1, чешуя, вид с наклоном сверху, × 200, скважина Житковичи 2, глубина 191,0 м, костюковичский горизонт; **3** — Экземпляр № 57/6-1a, чешуя, вид снизу, × 200, скважина Житковичи 2, глубина 191,0 м, костюковичский горизонт; **4** — Экземпляр № 41/26-1d, чешуя, вид сверху, × 180, скважина Пинск 26, глубина 422,4 м, костюковичский горизонт; **5** — Экземпляр № 41/66-1a, чешуя, вид спереди сверху, × 150, скважина Пинск 26, глубина 415,7 м, костюковичский горизонт; **6** — Экземпляр № 85/7a-4b, чешуя, вид с наклоном сверху, × 150, скважина Пинск 10, глубина 245,2 м, костюковичский горизонт; **7** — Экземпляр № 57/6-2, чешуя, вид сверху, × 200, крона слегка истерта, скважина Житковичи 2, глубина 191,0 м, костюковичский горизонт; **8** — Экземпляр № 85/7a-4a, чешуя, вид с наклоном сверху, × 160, скважина Пинск 10, глубина 245,2 м, костюковичский горизонт; **9** — Экземпляр № 85/7a-4d (голотип), чешуя, вид сверху, × 150, скважина Пинск 10, глубина 245,2 м, костюковичский горизонт; **10** — Экземпляр № 41/66-1q, чешуя, вид сверху, × 150, скважина Пинск 26, глубина 415,7 м, костюковичский горизонт; **11** — Экземпляр № 41/26-1b, чешуя, вид сзади сверху, × 150, скважина Пинск 26, глубина 422,4 м, костюковичский горизонт; **12** — Экземпляр № 116/16-15, чешуя, вид с наклоном сверху, × 250, скважина Быхов 1, глубина 201,4 — 202,4 м, костюковичский горизонт; **13** — Экземпляр № 41/66-1w, чешуя, вид спереди сверху, × 250, скважина Пинск 26, глубина 415,7 м, костюковичский горизонт; **14** — Экземпляр № 41/4a-1f, чешуя, вид сверху, × 200, скважина Пинск 26, глубина 421,2 м, костюковичский горизонт; **15** — Экземпляр № 85/7a-4s, чешуя: а — вид с наклоном сверху, × 180, б — вид сбоку, × 200, скважина Пинск 10, глубина 245,2 м, костюковичский горизонт; **16** — Экземпляр № 85/7a-4w, чешуя: а — вид сверху, × 200, б — вид снизу, × 200, скважина Пинск 10, глубина 245,2 м, костюковичский горизонт. Длина всех масштабных линеек 100 µm



Figures 17—23. — Microstructure of the scales of *Cheiracanthoides pinskensis* sp. nov. **17** — horizontal section of the scale crown. Specimen № 85/7a-4z, Pinsk 10 borehole, depth 245.2 m, Kostyukovich Regional Stage; **18** — horizontal section of the scale crown. Specimen № 57/6-1a, Zhitkovichi 2 borehole, depth 191.0 m, Kostyukovich Regional Stage; **19** — scale horizontal section at the neck level. Specimen № 85/7a-4m, Pinsk 10 borehole, depth 245.2 m, Kostyukovich Regional Stage; **20** — horizontal section of the scale crown. Specimen № 41/66-1n, Pinsk 26 borehole, depth 415.7 m, Kostyukovich Regional Stage; **21** — scale vertical longitudinal section. Specimen № 85/7a-4n, Pinsk 10 borehole, depth 245.2 m, Kostyukovich Regional Stage; **22** — scale vertical longitudinal section. Specimen № 85/7a-4p, Pinsk 10 borehole, depth 245.2 m, Kostyukovich Regional Stage; **23** — scale vertical section. Specimen № 85/7a-4k, Pinsk 10 borehole, depth 245.2 m, Kostyukovich Regional Stage. All scale bars are 100 μ m.

