

Annotated list of the family Mermithidae Braun, 1883 - the parasites of invertebrates

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Annotated list includes the nematodes of family Mermithidae Braun, 1883, bearing on the superfamily Mermithoidea Wulker, 1924 of order Mermithida (Hyman, 1951) Artyukhovskiy, Khartschenko et Rubzov, 1977.

At present the family Mermithidae Braun, 1883 numbers a little more than 700 species from 53 genera of 7 subfamilies (Gafurov, 1997). 47 species and 6 subfamilies are noted in the fauna of Kazakhstan.

The nematodes belong to the absolute, permanent, partimal parasites, larval as well as adult generations of which can be developed in the environment (Skrjabin, Shulz, 1940; Shulz, Gvozdev, 1972). Mermithids are most pathogenic cavity nematodes of invertebrates and are more often found in insects and more rarely in crustacea, spiders, molluscs, leeches. Their parasitism is usually lethal for the hosts, the potentialities of their reproductivity are very high.

Mermithids revealed in Kazakhstan have been mentioned for the first time in the article of L.S. Zimin (1937). G. Shamenov (1945) informs about mass invasion of locusts (*Gomphastax elavata* Bolivax) by mermithids. I.A. Rubzov (1967, 1971) found these worms in Kazakhstan in beetles and biting midges. In the early seventies the systematic study of the fauna, spreading, harmfulness and biology of mermithids, principally of blood-sucking insects (Diptera) - blackflies, gad-flies, gnats, biting midges as well as chironomids, molluscs and beetles was began (Rubzov, Vakker, 1973; Vakker, Dubitsky, Gubaidulin, Ikhsanova, 1977; Gubaidulin, Vakker, Nurakhzhanova, Dubitsky, 1977; Dubitsky, Gubaidulin, Zolotukhin, 1977; Gubaidulin, 1978; Vakker, Monakov, 1980; Deshevykh, Gubaidulin, Nurakhzhanova, 1980; Gubaidulin, Komardina, 1982; Gubaidulin, Vakker, 1983; Gafurov, Bekturganov, Gubaidulin, 1984, 1989, 1991; Shaimardanova, 1984; Kukashev, Gubaidulin, 1985; Bekturganov, 1986, 1991; Bekturganov, Gubaidulin, 1986, 1987, 1988, 1989, 1991, 1996; Gubaidulin, Bekturganov, 1986, 2000; Rakhimbaeva, Gubaidulin, 1986; Gubaidulin, Bekturganov, Rakhimbaeva, 1987; Komardina, Gubaidulin, 1989; Bekturganov, Gubaidulin, Dubitsky, 1990, 1991; Gubaidulin, Komardina, Bekturganov, 1991; Komardina, 1991, 1992; Gubaidulin, Batuev, 1998).

The collections made by collaborators of the laboratory of Biological control of the Institute of Zoology as well as the articles of I.A. Rubzov (1967, 1971, 1976), accomplished on the Material collected in Kazakhstan, serve as the basis for the present list of mermithids. The main literary sources are the monographies on mermithids (Rubzov, 1972, 1974, 1977a, 1978; Artyukhovskiy, 1990; Gafurov, 1997), the works on systematic position of mermithids in the system of Nematodes (Artyukhovskiy, 1971; Artyukhovskiy, Khartschenko, 1977; Rubzov, 1977b; Malakhov, Ryzhkov, Sonin, 1982; Gafurov, 1990) were also taken into consideration.

The morphological characteristics of each genus and species of nematodes, the main synonyms, and data on their distribution, biology and hosts of the parasite are listed in species outlines.

As the measurements of separate organs of mermithids and, especially, of their ratios have a great taxonomic significance they are given before the description in the following generally accepted order: n - the quantity of studied specimens; L - the length of body; a - the ratio of the body length to the greatest width; b - the ratio of body length to the length of oesophagus; c - the ratio of the male body's length of tail (from the cloaca to the posterior end of body); V - % ratio of the distance from the anterior end to vulva to the total length of body. All measurements mentioned below are given in micrometers thus their symbols are omitted in the text.

Taxonomy of the family Mermithidae Braun, 1883

Type	Nemathelminthes Schneider, 1866
Class	Nematoda Rudolphi, 1808
Order	Mermithida (Hyman, 1951) Artukhovskiy, Khartschenko et Rubzov, 1977
Superfamily	Mermithoidea Wulker, 1924
Family	Mermithidae Braun, 1883

Subfamily **Mermithinae** Braun, 1883

Genus *Mermis* Dujardin, 1842

The nematodes of middle and large size, the length is 15-150 mm. Head and tail tips are bluntly rounded. The head capsule is separated by neck hoop. There are four submedian papillae on one level and two lip papillae are situated on each side. Mouth opening terminal. Amphids are small, poreshaped, with the apertures on the level of head papillae. The stichosoma has 8 stichocysts. Oesophagus doesn't reach the middle of the body. Vulva

is direct. Vagina is S-shaped with short first and third parts. The eggs are small with byssi. Spicules paired, short, separated, archshaped. Genital papillae are arranged in three rows. Larval stages have no tail branch.

Hosts: Orthoptera, Lepidoptera.

Type species: *Mermis nigrescens* Dujardin, 1842.

The genus contain 10 species, one species is found in fauna of Kazakhstan.

***Mermis paranigrescens* Rubzov, 1976**

Female (n = 1). L = 72 mm; a = 187; b = 1; V = 47%.

Long nematodes with bluntly rounded anterior and posterior ends. Width of the body at the level of the cephalic papillae is 150, at the nerve ring 195, at the vulva 400 and at the cloaca 300. Cuticle with visible crisscross fibers 30-40 mm thick on most part of the body, near the vulva 90, at the anterior end about 20, on the tail 50, and on the end of tail 70. Six longitudinal chords. The cephalic papillae six, four of them are disposed dorsally and ventro-laterally, two - on side the mouth. Amphids are disposed slightly behind dorsal and ventral papillae and are complex. Mouth is terminal. The vulva is oblique with thick lips. Vagina S-shaped, length about 1.2 mm, width 100, vaginal canal joint with branch of uteri almost in front of vulva. The uteri is wide, length of anterior branch about 20 mm, posterior 12 mm. Ovariotubal are narrow, short, length 200. Eggs are round diameter about 60.

Found in Shymkent region, in soil of the National Park Aksu-Dzhabagly.

Holotype - female, conserved in Zoological institute of Russian Academy of Sciences (S-Peterburg).

Main references: I.A. Rubzov, 1976, 1978; A.K. Gafurov. 1997.

Subfamily **Pheromermithinae** (Artyukhovsky, 1990) Gafurov. 1997

Tribe **Pheromermithini** Gafurov, 1997

Genus ***Pheromermis* Poinar, Lane, Thomas, 1976**

Synonyms: *Mermis* Dujardin, 1842 (partim.); *Agamomermis* Stiles, 1903 (partim.); *Amphibiomermis* Artyukhovsky, 1969 (partim.); *Welchimermis* Rubzov, 1978; *Camponotimermis* Ipatjeva, Pimenova, Mukhamedzjanova, 1980.

