

## ***Helix pomatia* Linnaeus, 1758: the history of its introduction and recent distribution in European Russia**

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European snail *Helix pomatia* Linnaeus, 1758 has been widely introduced in Central Russia. The history of the introduction and review of the recent distribution of the species are presented. Possible ways of the introduction of this species are discussed.

**Key words:** *Helix pomatia*, Moscow

### **Introduction**

Due to increasing human activity and global climate change, the insulating ability of the major zoogeographical barriers decreases. This disrupts the existing set of habitats and leads to appearance of alien species in the regional ecosystems. In this regard, to identify the main directions of movement of species outside their natural range is extremely important. At the moment, *Helix pomatia* is one of rapidly spreading species in the territory of European Russia (Fig. 1).

*Helix pomatia* Linnaeus, 1758 is one of the largest terrestrial molluscs in Europe. Probably, the centre of origin of this species lies in the regions of Central and Southeastern Europe. Natively, *Helix pomatia* is widely distributed in almost all parts of the Central and Western Europe (JÄRVINEN et al. 1976; SCHILEYKO 1978; NEUBERT 2013, 2014). Except this, the species has been widely introduced by man in many parts of the world including northern Africa and America (DEES 1970; BERG 1994; RUMYANTSEVA 2006). Such high speed of its spreading is partly explained by its long life cycle (FALKNER 1984) and relatively high survival rate of juveniles. Observations in the Kaliningrad Region showed that the maximum lifespan of the snails in the local wild consists of 8–9 years (STARODUBTSEVA & DEDKOV 2003: 130–131). The magnitude of the survival specific to each age group remains throughout the life cycle of the studied populations more or less constant. About 60% of new-born snails reach the reproductive age (STARODUBTSEVA & DEDKOV 2003: 130–131).

### **The history of its introduction**

Introduction of *H. pomatia* on the territory of the central European Russia started a long time ago. DWIGUBSKY (1802) was the first to report the presence of the species in the central part of Russia. Subsequently, NADEZHIN (1868) commented on Dwigubsky's data: "[*H. pomatia*] was not found subsequently and its existence around Moscow is very unlikely". Also, MILACHEVICH (1881) stated in his

work: "Un trait caractéristique de la faune de Moscou est l'absence complète des grands Hélices, tels que: *Helix pomatia* L., ..." [one characteristic of the Moscow fauna is a complete absence of large Helicids, such as *Helix pomatia* L. ...]. However, all that have been said above cannot prove the absence of *H. pomatia* in central Russia in the 19<sup>th</sup> century. Although it is not possible to confirm or refute Dwigubsky's data because his materials were not preserved, it is unlikely that Dwigubsky would misidentify this species. Perhaps the snails were actually present in the vicinity of Moscow in the early 19<sup>th</sup> century, but for unclear reasons, they did not form a large and stable population. For example, one of the unsuccessful introductions of this species is described for Crimea (BALASHOV & GURAL-SVERLOVA 2012).

LINDHOLM (1911) presented the first trustworthy record of the species in the Moscow area with a detailed description of the population. It was located in the park in Petrovsko-Razoumovskoe settlement of the Moscow's Uezd (district) [село Петровско-Разумовское Московского уезда], now in the Timiryazev district of the Northern Administrative District of the Moscow City and called as the park of the Timiryazev's Agrarian Academy (TAA) [Московская Сельскохозяйственная Академия им. К. А. Тимирязева]. Subsequently, MALEVICH & STAROBOGATOV (1958) confirmed the presence of the species in the park of the TAA. Also, they noted a possible presence of *Helix lutescens* Rossmässler, 1837 in the south part of the Moscow Region, in the vicinity of Chekhov [Чехов] town; however, the population is still preserved there and consists exclusively of *H. pomatia*. The following distribution range for *H. pomatia* is indicated by SCHILEYKO (1982): "Middle and Southeastern Europe; in the USSR – along of western borders of Belarus, Ukraine, Moldova and Baltic states; introduced in Leningrad, Kyiv, Kursk, Moscow and environs". NEUBERT (2014) with reference to SYSOEV & SCHILEYKO (2009: 312) indicates "some other places in Russia towards the vicinity of Moscow" as eastern border of the species distribution.



**Fig. 1.** Schematic map of the introduction of *H. pomatia* in European Russia.

In 1982, *H. pomatia* was firstly discovered in the city park in the centre of Tver' [Тверь], near a local school. In the following decade, the population almost disappeared, but a new one has formed about 500 meters from it. Currently, there is a stable population of this species in the floodplain of the T'maka [Тьмака] River. There are plantations of elm (*Ulmus* sp.), poplar (*Populus* sp.), ash-leaved maple (*Acer negundo*) and brittle willow (*Salix fragilis*) in the floodplain, moreover, the entire area is overgrown with tall herbs, dominated by nettle (*Urtica dioica*) and small balsam (*Impatiens parviflora*) (SHIKOV 2007).