Abbreviations: avc — ascending vascular canal, ba — base, cbo — cellular bone, cc — circular vascular canal, crw — crown, dt — dentine tubule, gl — growth lamella, lac — lacuna, n — neck, oc — osteocyte cavity, omd — oriented mesodentine, olac — oriented lacuna, rvc — radial vascular canal; shf — Sharpey's fibres, smd — simple mesodentine

Рисунки 17—23. — Микроструктура чешуй *Cheiracanthoides pinskensis* sp. nov. **17** — горизонтальный срез чешуи через крону. Экземпляр № 85/7a-4z, скважина Пинск 10, глубина 245,2 м; костюковичский горизонт; **18** — горизонтальный срез чешуи через крону. Экземпляр № 57/6-1a, скважина Житковичи 2, глубина 191,0 м; костюковичский горизонт; **19** — горизонтальный срез чешуи на уровне шейки. Экземпляр № 85/7a-4m, скважина Пинск 10, глубина 245,2 м; костюковичский горизонт; **20** — горизонтальный срез чешуи через крону. Экземпляр № 41/66-1n, скважина Пинск 26, глубина 415,7 м; костюковичский горизонт; **21** — вертикальный продольный срез чешуи. Экземпляр № 85/7a-4n, скважина Пинск 10, глубина 245,2 м; костюковичский горизонт; **22** — вертикальный продольный срез чешуи. Экземпляр № 85/7a-4p, скважина Пинск 10, глубина 245,2 м; костюковичский горизонт; **23** — вертикальный срез чешуи. Экземпляр № 85/7a-4k, скважина Пинск 10, глубина 245,2 м; костюковичский горизонт. Длина всех масштабных линеек 100 μ m.

Буквенные обозначения: авс — восходящий сосудистый канал, ба — основание, cbo — клеточная костная ткань, cc — циркулярный сосудистый канал, crw — крона, dt — дентинный канал, gl — пластина нарастания, lac — лакуна, n — шейка, oc — полость остеокита, omd — ориентированный мезодентин, olac — ориентированная лакуна, rvc — радиальный сосудистый канал; shf — Шарпеевые волокна, smd — простой мезодентин

Description. Morphology. Small scales are 0.25 to 0.5 mm long. The scales 0.3 to 0.4 mm in length usually dominate. The crown of the scales is rhomboid, rounded-rhomboid, ovate-oblong, oval with an extended anterior margin. The crown sculpture is represented by 4 to 9 short, not high, narrow ridges and wide not very deep grooves which show a slightly fan-shaped location. These are well defined at the anterior margin of the crown, but gradually fade out towards the middle part or a little farther beyond it. The grooves form something like a narrow border along the front margin of the crown. The posterior part of the crown is smooth. The neck of the scales is well marked. It is of medium height, relatively thick, smooth, rhomboid in plan. The anterolateral walls of the neck of some scales slightly below the midline may be penetrated by some few pores, two or three pores on each sides. A well-developed rim outlines a junction of the neck and base. The base is moderately or slightly convex, rounded-rhomboid, elongated oval, elliptical, usually does not extend beyond the anterior margin of the crown. The apex of the base is weakly expressed, usually slightly shifted forward.

Histology. In the crown has up to six growth lamellae. The anterior section of the crown is penetrated by abundant narrow dentine tubules branching at different levels with numerous lacunae. The mesodentine in the posterior part of the crown with large oriented lacunae (Stranggewebe according to W. Gross [31]) occupies the entire body of the growth lamellae. The system of radial, circular and ascending canals penetrating the mesodentine is well developed. The circular canals are large and clearly observed in the posterior part of the crown. The radial canals are wide, long, located above the surface of the base and directed towards the center of the scale. The ascending canals are long, weakly sinuous, in the neck area with not numerous narrow processes. There are large osteocytes in the neck. The osteocytes have short processes. The base is formed by the bone tissue and shows a moderate amount of osteocyte cavities. Sharpey's fibers are narrow, relatively long, indistinct.

Variability. The scales of this species vary in the crown shape, the base configuration and its convexity degree — from slightly to moderately convex. The crown sculpture show various number of ridges. The ridges may fade at different distances from the anterior margin of the crown, but its posterior part is always smooth.