Diagnosis. Usually short nematodes, on both ends bluntly rounded. Cuticle with visible crisscross fibers. There are six longitudinal chords. Four head papillae in one plane, mouth papillae are absent. Mouth opening slightly ventral not reach the level of head papillae. Vagina S-shaped. Eggs small, have fluent cover. Develop with intermediate host. Male with two short, separated spicules. A caudal appendage of the juvenile stages is present or absent.

Definitive hosts: wasps, larvae of gadflies, ants.

Intermediate hosts: larvae and imago of the beetles, Plecoptera, Trichoptera et al.

Type species: *Pheromermis pachysoma* (Linstow, 1905).

The genus contain 16 species, in fauna of Kazakhstan one species is found.

***Pheromermis turgenica* Rubzov et Vakker, 1973**

Females. L = 30-75 mm; a = 100-144; b = 2; V = 57-59%.

Male. L = 17.7 mm; a = 65; b = 2; c = 71 (Holotype).

The body is narrow in anterior. Cuticle thick, imago and juveniles have crisscross fibers. Lateral chords before nerve ring are narrow with big cell in two rows, behind lightly widening. Amphids oval, with around pore. lay lightly behind and dorsal of the lateral papillae. Mouth displaced ventrally, therefore head capsule in front not gomocephalic. Stoma is very narrow. Oesophagus 4-5 wide extending about 1/2 of body length. Vagina is cylindrical with greatest width in middle 60, the upper verge reach just of middle body. Two spicules length 225, their tips are sharp, basis hardly widening. Three rows of genital papillae, total quantity 60, from them 18-20 behind of anus.

Found in larvae of horsefly from weak running weeds reservoirs of Turgen defile (Zailiyskiy Alatau) on height 1100-1200 m above of level sea.

Hosts: larvae of *Hybomitra* sp.

Holotype - female and male, conserved in Zoological institute of Russia Academy of Sciences (S.-Peterburg).

Main references: I.A. Rubzov, V.G. Vakker, 1973.

Subfamily **Mesomermithinae** (Rubzov, 1978) Gafurov, 1997Tribe **Terromermithini** Gafurov, 1997Genus **Terromermis** Artyukhovskiy et Lisikova, 1977

Synonym: *Hexameris* Steiner, 1924 (partim.).

Diagnosis. The small nematodes, relatively thick. Head homocephalic, conic. Mouth opening terminal. Six head papillae. Amphids middle proportion. Cuticle with visible crisscross fibers. Vagina V-shaped, arch bending. Spicules paired, weak curvature. Tail short, blunthead.

Hosts: Chrysomelidae, locusts and another terrestrial insect.

Type species: *Terromermis brevis* Hagmeier, 1912.

The genus contain 7 species, two species are found in fauna of Kazakhstan.

***Terromermis brevis* Hagmeier, 1912**

Female (n = 1). L = 9.4 mm. a = 70; b = ?; V = 49%.

Males (n = 3). L = 13.05 mm; a = 79 (73-87); b = ?; c = 94 (86-100).

Nematodes are white, width of the body of males on level of cephalic papillae 52 (50-57), at the nerve ring 107 (90-120), at middle of the body 166 (150-180), at the cloaca 140 (130-147); distance from anterior end of the body to nerve ring 227 (200-240). Spicules paired, 101 (90-110), separated; tail length 139 (130-152). Body width of female at cephalic papillae 50, at vulva 135; distance from anterior end of the body to nerve ring 170, to vulva 4.6 mm. Vagina is short, with wide anterior part.

Hosts: locusts.

Distribution: Germany, Europe part of Russia. In Kazakhstan found in Almaty region (near station Chemolgan).

Material: one female, three males.

Main references: N.A. Gubaidulin, B.B. Bekturganov, 2000.

***Terromermis brevisoides* Artyukhovskiy et Lisikova, 1977**

Females (n = 3). L = 14.8 (13.5-16.8) mm; a = 81 (71-93); b = 4.2; V = 49.8%.

Males (n = 2). L = 13.2-16.7 mm; a = 78-98; b = ?; c = 88-118.

Nematodes are short, white, width of the body of females on level of cephalic papillae 45-50, males - 60-65, at nerve ring, correspondingly, 110-130 and 110-120, in middle of the body 170-200 and 170, on posterior end of the body at trophosome 90-150 and at cloaca 140-147; distance from head to nerve ring 214-250 and 250-280, to vulva 7.4 mm. Vagina short and thick. The tail end round. Spicules paired, weak curvature with grooved basis, length 110-112, width 12-15. Length of tail 142-150.

Hosts: locusts.

Distribution: Uzbekistan (Surkhandarja and Kashkadarja regions). In Kazakhstan discovery in Almaty region (near station Chemolgan).

Material: three females, two males.

Main references: N.A. Gubaidulin, B.B. Bekturganov, 2000.

Tribe **Mesomermithini** Gafurov, 1997Genus **Mesomermis** Daday, 1911

Synonyms: *Neomesomermis* Nickle, 1972; *Dentomermis* Rubzov et Politschuk, 1975; *Spiculimermis* Artyukhovskiy, 1963 (partim.).

Diagnosis. Cuticle is concerning thick, adult nematodes have weak, larvae - clear-cut crisscross fibers. Mouth terminal, head homocephalic. Six head papillae on one level. Amphids at female middle or large, at male always large, round or cup-shaped. Six longitudinal chords. The length of oesophagus often 1/3-1/5, rarely 1/2 part of body. Stichocystes in two rows, quantity them at different species 22-48. Vulva in the form of chink. Vagina V-shaped and have two parts, one is muscular. The eggs middle size, ball-shaped, smooth. Spicules paired, separated, weak curvature. The end of the tail is sharp. The tail appendage juvenile often fall away in time way out from host.

Hosts: larvae of Simuliidae, rarely Tabanidae.

Type species: *Mesomermis zschokkei* Daday, 1911.

The genus contain 41 species and 16 species described on juvenile forms; 13 species is found in fauna of Kazakhstan.

***Mesomermis adultus* Gafurov, 1979**

Female (n = 5). L = 18 (15-20) mm; a = 92 (80-120); b = 5 (4-6); V = 45 (42-54)%.

Male (n = 5). L = 11.5 (10.0-13.9) mm; a = 115 (90-142); b = 4.8 (4.1-5.5); c = 49 (36-59).

White nematodes. Head end is blunt. Tail on end is riund. Cuticule is thick - near head end 14, at another parts 11-13. Amphids of male very large (28x33) with aperture 14x30, almost equal to width of cephalic capsule. The female have goblet-shaped amphids 15x19 with round aperture 5-6. Oesophagus concerning short, compose 1/5 part of body. Vulva in the form of chink; canal of vagina direct under corner forward and curveture V-shaped. Spicules paired length 214 (200-266), width at basis 8.4, end is round off.

Hosts: larvae of blackflies *Tetisimulium alajense*.

Biology. The mermithids emerge from the host in last larval stage, called the postparasitic larvae. Emergence from larvae midge proceed with middle of summer before late in the autumn. The postparasitic mermithid larvae molt over 2-2.5 weeks after emergence from host. Percentage of invasion in august riched 6.5.

Distribution: Tadzshikistan, the defile Kondara (Gafurov, 1979); Kazakhstan, upper course of a mountainous Turgen (Zailiyskiy Alatau).