Mass colonies of the "Roman snails" were observed in Velikoluts'k [Великолуцк] and Nevel' [Невель] districts of the Pskov [Псков] Region. The number of the snails is so large that in 2008 the 'ProfiTur' company had received permission to collect of snails from the Pskov's regional Committee of the Licensing and Nature (NIKOLAEV 2008). The first record of *H. pomatia* in St. Petersburg (former Leningrad, [Ленинград]) [Санкт-Петербург] was published by SCHILEYKO (1978: 346). Subsequently, the snails were repeatedly found in the parks of Peterhof [Петергоф, =Петродворец] and surroundings of Lomonosov [Ломоносов] (former Oranienbaum [Ораниенбаум]) (Markin, pers. comm., 1995–1997). According to unconfirmed reports, in recent years the species was observed in other parts of the Leningrad Region.

STOIKO & BULAVKINA (2010) expands the area of the introduction of this species and indicates three additional locations: a single finding in forest park in the Penza [Пенза] City, Zhigulevski Natural Reserve [Жигулёвский заповедник] in the Samara [Самара] Region and Vin-

novskaya Rotscha [Винновская Рошча] in the Uliyanovsk [Ульяновск] City. The population in Vinnovskaya Rotscha is described in detail by ARTEMIEVA & SEMENOV (2004, 2007). Later, KORÁBEK et al. (2015: 9) regards this population as belonging to another species – *Helix thessalica* Boettger, 1886. Also, *H. pomatia* was mentioned for malacofauna of Samarskaya Luka [Самарская Лука] (SACHKOVA 2009). Except this, *H. pomatia* is included in the Red Data Book of the Belgorod [Белгород] Region of Russia (PRISNYI 2004). SNEGIN (2010) described two populations from the territory of Belgorod Region (called as "Belgorodskaya" [Белгородская] and "Mayskaya" [Майская] populations) and advocated the relationship of the "Belgorodskaya" population with the Kharkiv's ones from adjacent part of Ukraine on the basis of their genetic similarity. The author also noted on genetic differences of the "Mayskaya" population from the "Belgorodskaya" ones. In a subsequent work SNEGIN & ARTEMCHUK (2014) have added more populations from the Belgorod Region: Belgorod district, Shopino [Шопино] settlement, a ravine forest near Belgorod-Moscow road; a floodplain of the Seversky Donets river [Северский Донец], near the Belgorod City; Bori-sovo [Борисово] district, Hotmyzhsk [Хотмыжск] village, floodplain of the Vorskla [Ворскла] river, a ravine forest near of recreational area "Krasivo" [«Красиво»]; Valuy [Валуй] district, near of Yablonovo [Яблоново] village, "Lis'ya Gora" [Лисья Гора] ravine, the floodplain of the Oskol [Оскол] river in the thickets of alder and in the Belgorod City, willow forest in the floodplain of the Vezyelka [Везёлка] river near the campus of the Belgorod State University. Recently, SYCHEV & SNEGIN (2015: 432) have described locality around Yablonovo village on the right shore of the Oskol river again. However, according to KORÁBEK et al. (2015: 9), "Roman snails" from this location also refer to *H. thessalica*.

According to NEGROBOV et al. (2005) the species is known from the Voronezh [Воронеж] Region since 1975. Since 2011 the species was included also in the Red Data Book of the Voronezh Region as well (NEGROBOV 2011: 37). The reasons for entry of the introduced species in the list of protected species in these regions remain unclear. It is interesting to note that Belgorod and Voronezh Regions of Russia are bordering on the Kharkiv Region of Ukraine, where *H. pomatia* was reported already in 1900 (ROSEN 1900). Nowadays *H. pomatia* is a common inhabitant of deciduous forests of Kharkiv and its environs (BALASHOV et al. 2009).

A small but stable population of *H. pomatia* was recently found in Mordovia. The population lives in a wooded area 3 km northeast from the R178 road to Ak-syenovno [Аксеново] village of the Lyambirsky district [Лямбирский район]. Eleven large mature individuals were found in the northern part of the forest on the border with the adjacent abandoned suburban area. Fifty empty shells were also found (LOBACHEV et al. 2015). Verbal reports about the finding and even single snail sample were received at the Department of Zoology of the Mordovian University periodically since the early 1990s (LOBACHEV et al. 2015: 144).