Comparison. The scales of *Cheiracanthoides pinskensis* sp. nov. differ from those of *Cheiracanthoides comptus* Wells, 1944 [30; 32] in size, the smaller number of the ridges on the crown, their configuration, thickness and length, less dense network of the radial, circular and ascending canals in the crown, the pattern of the dentine tubule branching in the anterior part of the crown, the smaller number of the osteocyte cavities in the base of the scales. Distinct differences are determined between the species of *Cheiracanthoides proprius* Valiukevičius, 1985 [5] and *Cheiracanthoides pinskensis* sp. nov. A new species shows a not very large, slightly or moderately convex base not extending beyond the anterior margin of the crown. The posterior edge of the crown is straight, sometimes, slightly lowered. The crown sculpture is mainly characterized by the pattern of the ridges and something like a narrow border formed by the grooves located along the anterior margin of the crown. The crown shows up to six growth lamellae. The density, location and branching pattern of the dentine tubules in the crown of the scales are different. The radial, circular and ascending vascular canals are large and distinct. The base contains a slightly larger amount of the osteocyte cavities. The described new species differs from the species of *Cheiracanthoides rarus* Valiukevičius, 1994 [33] in the crown shape, less numerous ridges on the crown, their size and configuration, the neck size, a poor base convexity, a distinctly expressed system of radial, circular and ascending canals, different structure of the oriented mesodentine in the crown, the smaller number of the osteocyte cavities in the base of the scale. The scales of *Cheiracanthoides pinskensis* sp. nov. differ from the scales of *Cheiracanthoides borealis* Valiukevičius, 1994 [33] in the crown and base shapes, as well as in the crown sculpture. The latter is described by the presence of longer ridges and wider grooves between the ridges, as well as by the presence of something similar to a narrow border formed by

the grooves along the anterior margin of the crown. The main histological differences between the species described and *Cheiracanthoides borealis* Valiukevičius, 1994 [33] are a well-developed system of radial, circular and ascending canals that penetrate the mesodentine and the presence of the oriented mesodentine. The new species differs from the species of *Cheiracanthoides planus* Valiukevičius, 1998 [11] in the number of ridges on the crown, their thickness and length, as well as in some microstructure details. The described species differs from the species of *Cheiracanthoides nativus* Valiukevičius, 1998 [11] in the configuration and size of the ridges on the crown, size of the neck, poor or moderate convexity of the base, less dense dentine tubules in the crown, slightly less expressed large principal vascular canals, a smaller number of the osteocyte cavities in the base of the scale. The scales of *Cheiracanthoides pinskensis* sp. nov. are slightly similar to those of *Cheiracanthoides estonicus* Valiukevičius, 1998 [11]. However, their detailed comparison allows a number of distinctive features to be revealed. So, the scales of the new species described differ in a smaller number of ridges on the crown, their distribution pattern, absence of dichotomous branching ridges at the anterior margin of the crown, presence of something similar to a narrow border formed by the grooves along the anterior margin of the crown, poor to moderate convexity of the base, a different mesodentine structure with large oriented lacunae in the posterior part of the crown, a smaller number of osteocyte cavities in the base of the scales. The described species also differ from the species of *Cheiracanthoides wangi* Burrow, Turner et Wang, 2000 [34] in the smaller size of the scales, the crown shape, the larger crown thickness, the configuration, size and discernibleness of the ridges on the crown, a smaller neck height, much smaller base convexity, a weakly expressed apex, the structure of the oriented mesodentine in the crown, a different pattern of the dentine tubule location in the crown and some peculiarities of their branching, differently expressed radial, circular and ascending canals, a larger number of the osteocyte cavities in the neck and base. The scales of *Cheiracanthoides pinskensis* sp. nov. differ from those of *Cheiracanthoides dolosus* Burrow, Turner et Wang, 2000 [34] in a smaller size of the scales, a smaller number of the ridges on the crown, a fewer pores penetrating the neck of some scales, a smaller number of the growth lamellae, density of the dentine tubules in the crown, a well-developed system of the principal vascular canals, the number of the osteocyte cavities in the scale base. The new species differs from the species of *Cheiracanthoides mosolovicus* Valiukevičius, 2003 [35] in a larger size of the scales, the number of the ridges on the crown, their configuration and length, the presence of something like a narrow border along the crown anterior margin, the neck height and base size, the structure of the oriented mesodentine in the crown, differently expressed radial, circular and ascending canals, a slightly larger number of the osteocyte cavities in the neck and base.

Etymology. The name of the species was derived from the town of Pinsk in the vicinity of which the boreholes were drilled where the scales of this new acanthodian species were found in the core for the first time.

Geological age and geographical distribution. Middle Devonian, Eifelian Stage, Upper Substage, Narva Regional Superstage, Kostyukovich Regional Stage; Belarus, Brest and Mogilev regions; Middle Devonian, Eifelian Stage, Veliky Most Subformation; Ukraine, Volyn region.