Material: 14 females and 10 males (adults).

Main references: I.A. Rubzov, 1978; B.B. Bekturganov, 1986; A.K. Gafurov, 1997.

***Mesomermis crassus* Bekturganov, Gubaidulin, Dubitsky, 1990**

Holotype - female. L = 28.4 mm; a = 84; b = 6.6; V = 56%.

Paratypes: females (n = 7). L = 27 (22-29) mm; a = 88 (60-97); b = 6.3 (5.2-6.9); V = 53 (49-59)%; male (n = 1). L = 11 mm; a = 65; b = ?; c = 43.

White nematodes, large, enough thick. The body in front bluntly cut, tail is conic, on end round off. Postparasitic larvae with short tail appendage. Cuticle of adult nematodes thickness 11, postparasitic larvae - 22, without visible crisscross fibers. Six head papillae. Amphids globular, with small apertures. Mouth opening terminal. Oesophagus short, compose 1/7 part of body. Vagina is barrel-shaped, canals curvature V-shaped, internal muscular part is long (140). Spicules paired length 210, width 14. Genital papillae are arranged in three rows, in middlle row 31, from their 17 anterior to anus, 14 posterior to anus. Length of the tail appendage 22.4.

Hosts: larvae of blackflies *Tetisimulium alajense hiemalis*

The place of discovery: Kazakhstan, Almaty province, Kegen' territory, mountainouds brook near village Saryzhaz.

Material: 15 females, one adult mele.

Main references: B.B. Bekturganov. N.A. Gubaidulin, Dubitsky, 1990.

***Mesomermis gafurovi* Bekturganov, Gubaidulin, Dubitsky, 1990**

Holotype - male. L = 17 mm; a = 149; b = 8.5; c = 61.

Paratypes: females (n = 10). L = 19.2 (17.4-21.5) mm; a = 111 (101-135); b = 5.1 (4.4-5.4); V = 51 (46-55)%; males (n = 5). L = 14.7 (12-17) mm; a = 121 (107-149); b = 6.6 (5.3-8.5); c = 54 (43-61).

White nematodes. The body to anterior end is narrow and round off. The tail is sharp and riund off. Thickness of the cuticle 8-11. Six head papillae on one level.

Amphids of the male are large with round aperture, at the female with lemon-shaped aperture. Mouth terminal. Oesophagus concerning short, compose 1/5 at male and 1/7-1/8 at female length of the body. Vulva is approximately in middle of body, in the form of transverse chink. Vagina is barrel-shaped, curvature V-shaped under corner 90° to wall of body. The first bend haven't of muscular wall, the second bend is muscular. Length of vagina 105 (98-112). Spicules paired length 196, width at basis 1, at end - 8.4. Genital papillae arranged in three rows. In median row 23-25 papillae from their 14-15 anterior to cloaca and 9-10 posterior to cloaca.

Hosts: larvae of blackflies *Tetisimulium sp.*, *Metacnephia kirjanovae*.

The place of found: Kazakhstan, Almaty province, Enbekshikazakh territory, affluent of river Turgen, altitude 1600-1800 m above level of sea.

Material: postparasitic juvenile from the larvae blackflies; grow up in laboratory adults.

Main references: B.B. Bekturganov, N.A. Gubaidulin, A.M. Dubitsky, 1990.

***Mesomermis kondarensis* Gafurov, 1979**

Females (n = 7). L = 21 (15.6-23.5) mm; a = 104.4 (86-125); b = 7.4 (6.8-9.2); V = 49 (46-55)%.

Males (n = 5). L = 11.6 (11.0-12.3) mm; a = 92.8 (85-100); b = 4 (3.7- 4.6); c = 437.6 (46-53).

Head homocephalic. Tail weak sharp, on end round off. Cuticle at juveniles with weak crisscross fibers, at adults - without crisscross fibers. Six head papillae on one plane. Mouth opening terminal. Postparasitic larvae have long tail appendage. Amphids of the females goblet-shaped measured 19x24 with oval aperture 8x11, at the

males is large (40x34) with kidney-shaped aperture measured 14x30. Length of the oesophagus 2.7-2.9 mm. Vagina barrel-shaped, with S-shaped curvature canal. Spicules paired length 207 (182-224). Genital papillae arranged in three rows. In median row 20 anterior to anus and 11 posterior to anus.

Hosts: larvae of blackflies *Tetisimulium alajense*.

The place of found: Kazakhstan, Almaty province, Enbekshikazakh territory, affluent of river Turgen, altitude 1400-1500 m above level of sea.

Distribution: Tadzhikistan - cold mountainous brooks, discharge itself into rivers Varzob and Kafirnigan (Gafurov, 1979); Uzbekistan - Navoi, Syrdarya and Tashkent provinces (Lebedeva, 1988).

Material: 21 females, 12 males (adult) and postparasitic juveniles.

Main references: A.K. Gafurov, 1979; B.B. Bekturganov, 1991.

***Mesomermis longicaudiensis* Bekturganov, Gubaidulin, Dubitsky, 1990**

Holotype - female. L = 25 mm; a = 105; b = 7; V = 52%.

Paratypes: females (n = 10). L = 23 (17.0-26.4) mm; a = 91 (64-111); b = 7.7 (7-8); V = 51 (50-52)%; males (n = 2). L = 14.5 (13-16) mm; a = 99 (93-104); b = 6.1 (5.2-7.0); c = 55 (46-63).

Head oval round off. Tail is long, conic, at end lightly round off. Juveniles have long tail appendage. Cuticle thick without crisscross fibers. Six head papillae in one plane. Amphids of the females small, goblet-shaped, of the males in aperture amphids have funnei-shaped formation, probably, amphidal glands. Mouth terminal. Oesophagus concerning short, compose 1/7 at females and 1/6 at males length of the body. Lateral chords contain three rows of cell, which at posterior end is larger. Vulva in the form of transverse chink at somewhat posterior of middle the body. Vagina is barrel-shaped character for species of genus *Mesomermis*, V-shaped, length 135 (112-140). Spicules paired, length 224, width 9. The genital papillae in median row 28, from their 16 anterior and 12 posterior of cloaca.

Hosts: larvae of blackflies *Tetisimulium alajense*, *Wilhelmia mediteranea*, *Odagmia ornata*.

The place of found: Kazakhstan, Almaty province, river Kazachka, altitude 1000-1200 m above level of sea.

Material: 10 females, 2 males (adults) and postparasitic juveniles.

Main references: B.B. Bekturganov, N.A. Gubaidulin, A.M. Dubitsky, 1990.

***Mesomermis macroforameni* Gafurov, Bekturganov, Gubaidulin, 1989**

Holotype - male. L = 11.2 mm; a = 114; b = 4.4; length of spicules 238.

Paratypes: females (n = 12). L = 19.2 (15.0-24.5) mm; a = 89 (72-108); b = 7 (5.9-8.6); V = 47 (40-53)%; males (n = 20). L = 10 (7.0-12.5) mm; a = 97 (66-122); b = 4.5 (3.1-6.0); c = 42 (33-50).