The southeastern and eastern parts of the present range of

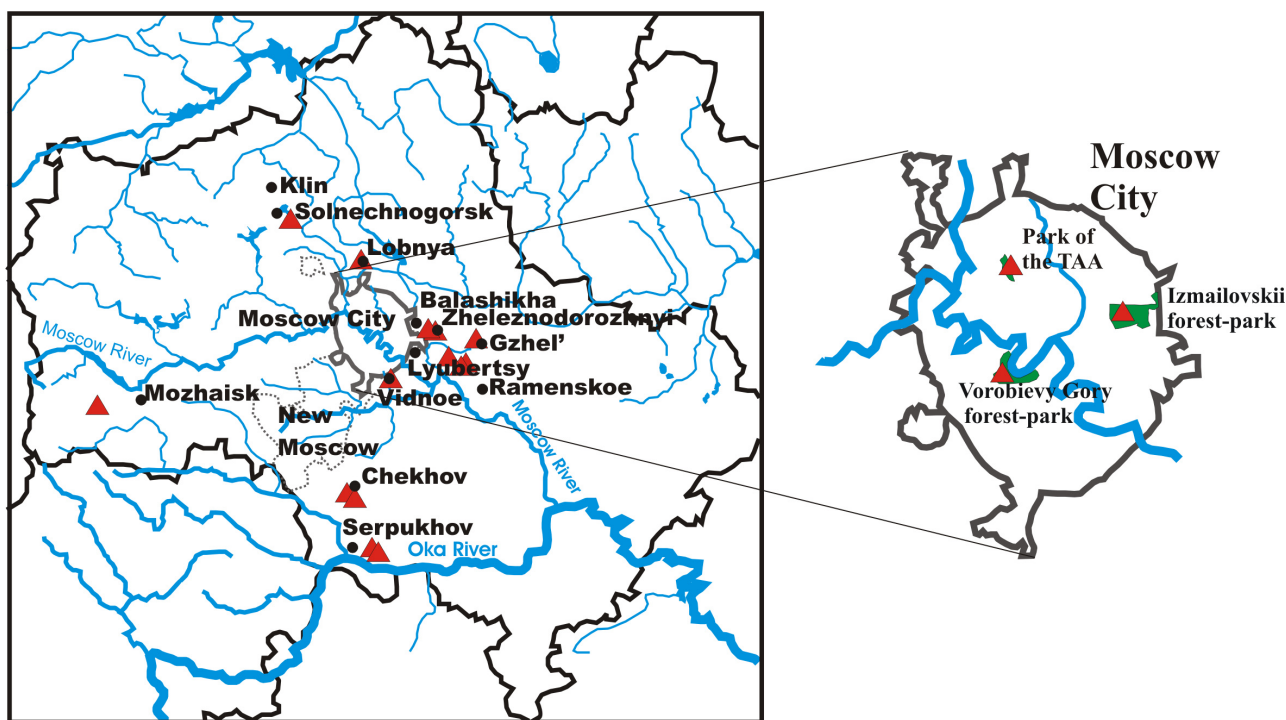


Fig. 2. Schematic map of locations of large colonies of *H. pomatia* in the Moscow City and the Moscow Region.

*H. pomatia* are less studied. The very eastern border of modern distribution of this species passes along the Middle Volga Region. However, there is unconfirmed information about the introduction of the snail in three sites in the vicinity of Novosibirsk (BABUEVA 2008). The species is identified as “*Helix vulgaris*”, however, there is no image of the studied specimens. “*Helix vulgaris*” is a synonym of *H. albescens* Rossmassler, 1839, a common inhabitant of northern and western Black Sea Coast territories. It is unlikely that this species could acclimate in Siberia and create numerous stable populations, as it is described in the article. However, given the significant climate changes in different parts of the planet (BEDRITSKY 2005; KABANOV 2008), acclimatization of *H. pomatia* in Western Siberia does not seem improbable.

KHOCHUTKIN et al. (2003) provided data about *H. pomatia* collected in the vicinities of Gelendzhik [Геленджик] and Sochi [Сочи] of the Krasnodar territory [Краснодарский Край] of the Southeastern part of European Russia and preserved in the malacological collection of the Zoological Museum of the Institute of Ecology of Plants and Animals of the Ural Branch of the Russian Academy of Sciences [Зоологический Музей Института Экологии Растений и Животных Уральского Отделения Российской Академии Наук]. Listed samples were collected between the years 1971–1997. Unfortunately, there is no other information to confirm the presence of the species in Krasnodar territory. Repeated attempts of introduction of *H. pomatia* in Crimea (the last in 1993) were unsuccessful (pers. observations; LEONOV 2005; BALASHOV & GURAL-SVERLOVA 2012) (Fig. 4A).