Occurrence. Near the town of Luninets, Luninets district, Brest region, Belarus, Pinsk 26 borehole, depth range of 420.1—422.4 m; northern outskirts of the village of Kormuzh, Luninets district, Brest region, Belarus, Pinsk 10 borehole, depth 245.2 m; north of the village of Gotsk, Soligorsk district, Minsk region, Belarus, Zhitkovichi 2 borehole, depth 191.0 m; near the village of Bolshaya Zimnitsa, Slavgorod district, Mogilev region, Belarus, Bykhov 1 borehole, depth range 201.4—202.4 m; southwestern outskirts of the village of Novostav, Volyn region, Ukraine, borehole № 6629, depth 180.5 m.

Conclusion. The re-examination of the previously collected scale material of the acanthodians from the deposits of the Kostyukovich Regional Stage of Belarus allowed the author to distinguish and describe in detail both morphologically, and histologically a new species of

Cheiracanthoides pinskensis sp. nov. Some isolated scales of this species of an acanthodian fish were found in the carbonate-clayey deposits of shallow-sea origin. These sediments contain abundant different skeletal elements of both the invertebrates, and vertebrates. The described new species supplements the taxonomic composition of the ichthyofauna known from the deposits of the Upper Eifelian of the Middle Devonian of the west of the East European Platform.

The author of the paper appreciates the assistance of O. A. Piskun and S. S. Mankevich (Institute of Geology, State Enterprise “Scientific Production Center for Geology”, Minsk, Belarus) in taking pictures of thin scale sections with optical microscopes, is sincerely grateful to V. G. Lugin (Belarusian State Technological University, Center for Physical and Chemical investigations, Minsk, Belarus) for help with the electron microscope photography, and also to V. G. Filippova (The Centre of Geophysical Monitoring of the National Academy of Sciences of Belarus, Minsk, Belarus) for assistance in editing the English version of the paper.

References

1. Bessonova V. Ya., Sinichka A. M., Golubtsov V. K., Medvedeva M. G. The reference boreholes of the USSR. The reference borehole № 2 of the Orsha Depression. Minsk: Nauka i Tekhnika Publ., 1972. 232 p. (in Russian).
2. Sinichka A. M., Zinovenko G. V. On the age analogues of the Tiverian Stage in the Brest Depression // Dokl. Akad. Nauk BSSR. 1972. Vol. XVI, № 2. Pp. 151—153 (in Russian).
3. Lyarskaya L. A. The Rēzekne Formation and its age equivalents // The Stratigraphy of the Phanerozoic of the Baltic States. Riga: Zinātne Publ., 1978. Pp. 22—39 (in Russian).
4. Valiukevičius J. Distribution of the acanthodian scales in the Middle Devonian deposits of Byelorussia // Materials of the Stratigraphy of Byelorussia. Minsk: Nauka i Tekhnika Publ., 1981. Pp. 66—67 (in Russian).
5. Valiukevičius J. Acanthodians from the Narva Regional Stage of the Main Devonian Field. Vilnius, 1985. 144 p. (in Russian).
6. Valiukevičius J. J., Kleesment A. E., Kurik E., Vaitiekūniene G. K. Correlation and the organic remains of the deposits of the Narva Regional Stage // Biofacies and Fauna of the Silurian and Devonian Basins of the Baltic States. All-Union Scientific Research Institute of Marine Geology, Riga: Zinātne Publ., 1986. Pp. 73—86 (in Russian).
7. Valiukevičius J. J., Karatajūtė-Talimaa V. N. An assemblage of the acanthodian scales from the bottom of the Middle Devonian Baltic States and Belorussia // Biofacies and Fauna of the Silurian and Devonian Basins of the Baltic States. All-Union Scientific Research Institute of Marine Geology, Riga: Zinātne Publ., 1986. Pp. 110—122 (in Russian).
8. Valiukevičius J. New species of acanthodians from the Middle Devonian of the Baltic Region and Byelorussia // Palaeontological Journal. 1988. № 2. Pp. 80—86 (in Russian).
9. Valiukevičius J. Acanthodian biostratigraphy of Lower and Middle Devonian in Lithuania, Latvia, Estonia and Byelorussia // In: Turner, S. (ed.). The Gross Symposium (IGCP 328 Palaeozoic Microvertebrates — Subcommission for Devonian Stratigraphy Joint Meeting, Göttingen, 1993). Scientific Sessions. Abstracts. 2 p.
10. Valiukevičius J., Talimaa V., Kruczek S. Complexes of vertebrate microremains and correlation of terrigenous Devonian deposits of Belarus and adjacent territories // Ichthyolith Issues. Special Publication 1 Socorro, New Mexico, 1995. Pp. 53—59.
11. Valiukevičius J. Acanthodians and zonal stratigraphy of the Lower and Middle Devonian in East Baltic and Byelorussia // Palaeontographica. Stuttgart, 1998. Abt. A. S. 1—53.
12. Valiukevičius J., Kruczek S. Acanthodian biostratigraphy and interregional correlations of the Devonian of the Baltic States, Belarus, Ukraine and Russia // Courier Forschungsinstitut Senckenberg (Final Report of IGCP 328 project). 2000. V. 223. Pp. 271—289.
13. Plax D. P., Kruczek S. A. Stratigraphy of Middle Devonian deposits of the western part of the Pripyat Trough (according to results of the study of ichthyofauna) // Lithosphere. 2014. № 1 (40). Pp. 24—42.
14. Kruczek S. A., Makhnach A. S., Golubtsov V. K., Obukhovskaya T. G. The Devonian system // Geology of Belarus. Ed. by A. S. Makhnach [et al.]. Minsk: National Acad. Sci. Belarus, Institute of Geological Sciences, 2001. Pp. 186—236 (in Russian).
15. The Devonian system // Stratigraphic Chart of the Precambrian and Phanerozoic deposits of Belarus: Explanatory Note / T. G. Obukhovskaya [et al.]. Minsk: State Enterprise “BelNIGRI”, 2010. Pp. 98—114 (with Stratigraphic Chart of the Devonian deposits of Belarus in 2 sheets) (in Russian).
16. Obukhovskaya T. G., Kruczek S. A., Obukhovskaya V. Yu., Plax D. P. On the substage division of deposits of the Eifelian Stage of the Middle Devonian in Belarus // Problems of regional geology and mineral exploration:

materials of the VII University geol. readings, 4—6 apr. 2013, Minsk, Belarus / Ed.: M. A. Zhuravkov, I. I. Pirozhnik, A. F. Sanko [et al.]. Minsk: Ed. center of BSU, 2013. Pp. 35—37 (in Russian).

17. Plaksa D. P. Introduction of vertebrate zonal scales into the Stratigraphic Chart of Devonian deposits of Belarus // Doklady of the National Academy of Sciences of Belarus. 2008. Vol. 52, № 4. Pp. 83—88 (in Russian).

18. Plax D. P. Devonian fish fauna of Belarus // Lithosphere. 2008. № 2 (29). Pp. 66—92 (in Russian).

19. Narkiewicz K., Kruczek S. Conodont-based correlation of the Middle Devonian in SE Poland and Belarus: preliminary data // Actual Problems of Geology of Belarus and Adjacent Territories: Materials of the International Scientific Conference Dedicated to the 90th Anniversary of A. S. Makhnach, Academician of the NAS of Belarus. Minsk: State Enterprise "BelNIGRI", 2008. Pp. 188—194.

20. Stratigraphic Chart of the Devonian deposits of the southwest of Ukraine // Stratigraphic Charts of Phanerozoic deposits of Ukraine to geological maps of new generation / I. B. Vishnyakov [et al.]. Kiev, 1993 (in Russian).

21. Legend of the State Geological Map of Ukraine at a scale of 1:200, 000 of the Volyn-Podolia series of sheets. Rovno, 1995 (in Russian).

22. Plax D. P. Devonian ichthyofauna of the Volyn Monocline // Lithosphere. 2011. № 2 (35). Pp. 12—21.

23. The Devonian of the Voronezh Anteclise and the Moscow Syncline // G. D. Rodionova, V. T. Umnova, L. I. Kononova [et al.]. Moscow, 1995. 265 p. (in Russian).

24. The Devonian and Carboniferous of the Baltic States / V. S. Sorokin, L. A. Lyarskaya, A. S. Savvaitova [et al.]. Riga: Zinātne Publ., 1981. 502 p. (in Russian).

25. Valiukevičius J. J., Golubtsov V. K. The Devonian system // Geological map of the USSR. Scale of 1:1,000,000 (new series). Explanatory Note. Sheet N-(34), (35). Vilnius. Leningrad, 1986. Pp. 53—68 (in Russian).