The nematodes of middle size, head rounded. The tail end of female is short, bluntly conic. Thickness of cuticle 7-10, without crisscross fibers. Six head papillae in one plane. Lateral chords of males have three rows of cells, females - four. Mouth opening terminal, there is cuticular small collar. Amphids of males are large, the width like diameter of body and the length lightly surpass of the width. Postparasitic larvae with thread-shaped appendage measured about 400, which often fall away in time leave of host. Vulva in the form of transverse chink with stick out of anterior lip. Vagina V-shaped, length of first bend 42-64, second bend 56-84, is muscle. Eggs almost circular diameter 63 (50-75). Spicules paired, separated, sickle-shaped, length 226 (196-266), thickness 6-7. On the end of spicule not large ventral curvature, on tip round. The genital papillae arranged in three rows; in median row 7-17 anterior and 7-14 posterior nipples, in lateral row, correspondingly, 5-11 and 6-9 nipples.

Hosts: larvae of blackflies *Tetisimulium alajense hiemalis*, *Odagmia caucasica*, *Odagmia sp.*, *Sulcinephia sp.*

Biology. The hosts often infect by one, rarely two-three nematodes. The infection riched 28-30%. In natural conditions by temperature of water 16-20°C life cycle finished for 35-40 days. The mermithids infect of host twice for period with May to August, i.e. give two generation. The life cycle proceed for 47-71 days in laboratory conditions. Productiveness of one female - about 1000 eggs. The increase is sexual, parthenogenesis is absent. The nematodes winter in egg phase.

The place of found: Kazakhstan, Zhambyl province, Korday territory, river Rgayty (1200 m above level of sea); Almaty province, Chilik territory, river Assy (more 2000 m above level of sea).

Material: 34 females, 62 males (adults) and postparasitic juveniles.

Main references: A.K. Gafurov, B.B. Bekturganov, N.A. Gubaidulin, 1989.

***Mesomermis melusinae* Rubzov, 1966**

Females (n = 11). L = 18 (10-25) mm; a = 70-90; b = 4-5; V = 48-49%.

Males (n = 4). L = 11 (7.5-12.5) mm; a = 83-100; b = 3.8-4.8; c = 38-46.

The body on head end is lightly narrow and round off on hind end is clear sharp. Cuticle is thin, thickness

4-5 at living mermithids and 8-15 at fixation mermithids, smooth, at adults without visible crisscross fibers, at juveniles - with clear-cut crisscross fibers. Amphids round-oval with different measurements at females, males and juveniles. Vulva is oblique, length about 10. Vagina barrel-shaped, length 8-12. The eggs is oval, smooth, diameter 16-20. Spicules length 160-200, arc-shaped curvature. The anal papillae in three rows, but anterior and posterior of anal aperture - in four rows.

Hosts: larvae of blackflies *Boopthora erythrocephala*, *Simulium morsitans*, *S. argyreatum*, *S. verecundum*, *Odagmia ornata*, *Eusimulium latipes*, *E. cryophilum* et al.

Biology. The infection riched 3.9-12,0% with intensity 1-5 nematodes. The molt of postparasitic stage proceed across 5-13 days after emergence from host. Copulation proceed in first hours after molt. Spermatophores find sometimes in vagina of full not molt females. The times of parasitic dependence from tipe of reservoir; in good worm rivers this species find with may to end of June, in August disappear. In cold rivers find in the end May - begining June; the second peak find in the end July - begining August.

Distribution: Leningrad province, Luzhsky territory, rivers Obla, Vrevka, Rybinka et al. In Kazakhstan found in larvae of blackflies from rivers Turgen, Kazachka, Saryzhaz and affluent ribver Talgar on altitude 1600-2000 m above level of sea.

Holotype - female (N 2270. L = 14.3 mm; a = 73; b = 5) and paratype - male (N 2260; L = 10.9 mm; a = 96; c = 44), concerved in Zoological institute of Russian Academy of Sciences (S.-Peterburg).

Main references: I.A. Rubzov, 1966, 1972.

***Mesomermis minuta* Rubzov, 1972**

Females (n = 3). L = 12 (11.4-12.8) mm; a = 79; b = 2.9; V = 52%.

Cuticle is thick 12-18, on end of tail 3-8. Diameter of body on level head papillae 80, nerve ring 105, middle of the body 180. Amphids is round, diameter of the flask 15, aperture round (7). Mouth in not large deepening. Diameter of oesophagus 5. Homorocyt one, stychocytys twenty. Vulva is oblique, chink-shaped. Canal of vagina curvature arc-shaped; from vulva canal direct at first forward sub angle 40-45⁰, after back sub angle 50⁰ concerning longitudinal axis of body.

Hosts: larvae of blackflies *Simulium morsitans*.

Distribution: Leningrad province, Luzhsky territory, river Yashchera. In Kazakhstan found in rivers Turgen, Kazachka, Saryzhaz, Talgar (Zailiyskiy Alatau).

Holotype - female (N 444) conserve in Zoological institute of Russian Academy of Sciences (S.-Peterburg).

Main references: I.A. Rubzov, 1972.

***Mesomermis odeshti* Gafurov, 1979**

Females (n = 6). L = 21,2 (15.0-21.6) mm; a = 84 (71-105); b = 4.3 (2.9-5.9); V = 54 (40-60)%.

Males (n = 7). L = 14 (11-17) mm; a = 94 (67-157); b = 3.4 (3.1-4.4); c = 54 (40-60).

Head is bluntly rounded; the tail conic, on end is riund off. Cuticle width 6-14. Six head papillae in one plane. Amphids male and female importan difference at shape and proportion. Oesophagus compose 1/3-1/4 length of the body. Vulva in the form of transverse chink. Canal of vagina directed under corner forward and V-shaped curvature, wall of the first bend is muscular. Spicules paired, length 226 (196-252), width 9-11, curvature, on end round off. Tail papillae in three rows, middle row bifurcating around the cloaca.

Hosts: larvae of blackflies *Tetisimulium sp.*, *T. alajense*, *Metacnephia kirjanovae*, *Wilhelmia mediterranea*.

Biolody. Mermithids winter in stage of eggs. The invasion of hosts proceed in Jule when appear larvae of midge II-III stages. The life cycle complete for 34-40 days, Productiveness of one female 1000 eggs.

The place of found: Kazakhstan, Almaty province, Enbekshikazakh territory (rivers Kazachka, Kyrgauldy, altitude 1000-1300 m above level of sea).

Distribution: Tadzhikistan - affluent river Vanch, brook near village Odescht; Kazakhstan - rivers Assy, Talgar, Kazachka, Kyrgauldy (Zailiyskiy Alatau). Material: 108 females, 123 males and more 200 postparasitic larvae.

Main references: A.K. Gafurov, 1979; B.B. Bekturganov, N.A. Gubaidulin, 1986; B.B. Bekturganov, 1991.

***Mesomermis robusta* Gafurov, Bekturganov, Gubaidulin, 1989**

Holotype - male (N 127). L = 13.8 mm; a = 141; b = 5.3; c = 55; spicule length 182.