Most eastern findings of the species in fossil deposits are known from the Quaternary deposits of the Czech Republic (JUŘÍKOVÁ et al. 2014), Slovakia (LOŽEK 2012) and northern Bulgaria (ALEXANDROWICZ 2009). It should be noted that *H. pomatia* is missing in the review of Quater-

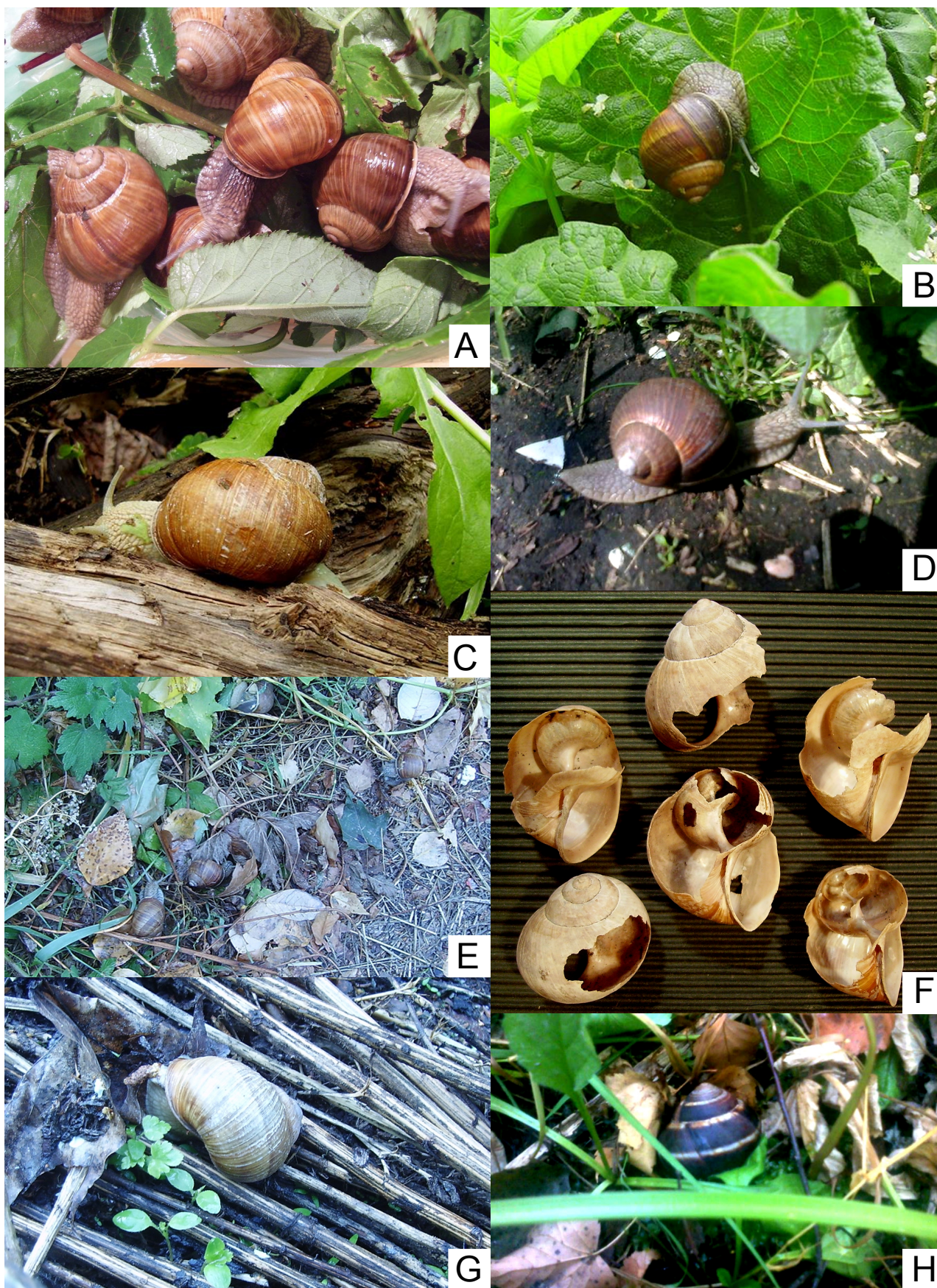
nary molluscs of Belarus (SAN’KO 2000). Also, there are no data about fossil records of *H. pomatia* from the territory of Russia.

Moscow City and the Moscow Region are good examples of a resettlement of *H. pomatia*. There are many populations, in an urbanized anthropogenous and in natural habitats. Most important Moscow’s populations are reviewed below (Fig. 2).