26. Plax D. P., Kruczek S. A., Obukhovskaya V. Yu. Stratigraphy of the Eifelian deposits of the Middle Devonian in the western part of the Pripjat Trough // Lithosphere. 2016. № 2 (45). Pp. 29—47 (in Russian).

27. Plax D. P., Kruczek S. A. Stratigraphy and fish fauna from Middle Devonian deposits of the southern part of the Starobin Centrocline of the Pripjat Trough // Lithosphere. 2010. № 2 (33). Pp. 32—48 (in Russian).

28. Murashko O. V., Plax D. P. A finding of the Middle Devonian conodonts in the Bykhovskaya parametric borehole section in the eastern part of Belarus // Problems of Geology of Belarus and Adjacent Territories: Materials of the International Scientific Conference Dedicated to the 100th Anniversary of A. S. Makhnach, Academician of the NAS of Belarus (Minsk, November 21—22, 2018) / Institute for Nature Management of the National Academy of Sciences of Belarus. Eds.: A. A. Makhnach [et al.]. Minsk: StroyMedia Project Publ., 2018. Pp. 138—139 (in Russian).

29. Denison R. H. Acanthodii // Handbook of Paleichthyology. Stuttgart. New-York, 1979. Vol. 5. 62 p.

30. Wells J. Fish remains from the Middle Devonian bone beds of the Cincinnati Arch Region // Palaeontographica Americana, 1944. Vol. 3, № 16. Pp. 1—62.

31. Gross W. Downtonische und dittonische Acanthodier-Reste des Ostseegebietes // Palaeontographica, 1971. Bd. 136, Abt. A. 82 S.

32. Gross W. Kleinschuppen, Flossenstacheln und Zähne von Fischen aus europäischen und nordamerikanischen Bonebeds des Devons // Palaeontographica, 1973. Bd. 142, Abt. A. S. 51—155.

33. Valiukevičius J. Acanthodians and their stratigraphic significance // Stratigraphy and Fauna of the Lower Devonian Tareya Reference Section (Taimyr). The All-Russian Research Institute of Ocean geology. St. Petersburg: Publ. Nedra, 1994. Pp. 131—197 and 236—243 (in Russian).

34. Burrow C., Turner S., Wang S. Devonian microvertebrates from Longmenshan, Sichuan, China: Taxonomic assessment // Courier Forschungsinstitut Senckenberg (Final Report of IGCP 328 project). Vol. 223. 2000. Pp. 391—451.

35. Valiukevičius J. New Silurian to Middle Devonian acanthodians of the Timan-Pechora region // Acta Geologica Polonica. 2003. Vol. 53, № 3. Pp. 209—245.

Список цитируемых источников

1. Опорные скважины СССР. Опорная скважина № 2 Оршанской впадины / В. Я. Бессонова [и др.]. — Минск : Наука и техника, 1972. — 232 с.

2. Синичка, А. М. О возрастных аналогах тиверского яруса в Брестской впадине / А. М. Синичка, Г. В. Зиновенко // Докл. Акад. наук БССР. — 1972. — Том XVI, № 2. — С. 151—153.

3. Лярская, Л. А. Резекненская свита и ее возрастные аналоги / Л. А. Лярская // Стратиграфия фанерозоя Прибалтики. — Рига : Зинатне, 1978. — С. 22—39.

4. Валюкявичюс, Ю. Ю. Распространение чешуй акантодов в среднедевонских отложениях Белоруссии / Ю. Ю. Валюкявичюс // Материалы по стратиграфии Белоруссии. — Минск : Наука и техника, 1981. — С. 66—67.

5. Валюкявичюс, Ю. Ю. Акантоды наровского горизонта Главного девонского поля / Ю. Ю. Валюкявичюс. — Вильнюс, 1985. — 144 с.