Paratypes: females (n = 10). L = 36.5 (33-41) mm; a = 138 (122-163); b = 9.8 (6.5-11.0); V = 47 (43-51)%; males (n = 10). L = 13 (12-14) mm; a = 132 (95-149); b = 4.6 (3.3-5.3); c = 50 (43-56);

The females more larger of males. Cuticle thick, without visible crisscross fibers thickness males 8-14, females 15-20. Amphids is very large, at males almost all the width of body, with large bud-shaped aperture. Mouth opening terminal, altitude of mouth capsule 15-20 there is small collar. Oesophagus not more 1/3 length of body. The juvenile (female and male) have caudal appendage length 14-30. Vagina V-shaped. Walls first bend (knee) without muscular fibers, length 30-50; second - muscular, 70-76, direct under corner 90° at first. Eggs globular, diameter 73. Spicules paired, sickle-shaped curvature, on end round off. Tail papillae in three rows.

Hosts: larvae of blackflies *Tetisimulium alajense hiemalis*, *Tetisimulium sp.*

Biology. Polycycle species, in host for year develop three generation. Life cycle one generation in natural conditions proceed for 40-45 days. Productiveness of one females 3500 eggs. Mermithids winter in stage of eggs.

The place of found: Kazakhstan, Almaty province, Enbekshikazakh territory, river Turgen (1100 m above level of sea).

Material: 15 female, 40 male and more 200 postparasitic larvae.

Main references: A.K. Gafurov, B.B. Bekturganov, N.A. Gubaidulin, 1989.

***Mesomermis sibirica* Rubzov, 1972**

Females (n = 2). L = 15 (14.3-15.7) mm; a = 70; b = ?; V = 50%.

The body with sharp anterior end, tail end round off and have thickening cuticle. Cuticle thin (6-7) without clear crisscross fibers. Head round off, symmetrical, without clear neck constriction. Mouth opening terminal. Oesophagus diameter 4. Vagina in middle of the body.

Hosts: larvae of blackflies *Gnus relictum*.

Distribution: Russia, East Siberia, Irkutsk province, river Korolog; Kazakhstan - rivers Turgen, Kazachka, Saryzhaz, Talgar (Zailiyskiy Alatau).

Holotype - larvae female (N 3271), conserve in Zoological institute of RAS (St.-Petersburg).

Main references: I.A. Rubzov, 1972.

***Mesomermis talgaricus* Bekturganov, Gubaidulin, Dubitsky, 1990**

Holotype - adult female. L = 18.5 mm; a = 95; b = 6.6; V = 47%.

Paratypes: females (n = 10). L = 18.4 (16.8-21.0) mm; a = 94 (91-105); b = 6.4 (5.7-7.0); V = 47.5 (42-50)%; males (n = 2). L = 9 (7-11) mm; a = 70 (63.0-87.3); b = 5.5; c = 40 (31-49).

Head end bluntly-rounded, the tail conic and on end round off. Cuticle thick (11), without crisscross fibers. Six head papillae in one plane. Amphids goblet-shaped with large round-oval aperture, arranged behind of lateral papillae. Mouth opening terminal. Oesophagus compose approximately 1/6 (female) and 1/5 (male) length of the body. Vulva in middle of the body, vagina V-shaped, length 112 (98-126). The eggs with thin transparent envelope, diameter 70. Spicules paired length 147 (140-154). Tail papillae in three rows.

Hosts: larvae of blackflies *Tetisimulium alajense*.

The place of found: Kazakhstan, Almaty province, affluent of the river Talgar (Goncharov klyuch).

Material: 20 females, 2 males and about 200 postparasitic larvae.

Main references: B.B. Bekturganov, N.A. Gubaidulin, A.M. Dubitsky, 1990.

***Mesomermis vernalis* Rubzov, 1966**

Females (n = 5). L = 12-25 mm; a = 90-100; b = 5; V = 49%.

Males (n = 4). L = 10-21 mm; a = 82-175; b = 5.0-5.2; c = 35-40.

The body weakly narrow anterior and round off on apical end. Posterior end after trophosome conic sharp. Cuticle thin (6). Amphids round, males have more large amphids. Vulva is oblique, vagina barrel-shaped, lightly oblique anterior. Spicules length 150-170. Tail papillae in three rows.

Hosts: larvae of blackflies *Simulium morsitans*, *Eusimulium latipes*, *E. cryophilum*, *Odagmia ornata*, *O. ferganica*.

Distribution: Russia - Leningrad province, rivers Obla, Vrevka and small affluents of river Luga; Kazakhstan - Pavlodar province, Bayan-Aul territory (Kafarsky klyuch).

Material: holotype - male (N 15127) conserved in Zoological institute of RAS (St.-Petersburg).

Main references: I.A. Rubzov, 1966, 1972; L.S. Komardina, 1991.

Genus *Spiculimermis* Artyukhovsky, 1963

Synonyms: *Amphidomermis* Fil., 1934; *Mermis* Dujardin, 1842 (part.); *Mesomermis* Daday, 1911 (part.); *Bathymermis* Daday, 1911 (part.).

Diagnosis: Cuticle is thin, adult without visible crisscross fibers, larvae with weak fibers. Six head papillae in one plane. Amphids very large (especially at males) with large aperture, arranged behind lateral

papillae on distance diameter of amphids. Six lateral chords. Mouth opening terminal. The length of oesophagus compose 1/3 length of the body. Vagina barrel-shaped or globular, her canal perpendicular longitudinal axis of the body or lightly curvature. Spicules paired, separated, long. Tail adults is bluntly-rounded, larvae with long whip-shaped appendage.

Hosts: chironomids, rarely blackflies.

Type species: *Spiculimermis subtilis* (Schmassmann, 1914).

The genus contain 26 species, five from them described on larval stages; four species founded in fauna of Kazakhstan.

***Spiculimermis angusta* Rubzov, 1972**

Females (n = 2). L = 11 (9-13) mm; a = 55 (50-60); b = ?; V = 50%.

Males (n = 2). L = 5.7-6.0 mm; a = 57 (52-62); b = ?; c = 40.

Postparasitic larvae, females (n = 3). L = 6.8 (6.2-8.0) mm; a = 89 (88.5-90.0); b = ?; V = 54.5 (54-55)%.

The body lightly sharp anteriorly and on end fluently rounded. Amphids draw out crossways, pouch width 22, length 16. Vulva is transverse, canal of vagina perpendicular to axis of the body. Tail appendage is thread-shaped, long, it has twice more diameter of the body.

Hosts: larvae of chironomids.

Distribution: Russia - Leningrad province, Luzhsky territory, river Luga; Kazakhstan - Almaty province, river Kazachka (1100-1200 m above level of sea).

Material: Three postparasitic larvae (females) from larvae chironomids.

Main references: I.A. Rubzov, 1972; B.B. Bekturganov, 1991.

***Spiculimermis chironomi* Rubzov, 1972**

Females (n = 57). L = 10 (8.0-12.5) mm; a = 60 (52-70); b = 3; V = 52 (49-53)%.

Males (n = 46). L = 5.5 (5.0-6.5) mm; a = 62 (60-69); b = 3; c = 30 (28-34).

Postparasitic larvae, females (n = 2). L = 9.9 (9.5-10.2) mm; a = 94.5 (91-98); b = 3.1 (3.0-3.2); V = 52.5 (52-53)%.