#### ***Helix pomatia* in the Moscow City and the Moscow Region**

As mentioned above, DWIGUBSKY (1802) had given the first mention of the presence of *H. pomatia* in Moscow and its surroundings, but he did not specify where precisely were the snails collected. Probably due to the lack of clear guidance on the collecting place, later authors (NADEZHIN 1868; MILACHEVICH 1881) indicated the species occurrence as “dubious” or “incorrectly defined” in own reviews of the mollusc fauna of Moscow and its environs. Thus the first trustworthy record of this species dates back to LINDHOLM (1911), who reported the species from the present park of the Timiryazev’s Agricultural Academy located in the northern part of the Moscow City. Within a few excursions in 2013–2015, I have confirmed myself the presence of a large and stable population of *H. pomatia* in the park (Figs. 3A, 4E-G, 5A). The snails are spread throughout the park and the adjacent part of the nursery school now, but most of them have been observed on the edge of the park near a pond. Based on the LINDHOLM’s (1911) data, the population was founded at least 20 years before the first detection of the snails. Therefore, this population is the oldest in Moscow and the surrounding area and its continuous existence (MALEVICH & STAROBOGATOV 1958) lasts at least 125 years. Many other introduced molluscs were collected together with *H. pomatia* here recently: *Derocer-*





**Fig. 3.** A: live *H. pomatia* from the park of the Timiryazev's Agrarian Academy, after rain,  $t +17^{\circ}\text{C}$ , between 5:15 and 6:30 PM, July 20, 2015; B–D: live *H. pomatia* from the Izmailovskii forest park, summer 2014; E: live *H. pomatia* from Malakhovka, August 29, 2015; F: empty shells of *H. pomatia*, crashed by birds, Izmailovskii forest park, summer 2015; G: alive *H. pomatia* from the northern border of municipal park and residential sector of the Vidnoe town, May, 2015; H: live *H. lucorum* from the Izmailovskii forest park, August 9, 2014. All photos by R. Egorov.



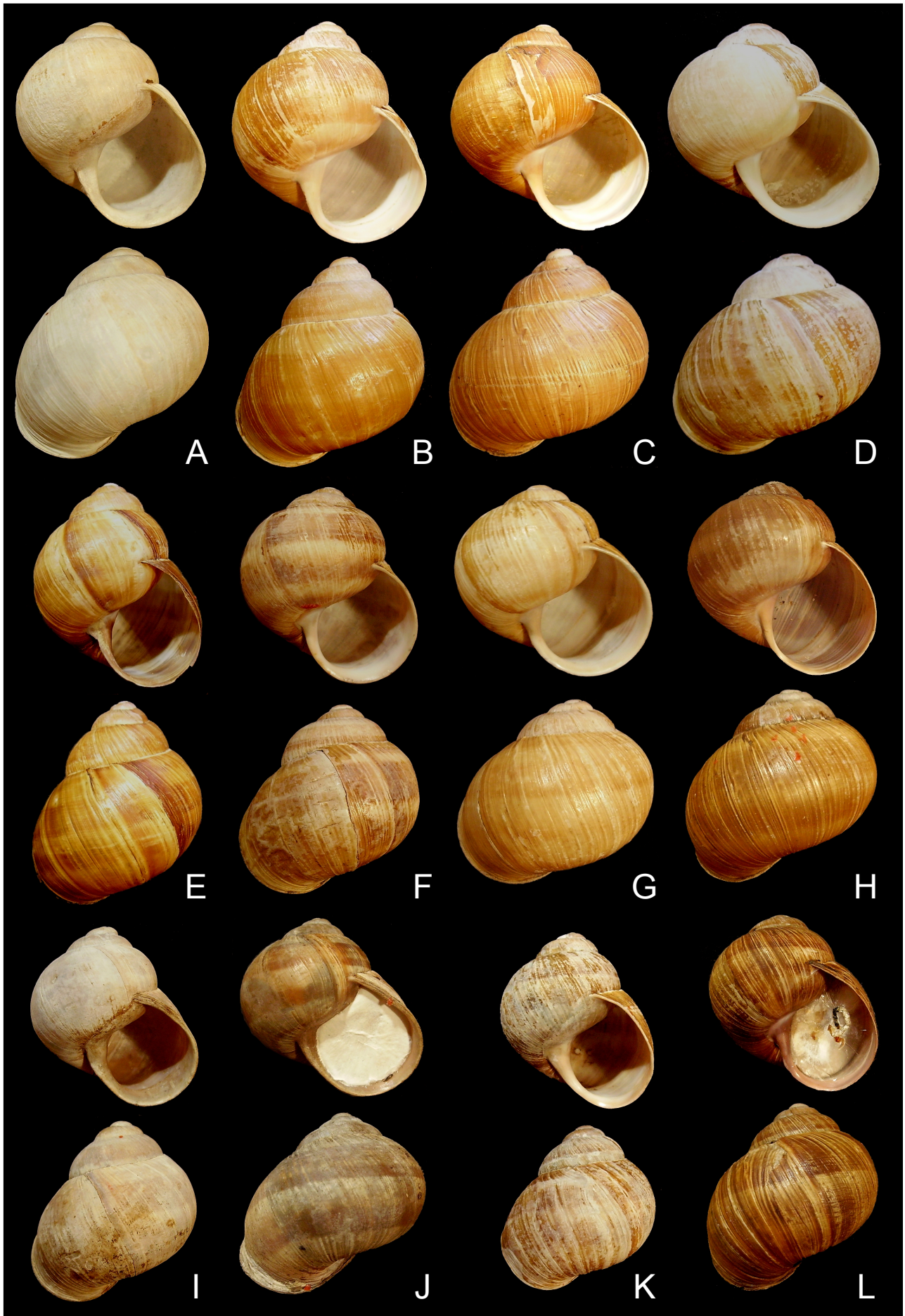


Fig. 4. See next page.