6. Корреляция и органические остатки отложений наровского горизонта / Ю. Ю. Валюкявичюс [и др.] // Биофашии и фауна силурийского и девонских бассейнов Прибалтики / ВНИИ морской геологии. — Рига : Зинатне, 1986. — С. 73—86.
7. Валюкявичюс, Ю. Ю. Комплекс чешуй акантодов из основания среднего девона Прибалтики и Белоруссии / Ю. Ю. Валюкявичюс, В. Н. Каратайте-Талимаа // Биофашии и фауна силурийского и девонских бассейнов Прибалтики / ВНИИ морской геологии. — Рига : Зинатне, 1986. — С. 110—122.
8. Валюкявичюс, Ю. Ю. Новые виды акантодов из среднего девона Прибалтики и Белоруссии / Ю. Ю. Валюкявичюс // Палеонтологический журнал. — 1988. — № 2. — С. 80—86.
9. Valiukevičius, J. Acanthodian biostratigraphy of Lower and Middle Devonian in Lithuania, Latvia, Estonia and Byelorussia / J. Valiukevičius // In: Turner, S. (ed.). The Gross Symposium (IGCP 328 Palaeozoic Microvertebrates — Subcommittee for Devonian Stratigraphy joint meeting, Göttingen, 1993). Scientific Sessions. Abstracts. — 2 p.
10. Valiukevičius, J. Complexes of vertebrate microremains and correlation of terrigenous Devonian deposits of Belarus and adjacent territories / J. Valiukevičius, V. Talimaa & S. Kruchek // Ichthyolith Issues. Special Publication 1 Socorro, New Mexico, 1995. — Pp. 53—59.
11. Valiukevičius, J. Acanthodians and zonal stratigraphy of Lower and Middle Devonian in East Baltic and Byelorussia / J. Valiukevičius // Palaeontographica. — Stuttgart, 1998. — Abt. A. — S. 1—53.
12. Valiukevičius, J. Acanthodian biostratigraphy and interregional correlations of the Devonian of the Baltic States, Belarus, Ukraine and Russia / J. Valiukevičius, S. Kruchek // Courier Forschungsinstitut Senckenberg (Final Report of IGCP 328 project). — V. 223. — 2000. — Pp. 271—289.
13. Plax, D. P. Stratigraphy of Middle Devonian deposits of the western part of the Pripyat Trough (according to results of the study of ichthyofauna) / D. P. Plax, S. A. Kruchek // Lithosphere. — 2014. — № 1 (40). — Pp. 24—42.
14. Девонская система / С. А. Кручек [и др.] // Геология Беларуси / ред. А. С. Махнач [и др.]. — Минск : Ин-т геол. наук Нац. акад. наук Беларуси, 2001. — С. 186—236.
15. Девонская система / Стратиграфические схемы докембрийских и фанерозойских отложений Беларуси : Объяснительная записка / Т. Г. Обуховская [и др.]. — Минск : БелНИГРИ, 2010. — С. 98—114 (со стратиграфическими схемами девонских отложений Беларуси (2 листа)).
16. К вопросу о подъярусном расчленении отложений эйфельского яруса среднего девона в Беларуси / Т. Г. Обуховская [и др.]. // Проблемы региональной геологии и поисков полезных ископаемых : материалы VII Унив. геол. чтений, 4—6 апр. 2013 г., Минск / редкол.: М. А. Журавков (гл. ред.), И. И. Пирожник (зам. гл. ред.), А. Ф. Санько (отв. ред.) [и др.]. — Минск : Изд. центр БГУ, 2013. — С. 35—37.
17. Плакса, Д. П. Введение зональных шкал по позвоночным в стратиграфическую схему девонских отложений Беларуси / Д. П. Плакса // Докл. Нац. акад. наук Беларуси. — 2008. — Т. 52, № 4. — С. 83—88.
18. Плакс, Д. П. О девонской ихтиофауне Беларуси / Д. П. Плакс // Літасфера. — 2008. — № 2 (29). — С. 66—92.
19. Narkiewicz, K. Conodont-based correlation of the Middle Devonian in SE Poland and Belarus: preliminary data / K. Narkiewicz, S. Kruchek // Actual problems of geology of Belarus and adjacent territories: materials of the International Scientific Conference dedicated to the 90th anniversary of the birth of Academician of the NAS of Belarus A. S. Makhnach. — Minsk : BelNIGRI, 2008. — Pp. 188—194.
20. Стратиграфическая схема девонских отложений юго-запада Украины // Стратиграфические схемы фанерозойских отложений Украины для геологических карт нового поколения / И. Б. Вишняков [и др.]. — Киев, 1993.
21. Легенда Государственной геологической карты Украины в масштабе 1:200 000 Вольно-Подольской серии листов. — Ровно, 1995.
22. Plax, D. P. Devonian ichthyofauna of the Volyn Monocline / D. P. Plax // Lithosphere. — 2011. — № 2 (35). — Pp. 12—21.
23. Девон Воронежской антеклизы и Московской синеклизы / Г. Д. Родионова [и др.]. — М., 1995. — 265 с.
24. Девон и карбон Прибалтики // В. С. Сорокин [и др.]. — Рига : Зинатне, 1981. — 502 с.
25. Валюкявичюс, Ю. Ю. Девонская система / Ю. Ю. Валюкявичюс, В. К. Голубцов // Геологическая карта СССР. Масштаб 1: 1000000 (новая серия) / Объяснительная записка. Лист N-(34), (35). — Вильнюс : Л., 1986. — С. 53—68.
26. Плакс, Д. П. О стратиграфии эйфельских отложений среднего девона западной части Припятского прогиба / Д. П. Плакс, С. А. Кручек, В. Ю. Обуховская // Літасфера. — 2016. — № 2 (45). — С. 29—47.
27. Плакс, Д. П. О стратиграфии и ихтиофауне среднедевонских отложений южной части Старобинской центриклинали Припятского прогиба / Д. П. Плакс, С. А. Кручек // Літасфера. — 2010. — № 2 (33). — С. 32—48.
28. Мурашко, О. В. О находке конодонтов среднего девона в разрезе параметрической скважины Быховская на востоке Беларуси / О. В. Мурашко, Д. П. Плакс // Проблемы геологии Беларуси и смежных территорий : материалы междунар. науч. конф., посвящ. 100-летию со дня рождения академика НАН Беларуси А. С. Махнач (Минск, 21—22 нояб. 2018 г.) / Ин-т природопользования НАН Беларуси, редкол.: А. А. Махнач [и др.]. — Минск : Строй Медиа Проект, 2018. — С. 138—139.