The body visible narrow anteriorly and posteriorly. The cavity of pouch amphids is round off or pear-shaped. Vulva in the form of transverse chink. Vagina almost globular, diameter 80. Spicules paired, lightly curvature, length 300. Anal papillae in three rows.

Hosts: larvae of chironomids *Cricotopus* sp. *algarum*, *Tanytarsus* sp. *exiguus*, *Paratendipes transcaucasicus*.

Biology. Nematodes found during the course of whole summer in not large and middle rivers frequent among grass the plant. Parasite left of the host in stage of free postparasitic larvae. The maturation and molt adult at room temperature proceed for 7-8 days. Distribution: Russia - Leningrad province, Luzhsky territory, rivers Luga, Vrevka, Obla; Kazakhstan - Almaty province, river Kyrgauldy.

Material: two postparasitic larvae (females) and some larvae of chironomids with parasitic larvae of mermithids.

Main references: I.A. Rubzov, 1972; B.B. Bekturganov, 1991.

***Spiculimermis elegans* Bekturganov, Gubaidulin, Dubitsky, 1991**

Holotype - adult female. L = 13.4 mm; a = 114; b = 4.9; V = 50%.

Paratypes - females (n = 5). L = 11.8 (10.5-13.4) mm; a = 106 (90-122); B = 4.9; V = 50%.

The body to anteriorly is narrow begin from nerve ring. Tail have conic form, on end lightly round. Postparasitic larvae have tail appendage. Cuticle thin (8) without crisscross fibers. Amphids small, cup-shaped; aperture is round or lightly oval. Mouth terminal. The length of oesophagus compose 1/6 length of body. Vulva in the form of crossways chink, arranged in the middle of body. Canals of vagina V-shaped curvature, the first part have't muscular wall, the second part is muscular.

Hosts: larvae of chironomids *Diamesa nygromodrica*.

The place of found: Kazakhstan, Almaty Prov., river Turgen (the height 1100 m above of sea level).

Material: 15 postparasitic larvae (females) and five adult females, rearing in laboratory.

Main references: B.B. Bekturganov, N.A. Gubaidulin, A.M. Dubitsky, 1991.

***Spiculimermis* sp.**

Females (n = 2). L = 9.9 (8.6-11.0) mm; a = 82 (77-88); b = 9; V = 51 (50-52)%.

The body weak long, anteriorly narrow from beginning of trophosome. Posterior end moderately narrow, tail is round off. Amphids small, cupshaped, with round aperture. Mouth opening terminal. Oesophagus thin,

length 1.2 mm. Vulva in the form of transverse chink; arranged in middle of the body. Vagina is globular, canals curvature. Hosts: larvae of chironomides.

Found in Almaty province, river Turgen (the height 1100 m above of level sea).

Material: two postparasitic larvae (females) from larvae chironomides.

Main references: B.B. Bekturganov, 1991.

Genus *Simulimermis* Gafurov, Bekturganov, Gubaidulin, 1991

Synonyms: *Neomesomeris* Nickle, 1972 (part.); *Octomyomeris* Johnson, 1963 (part.).

Diagnosis: Usually medium nematodes. Cuticle without visible crisscross fibers. Head homocephalic, round off. Six head papillae in one plane. Amphids large, males have twice as large comparatively with it of females. Six longitudinal chords. Mouth opening terminal. Length of the oesophagus about 1/3 length the body. Vagina barrel-shaped. Tail bluntly conic. Spicules paired, separated, lightly curvature.

Hosts: larvae of blackflies.

Type species: *Simulimermis assiensis* Gafurov, Bekturganov, Gubaidulin, 1991.

Simulimermis assiensis Gafurov, Bekturganov, Gubaidulin, 1991

Holotype - male (№ 126). L = 15.4 mm; a = 110; b = 3.9; c = 58; length spicules 200.

Paratypes: females (n = 10). L = 24 (20.0-30.6) mm; a = 100 (82-116); b = 4.2 (3.8-5.5); V = 52 (50-54)%; males (n = 10). L = 15.6 (13-19) mm; a = 120 (93-139); b = 3.8 (3.2-4.2); c = 61 (52-71).

Head rounded not clear neck constriction. Tail bluntly conic, juveniles have tail appendage length 40-90. Cuticle without visible crisscross fibers. Six longitudinal chords, lateral chords contain three rows of cells. Vulva in the form of transverse slit with lightly jut lips. Vagina barrel-shaped, perpendicular to longitudinal axis of body. Spicules paired, separated, lightly curvature, the end of spicules is sharp on ventral.

Hosts: larvae of blackflies *Odagmia caucasica*, *Tetisimulium alajense*, *Sulcisnephia* sp., *Odagmia* sp.

Biology. Spend the winter in stage of egg. In natural conditions life cycle finished during 35-40 days. Productiveness one female compose more 2000 eggs. Embryonal develop continue 8-11 days after lay eggs.

The place of found: Kazakhstan, Almaty province, Chilik and Enbekshikazakh territories, rivers Assy, Turgen and their affluents (1100-1200 m above level of sea).

Material: 130 females, 70 males and many parasitic and postparasitic larvae.

Main references: A.K. Gafurov, B.B. Bekturganov, N.A. Gubaidulin, 1991.

Genus *Strelkovimermis* Rubzov, 1969

Synonyms: *Kurshimermis* Zahidov et Poinar, 1970; *Filipjevimermis* Strelkov, 1964; *Mesomeris* Dady, 1911 (part.); *Schmassmannimermis* Rubzov, 1978; *Mermis* Dujardin, 1842 (part.); *Hydromermis* Corti, 1902 (part.).

Diagnosis. Six head papillae, arranged hexagonalic. Amphids small, pear-shaped or flask-shaped, their aperture arranged behind of level head papillae. Six longitudinal chords. Mouth opening terminal. Head homocephalic, stand up neck constriction. Vagina curvature S-shaped. Oesophagus compose about 1/3 length of body. Spicules paired, lightly curvature, identical width. Tail is sharp. The eggs globular.

Hosts: larvae and imago of chironomides.

Type species: *Strelkovimermis singularis* (Strelkov, 1964).

The genus contain 10 species, one species founded in fauna Kazakhstan.

Strelkovimermis sp.

Male (n = 1). L = 16 mm; a = 71.4; b = ?; c = 36.3.

The color of nematoda is yellow, fix nematoda is white. Cuticle without crisscross fibers. Head homocephalic with neck constriction. Amphids rounded, arranged on level of head papillae. Tail is sharp, length 370. Spicules paired, length 250, lightly curvature, on basic is widening.

Host unknown.

The place of founded: Kazakhstan, Pavlodar province, river Irtysh.

Material: one adult male.

Main references: I.A. Rubzov, 1978; L.S. Komardina, 1991; A.K. Gafurov, 1997.

Tribe *Romanomermithini* Gafurov, 1997 Genus *Romanomermis* Coman, 1961

Synonyms: *Pseudomermis* De Man, 1903 (part.); *Eurymermis* Muller, 1931 (part.); *Octomyomeris* Johnson, 1963 (part.); *Reesimermis* Tsai et Grundmann, 1969.