**Fig. 4.** Shells of *H. pomatia*; A: Ukraine, Crimean peninsula, Bakhchisaray district, Prokhladnoe village, coll. A. Oleinik, 1984, height of shell 50.0 mm; B–D: Moscow Region, Serpukhov district, Prioksdko-Terrasnyi State Biosphere Reserve, coll. P. Morozov, 1986, height of shells, B: 49.0 mm, C: 46.5 mm, D: 42.7 mm; E–F: north of the Moscow City, park of the Timiryazev's Agricultural Academy, coll. R. Egorov, July 20, 2015, height of shells, E: 42.0 mm, F: 43.7 mm; G: same locality, ex. coll. A. Oleinik, 1984, height of shell 39.8 mm; H: East of the Moscow City, Izmailovskii forest park, in grass after rain, coll. E. Kolodyazhnaya, June 5, 2008, height of shell 41.5 mm; I–J: East of the Moscow City, Izmailovskii forest park, along Glavnaya Alleya road, coll. R. Egorov, August, 2015, height of shells, I: 44.4 mm, J: 41.8 mm; K: South-west of the Moscow City, forest park "Vorobievsky Gory (Sparrow Hills)", coll. R. Egorov, September 2, 2015, height of shell 37.7 mm; L: Moscow Region, Lyubertsy district, Malakhovka settlement, Fevral'skaya street, in grass after rain, coll. R. Egorov, August 29, 2015, height of shell 45.0 mm.



**Fig. 5.** Landscapes of some reviewed localities. A: North of the Moscow City, park of the Timiryazev's Agricultural Academy, a typical landscape of habitat of *H. pomatia* in this park, August, 2015; B: East of the Moscow City, Izmailovskii forest park, experimental area of agronomy of the Station of Young naturalists, one of the probable centers of distribution of *H. pomatia* in Izmailovo, June, 2014; C: Moscow Region, Lyubertsy district, Malakhovka settlement, Fevral'skaya street, a typical habitat of *H. pomatia*, August, 2015; D: Moscow Region, Leninski district, Vidnoe town, a border of municipal park and residential sector near of Meditsinskaya street, habitat of *H. pomatia* and *Cepaea hortensis*, May, 2014.

as *caucasicum*, *Arion* cf. *vulgaris*, *Oxychilus draparnaudi*, *Arianta arbustorum* and *Cepaea hortensis*.

Another large and stable population of *H. pomatia* was recorded in the Izmailovskii forest-park [Измайловский лесопарк] in eastern part of the Moscow City (Figs. 3B–D, 4H–J, 5B) in 2007 (EGOROV 2008: 84). A few specimens were observed in south-western part of the park on a gravel road after rain. Over the next few years *H. pomatia* spreads across all of the western part of the forest-park. In the summer of 2015, the population density reached up to 6–8 specimens per square meter in some places of the forest-park. It is interesting to note that in August 2014 one live adult specimen of *Helix lucorum* was found in the same forest park (Fig. 3H). Izmailovskii forest park, one of the oldest parks in Moscow, arose on the site of the

manor of Boyar N.R. Zakharin-Yuriev, which existed in 1571–1585. In 1585–1654 the owners were his descendants Romanov's, then this place was under the state administration (1654–1837), and since 1663 the territory is patrimony of Tsar Alexei Mikhailovich, who made it a vast country residence. After this period, the manor has been gradually destroyed. Since the middle of the 19<sup>th</sup> century, Izmailovo was a forest plantation: the forest was divided into quarters, a network of land reclamation was created and forest cultures "of foreign breeds" were planted. Only a few old trees remain today. Large areas are occupied by middle-planting linden (*Tilia cordata*) and maple (*Acer platanoides*). There are *Salix alba*, *S. fragilis*, *Pinus sylvestris*, *Populus tremula*, some oak trees (*Quercus robur*), and a few large elms (*Ulmus laevis*). European larch (*Lar-*



*ix decidua*) is found in various parts of the park, mostly along alleys. Part of the territory is occupied by middle-aged natural stands, mainly birch (*Betula pendula*). There is a lot of planting of introduced trees and shrubs, middle-aged as well as young, and some spruce (*Picea abies*). Undergrowth is represented by *Corylus avellana*, *Sorbus aucuparia*, *Sambucus racemosa*, *Rubus idaeus*, *Rhamnus* sp., *Euonymus verrucosus* and *Salix caprea*. It should be noted that *H. pomatia* became an important element in the ecosystem throughout the forest park. Due to the high numbers, they have become a regular part of the diet of omnivorous birds like crows and rooks (Fig. 3F).