29. Denison, R. H. Acanthodii / R. H. Denison // Handbook of Paleichthyology. — Stuttgart : New York, 1979. — Vol. 5. — 62 p.
30. Wells, J. Fish remains from the Middle Devonian bone beds of the Cincinnati Arch Region / J. Wells // Palaeontographica Americana, 1944. — Vol. 3, № 16. — Pp. 1—62.
31. Gross, W. Downtonische und dittonische Acanthodier-Reste des Ostseegebietes // Palaeontographica, 1971. — Bd. 136, Abt. A. — 82 S.
32. Gross, W. Kleinschuppen, Flossenstacheln und Zähne von Fischen aus europäischen und nordamerikanischen Bonebeds des Devons / W. Gross // Palaeontographica, 1973. — Bd. 142, Abt. A. — S. 51—155.
33. Валюкявичюс, Ю. Ю. Акантоды и их стратиграфическое значение / Ю. Ю. Валюкявичюс // Стратиграфия и фауна нижнедевонских отложений тарейского опорного разреза (Таймыр). Ком. по геологии и использованию недр России, Всерос. науч.-исслед. ин-т геологии и минерал. ресурсов Мирового океана. — СПб. : Недра, 1994. — С. 131—197, 236—243.
34. Burrow, C. Devonian microvertebrates from Longmenshan, Sichuan, China: Taxonomic assessment / C. Burrow, S. Turner & S. Wang // Courier Forschungsinstitut Senckenberg (Final Report of IGCP 328 project). — Vol. 223. — 2000. — Pp. 391—451.
35. Valiukevičius, J. New Silurian to Middle Devonian acanthodians of the Timan-Pechora region / J. Valiukevičius // Acta Geologica Polonica. — 2003. — Vol. 53, № 3. — Pp. 209—245.

В статье на основе изолированных чешуй описан новый вид акантодовой рыбы *Cheiracanthoides pinskensis* sp. nov. из костюковичских отложений эйфельского яруса среднего девона Беларуси. Чешуйный материал по этому виду происходит в основном из керна четырех скважин, пробуренных на территории республики. Чешуи имеют хорошую сохранность. Они обнаружены в карбонатно-глинистых отложениях мелководно-морского генезиса. Эти образования достаточно часто содержат различные скелетные элементы как беспозвоночных, так и позвоночных. Описанный новый вид дополняет таксономический состав ихтиофауны, известной из отложений верхнего эйфеля среднего девона запада Восточно-Европейского кратона.

Received by the editorial staff 07.06.2019