Diagnosis. Cuticle without crisscross fibers. Mouth opening terminal. Eight longitudinal chords. Six head papillae in one plane. Amphids medium-sized, arranged behind lateral head papillae. Oesophagus extended before end of body. Vagina barrel-shaped or pear-shaped, perpendicular to longitudinal axis of body. Spicules paired, separated. Tail bluntly rounded. Larvae with long, whip-shaped tail appendage.

Hosts: Culicidae, Tipulidae, Corphiidae.

Type species: *Romanomermis cazanica* (Bacescu, 1948).

The genus contain 17 species, one species founded in Kazakhstan.

***Romanomermis altaica* Gubaidulin et Vakker, 1983**

Females (n = 6). L = 15.4 (14.6-17.2) mm; a = 65 (57-66); b = 1; V = 46 (40-52)%.

Males (n = 4). L = 10.5 (9.0-12.3) mm; a = 60 (57-66); b = 1; c = 60.7 (53-70).

The body anteriorly gradually narrow, neck constriction is absent. Tail bluntly-rounded. Mouth opening terminal. Amphids small, especially at females, without commissure. Vulva in the form of transverse slit in middle of body. Vagina is short, pear-shaped, arranged under not large corner to longitudinal axis of body. Spicules paired, separated, but lay closely, with pointed distal end, length 324.

Hosts: larvae of midges genus *Aedes* - *Ae. communis* de Geer, *Ae. dianteus* H.D.K., *Ae. flavescens* Mull., *Ae. pionips* Gyar, *Ae. pullatus* Coq., *Ae. punctor* Kirby and *Mochlonyx* sp.

Biology. Parasitic stage of developments prolonged for 35-40 days. The first molt proceed across 10-16 days after emerge from host, second - across 26-32 days after first. The lay eggs beginning across 10-15 days after copulation and continue 5-8 days.

The place of found - Kazakhstan, East-Kazakhstan province, Katon-Karagai territory, reservoir on river Arasan.

Material: 6 females, 4 males and more 300 postparasitic larvae,

Mail references: N.A. Gubaidulin, V.G. Vakker, 1983; Kh.T. Rakhimbaeva, N.A. Gubaidulin, 1986.

Genus *Octomyomermis* Johnson, 1963

Synonyms: *Bathymermis* Daday, 1911 (part.); *Amphibiomermis* Artyukhovsky, 1969 (part.).

Diagnosis: Cuticle thin, without crisscross fibers. Six head papillae. Amphids small, rounded.

Eight longitudinal chords. Mouth opening terminal. Oesophagus compose about 1/4 length of body. Vagina barrel-shaped perpendicular to longitudinal axis of body. Spicules paired, short, lightly curvature. Tail bluntly-rounded.

Hosts: larvae, pupa and imago of chironomids.

Type species: *Octomyomermis itascensis* Johnson, 1963.

The genus contain 7 species, one species founded in Kazakhstan.

***Octomyomermis* sp.**

Female (n = 1). L = 42.6 mm; a = 64; b = 4.2; V = 56.3%.

Anterior end of body with not clear neck constriction. Cuticle thin. Maximal diameter of body 660. Mouth opening terminal. Amphids rounded, 12x13. Eight longitudinal chords, Vagina barrel-shaped, length about 170. Uterus is musclic with bends. Tail end is rounded.

Host unknown.

The place of founded: Kazakhstan, Pavlodar province, Lebyazhin territory, lake Yamyshevo.

Material: one adult female.

Main references: A.A. Johnson, 1963; L.S. Komardina, 1991.

Genus *Bathymermis* Daday, 1911

Synonym: *Lugamermis* Rubzov, 1978.

Diagnosis: Usually medium nematodes. Cuticle thick with crisscross fibers. Six head papillae. Amphids oval or round, flask-shaped, with not large aperture. Six longitudinal chords. Mouth opening terminal. Oesophagus compose about 1/3 length of body. Vagina is short, pear-shaped, perpendicular to longitudinal axis of body. Spicules paired. Larvae have not large tail appendage.

Hosts unknown, probably larvae of chironomids.

Type species: *Bathymermis fuhrmanni* Daday, 1911.

The genus contain 5 species, one species founded in Kazakhstan.

***Bathymermis scytoidea* Rubzov, 1973**

Female (n = 1). L = 31.5 mm; a = 103.6; b = ?; V = 51.7%.

Mermithida medium size. The body moderately narrow in head part. Cuticle thick, with crisscross fibers. Six head papillae. Six longitudinal chords. Mouth opening terminal, stoma is width. Amphids small, prolongy-oval, arranges on level head papillae. Vulva is right, vagina long, direct oblique back, by bend. Tail is blunt.

Host unknown.

The place of found: Kazakhstan, Pavlodar province, Bajan-Aul territory, Kafarsky klyuch.

Material: one adult female.

Main references: I.A. Rubzov, 1973; L.S. Komardina, 1991.

Genus *Isomermis* Coman, 1953

Synonyms: *Eumermis* Daday, 1911 (part); *Mesomermis* Daday, 1911 (part.).

Diagnosis: Cuticle relatively thick, without crisscross fibers. Six head papillae. Amphids medium, their aperture open behind of level lateral papillae. Eight longitudinal chords. Mouth opening terminal. Oesophagus compose 1/3-1/5 length of body. Vagina weak S-shaped curvature. Spicules paired, separated. Tail bluntly-rounded. Larvae with small spine appendage.

Hosts: larvae of blackflies, rarely - chironomids.

Type Species: *Isomermis herculanensis* Coman, 1953.

The genus contain 14 species, three from them described on juvenile forms; three speciec found in Kazakhstan.

***Isomermis brevis* Rubzov, 1972**

Female (n = 1). L = 8.9 mm; a = 71; b = ?; V = 48.3%.

The body is short, clear narrow to anterior. Cuticle without crisscross fibers. Head rounded. Amphids small, oval-rounded. Mouth opening terminal. Vulva in middle body in the form of oblique slit. Vagina is right, direct back sub corner 45°.

Hosts: larvae of blackflies *Simulium morsitans* (Rubzov, 1972), larvae of chironomides.

Distribution: Russia - Leningrad province, Luzhsky territory, river Obla; Kazakhstan - Almaty province, river Turgen (Zailiyskiy Alatau).

Material: postparasitic larvae (female) from the larvae chironomides and grow up adult.

Main references: I.A. Rubzov, 1972; B.B. Bekturganov, 1991.

***Isomermis rossica* Rubzov, 1963**

Females (n = 10). L = 11.5 (11.0-14.5) mm; a = 62 (51.0-71.4); b = ?; V = 49.8 (43-56)%.

Males (n = 10). L = 9.8 (8.4-11.3) mm; a = 88.6 (66-110); b = 4.6 (3.7-5.0); c = 45 (43-55).

Living nematodes are clear-yellow. Head homocephalic. Juveniles have small spine tail appendage. Six head papillae on one plane. Length of oesophagus about 1/4 llength of body. Vagina weak S-shaped curvature, its canal direct oblique to longitudinal axis of body. Spicules paired, lightly curvature, length 154.