A small but stable population of “Roman snail” lives in the Botanical Garden of Moscow State University and the adjoining forest park “Vorobievsky Gory” (Sparrow Hills [Воробьевы Горы]) in the southwestern part of Moscow (Fig. 4K). The Vorobievsky Gory were not affected by an intensive impact of human activity and largely retained their natural appearance – this is the only specially protected natural territory of Moscow, where natural broadleaf forest with characteristic flora and fauna has been preserved. Almost all territory of the Vorobievsky Gory is covered by the old deciduous forest, consisting mainly of lime tree (*Tilia*), oak (*Quercus*), maple (*Acer*), birch (*Betula*) and ash-tree (*Fraxinus* sp.). Other vegetation consists of dense undergrowth, consisting mainly of young shoots of maple and ash trees. “Roman snails” are most often found in the thickets of nettles and under bushes of different hawthorns (*Crataegus* spp.).

In addition, the species is widely distributed in the Serpukhov district of the Moscow Region, from where it also penetrated in the forests of the Chekhov district. This population is one of the largest in the Moscow Region (Fig. 4B–D). The population is patchy and occupies various biotopes in this area – from outskirts of residential sectors and garden plots to edges of adjacent forests and parks. There are two published versions of the introduction of this species in the Serpukhov [Серпухов] district. One of them reports that the leadership of the Soviet Russia has decided to start a breeding of the Roman snail in the 30's of the 20<sup>th</sup> century. For this, an experimental farm for breeding of the snails was built near Serpukhov town close to the Dankee [Данки] village. The first snail specimens for the farm were allegedly brought from the Côte d'Azur (SABUROV 2015). For some reasons, the production of the delicacy failed and the staff abandoned the farm, leaving a colony of snails unattended. Snails dispersed around the farm and in the 70's they were seen for the first time in the territory of the nearby Prioksko-Terrasnyi Reserve [Приокско-Террасный заповедник], since then they have formed a large population covering a substantial area. Subsequently the snails were spread from the reserve mainly by humans. Tourists coming in Serpukhov district collected large snails there and released them into their backyards and home gardens. Because of this, large colonies of Roman snails are now found in other parts of the Moscow Region and neighbouring areas, sometimes forming large populations. This version looks quite plausible and is generally supported by local residents and staff of the Prioksko-Terrasnyi Reserve. According to another ver-

sion, offered by journalist of the newspaper “Moskovsky Komsomolets” (BELYAEVA 2005), “in the 70's of the last century, the French experts have delivered snails into the Prioksko-Terrasnyi Reserve, in the Serpukhov Region.” The journalist refers to information allegedly received from an employee of the Moscow ZOO, I. Shapovalova. Meanwhile, I. Shapovalova completely rejected this version, explaining that at the meeting with the journalist the problem of the snails appearance in the Moscow Region was not discussed, and all the statements in the newspaper article considering the time and circumstances of the emergence of *H. pomatia* in the suburbs does not correspond to reality, and were thus entirely made up by the journalist. It is hard not to agree with I. Shapovalova because Prioksko-Terrasnyi State Biosphere Reserve is a protected natural area and a deliberate introduction of an alien animal and plant species is prohibited. However, both sources indicate France as the origin of the first snails which gave rise to this large population. In the reserve, the snails inhabit a mixed forest with predominance of broad-leaved trees.

Another large population is distributed in the territories of the Lyubertsy [Люберцы] and Ramenskoe [Раменское] districts of the Moscow Region. The snails occupy various places in Malakhovka [Малаховка] (Figs. 3G, 4L, 5C), Udel'naya [Удельная] and Bykovo [Быково] settlements. The population density is usually about 3–5 specimens of different ages per square meter, and reaches up to 12–15 individuals in some areas of Malakhovka (pers. obs., August 2015). Snails are common in backyards and around them, but they are completely lacking in the local forest park. During my visit I observed the highest concentration of snails in areas of dumped food and garden waste (in piles of weeds and mowed vegetation). In addition, a significant number of snails were found on the brick-cement foundations of buildings and fences. In addition to *H. pomatia*, introduced snails *Cepaea vindobonensis* and *C. nemoralis* were collected in huge numbers. According to the local residents and reports of the user of gardening forum (YULIYA 2005), the introduction of all three alien species occurred probably about ten years ago, but their mass occurrence in the settlement was noted only in the last three or four years. Also, there is a multiple stable isolated population in the north of the Ramenskoe district, inhabited in the old clay quarry and in a mixed forest around the quarry in the vicinity of Gzhel' [Гжель] settlement and in adjacent gardening plots (Malenkina, pers. comm. 2015).

Numerous small populations of *H. pomatia* are located in different parts of the Moscow Region. Stable population lives in municipal forest park of Vidnoe [Видное] town south of Moscow (Fig. 3G, 5D). According to the message of Alexander Zubarev, in summer of 2014 the species was observed in Butovo [Бутово] forest park, located to the west of Vidnoe. The Roman snails live in an overgrown old quarry within this park (Zubarev, pers. comm.). Also, *H. pomatia* was found in private gardens and in the surrounding woods near Semenovskoe [Семеновское] village in the Mozhaisk [Можайск] district in the west; in parks, gardens and forests of the Mytitschee [Мытищи] and Dmitrov [Дмитров] districts in the north. In addi-

tion, separate colonies were recorded in Solnechnogorsk [Солнечногорск] (pers. obs.), Tschyolkovo [Щёлково] (Zubarev, pers. comm.) and Balashikha [Балашиха] (SCHILEYKO 1978: 346) districts of the Moscow Region. Solnechnogorsk colony consists of contingently separated populations and stretches as far north as to Klin [Клин] (LOBACHEV et al. 2015), where the species is found in the garden plots of the private sector and adjacent forest edges. As a result of introduction of the Roman snail in habitats suitable for its naturalization, the species forms numerous, geographically isolated populations. It should be noted that the distribution of *H. pomatia* in the Moscow Region is closely linked to human activities, and its distribution is mostly limited to various types of anthropogenic and agricultural habitats. In addition to the human settlements, when this species was introduced its populations invaded some natural forest communities, as in the natural forest of the Prioksko-Terrasnyi Reserve. In areas where human activity is minimal or absent the snail does not occur. Such places are, for example, forests of eastern part of the Smolensk Region between Vyaz'ma and Ugra towns (pers. obs.) and a relic Lesodolgorukovsky forest [Лесодолгоруковский лесной массив] to the west and north-west of the Moscow Region (pers. obs.). A good example of a direct human intervention in the spread of *H. pomatia* is the Mordovian finding. Species is found in a residential area near the edge of the forest which is adjacent to human settlements, but absolutely absent in parts more remote from residential areas. The form also does not exist in Mordovian State Reserve [Мордовский Государственный Заповедник] (BEZINA 2014).

## Conclusions

It was established that *H. pomatia* is a synanthropic species of the European part of Russia, which has become an important component of local ecosystems. The main habitats are confined to anthropogenic habitats of different origins; however, the ability of the snails to colonize and form stable populations in natural habitats makes *H. pomatia* a polytopic species with a wide range of occupied habitats. Geographically, the modern area of the introduction covers most regions of the central part of European Russia from St. Petersburg in the north to Voronezh and Belgorod in the south. In the Krasnodarski Krai, *H. pomatia* likely did not form a stable population. Eastern border of *H. pomatia* at the moment cannot be clearly defined. The population of molluscs from the vicinity of Novosibirsk needs further investigation and a clear identification of the species found. However, given the high adaptability of the species in agrocoenoses and general warming of the climate in continental Eurasia, further spreading of *H. pomatia* in the eastern parts of Russia should be expected. The artificial resettlements of *H. pomatia* are partly due to the fact that the Roman snail has long been considered a valuable food object. Therefore, in areas previously being private parks, estates and farms successful efforts to acclimatize *H. pomatia* with the purpose to introduce the species in local agriculture were often carried out (LINDHOLM 1911). Establishing of breeding farms also contributes to their resettlement (ROZHKOVA 2015). As well is the Roman

snail a popular object of laboratory tests and is often kept indoors of amateur naturalists; the snails then frequently appear in nature due to the carelessness of their keepers. That is the way how *H. pomatia* was introduced in the Vladimir [Владимир] Region (МУХАНОВ 2014). In addition, the expansion of the distribution range of this species is also due to the moving of snails and their eggs with the ground of garden plants from nurseries (MAHLFELD 2000). In addition to the anthropogenous landscapes where the species was introduced, its populations are naturalized in adjacent natural forest communities. The introduction of *H. pomatia* into biogeocoenoses, which are not characteristic for the species but proved to be suitable for their naturalisation, resulted in the establishment of numerous geographically isolated introduced populations. These populations are good facilities for the study of microevolution phenomena occurring in modern anthropogenic landscapes. The exact number of geographically separated populations of *H. pomatia*, currently available, is unknown, but some of them are objects for ecological and genetic research. Several papers were devoted to the study of the population structure of this species based on the analysis of morphological characteristics (KHLUS et al. 2001; KRAMARENKO & SVERLOVA 2005; SVERLOVA 2005; ANDREEV 2006; KHLUS 2007; ANDREEV et al. 2013).

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