Hosts: larvae of blackflies *Boopthora erythrocephala*, *Simulium morsitans*, *S.verecundum*, *Eusimulium latipes*, *E.cryophilum*, *E.kerteszi*, rarely larvae of chironomids (Rubzov, 1972); *Odagmia flaveola*, *Tetisimulium alajense*, *T.desertotum* (Lebedeva, 1988); *Wilhelmia veltistahovi*, *Tetisimulium sp.*

Distribution: Russia - Leningrad province, river Luga and its affluents: Vrevka, Obla, Svinechnaja, Ropotka, Bystrjanka, Jashchera at al.; Vologoda province, rivers Izhina, Ustyuzhnaja; Ivanovo province, river Molokhta (Rubzov, Ivashchenko, 1970). Belorussia (Rubzov, 1968). Tadjhikistan - upper course river Varzob (Gafurov, 1982). Uzbekistan - Navoi province, small mountainous rivers (Lebedeva, 1988). Kazakhstan - Almaty and Zhambyl provinces, rivers Assy, Turgen, Kyrgauldy, Kazachka, Rgayty.

Biology in detail learn by I.A. Rubzov (1963, 1967). On South-East Kazakhstan infected blackflies founded in ten mountainous rivers; extensive of infection 1-5%, intensive - 1-5 nematodes in one host.

Material: numerous adult and juveniles.

Main references: I.A. Rubzov, 1972; N.A. Gubaidulin, B.B. Bekturganov, K.T. Rakhimbaeva, 1987; B.B. Bekturganov, 1991.

***Isomermis wisconsinensis* Welch, 1962**

Female (n = 1). L = 15.1 mm; a = 63.4; b = 4.3; V = 55%.

The body antieriad gradually narrow. Tail end is bluntly-rounded. Cuticle without visible crisscross fibers. Six head papillae in one plane. Amphids egg-shaped. Mouth opening terminal. Oesophagus composed 1/3 length

of body. Vulva in the form of transverse slit with weak stand up lips. Vagina lightly S-shaped cuevature, its canal direct oblique to longitudinal axis of body.

Hosts: larvae of blackflies *Simulium vitatum* (Welch, 1962), *Tetisimulium alajense*.

Distribution: Canada, State Wisconsin, Blek Krik. Kazakhstan, Almaty province, river Turgen (Zailiyskiy Alatau Mts.).

Material: five postparasitic larvae (females) from larvae of blackflies.

Main references: H. Welch, 1962; B.B. Bekturganov, 1991.

Genus *Eurymermis* Muller, 1931

Synonym: *Eumermis* Daday, 1911.

Diagnosis. Usually medium nematodes, 15-30 mm in length. Cuticle with clear-cut crisscross fibers. Eight longitudinal chords. Six head papillae. Mouth opening slightly ventral shifting. Oesophagus extend to end of body. Vagina short, pear-shaped, perpendicular to longitudinal axis of body. Spicules paired, separated.

Hosts: larvae of gad-flies and midges.

Type species: *Eurymermis chrysopidis* Muller, 1931.

This genus contain 10 species, two species founded in Kazakhstan.

Eurymermis stratiomyi Bekturganov, Gubaidulin, Dubitsky, 1991

Holotype - adult female. L = 22 mm; a = 83; b = 1.1; V = 45%.

Paratypes: females (n = 2). L = 29 (22-36) mm; a = 83; b = 1.1; V = 45%.

Males (n = 3). L = 23.5 (20.2-27.0) mm; a = 108.3 (96.2-120.5). b = 4.2 (4.0-4.4); c = 89.5 (72-107).

The body antieriad clear narrow. Head rounded. Tail wide-rounded, blunt. Cuticle thick, three-layers, with clear-cut crisscross fibers. Six head papillae in one plane. Amphids cup-shaped, small, opening behind lateral head papillae. Vagina is direct, perpendicular to longitudinal axis of body. Spicules paired, 224-226 in length.

Hosts: Larvae of *Stratiomis chameleon*.

The place of founded: Kazakhstan, Almaty province, weak-running reservoir in Turgen defile (1100 m above level of sea).

Material: three females and five males (adults).

Main references: B.B. Bekturganov, N.A. Gubaidulin, A.M. Dubitsky, 1991.

Eurymermis sp.

Male (n = 1). L = 26.4 mm; a = 85.7; b = ?; c = 110.

Mermithida is medium size, yellow colour. The body shrill thick direct behind of nerve ring. cuticle with crisscross fibers. Eight longitudinal chords, lateral chords are narrow. Mouth displaced ventrally. Oesophagus withoutedging, extend to end of body. Amphids are prolongly-oval, arranged on level of head papillae. Spicules paired, thin, curvature, with construction, length 328. The tail in pointed, on end bluntly-rounded.

Host unknown.

The place of founded: Kazakhstan, Pavlodar province, valley of river Irtysh near town Ermak.

Material: one male adult.

Main references: L.S. Komardina, 1991.

Subfamily *Agamermithinae* (Artyukhovskiy et Khartschenko, 1977)

Tribe *Agamermithini* Gafurov, 1997

Genus *Hexameris* Steiner, 1924

Synonyms: *Mermis* Dujardin, 1842 (part.); *Ovomermis* Rubzov, 1976.

Diagnosis: Usually long nematodes. Head lightly pointed, tail wide rounded. Six head papillae. Amphids small, flask-shaped or pore-shaped. Mouth opening terminal. Vagina is pear-shaped or arc shaped, curvature transverse of body. Eggs are large, globular, with smooth envelope. Spicules paired, short, separated. Tail papillae in few incorrect rows. Juvenile have bittle tail appendage.

Hosts: insects (Lepidoptera, Orthoptera, Coleoptera, Hemiptera, Diptera, earwig et al.), mollusks, spiders.

Type species: *Hexameris albicans* Siebold, 1848.

The genus contain 25 species, two species and four subspecies founded in Kazakhstan.

Hexameris albicans Siebold, 1848

Synonyms: *Hexameris meridionalis* Steiner, 1924; *H. pussardi* (Baylis, 1933); *H. tamalensis* Baylis, 1933; *H. cornuta* Rubzov et Koval, 1975; *H. elongata* Kaiser, 1977; *H. lineata* Kaiser, 1977.

Females (n = 30). L = 40.4 (8-122) mm; a = 171.5 (39-287); b = 3.1 (2.3-4.1); V = 54.1 (46.4-62.6)%.

Males (n = 20). L = 20.9 (9.9-50.1) mm; a = 119.1 (52-229); b = 3.4 (2.2-4.7); c = 80.4 (43-138).

Head conical-rounded, bilateral-symmetrical, with slight neck constriction. Cuticle with clear-cut crisscross fibers. Six head papillae in one plane. Mouth aperture arranged above level of head papillae. Length of oesophagus about 1/3 length of body. Vulva is direct in the form of transverse slit with clear-cut lips. Vagina is cylindrical, V-shaped, curvature. Spicules paired, separated, length 147.

Hosts: land mollusks *Bradybaena almaatini* (Skworzov, 1940), *B. lantzi* (Lindholm, 1927), *B. phaeozona* (Martens, 1874), *B. sinistrosa* (Tzwetkov, 1941), *B. tzwetkovi* Uval. et Sob., 1973, *Succinea altaica* (Martens, 1871), *Pseudonapaeus asiatica* (Martens, 1881), *P. aptycha* (Martens, 1879), *P. secalina* (Martens, 1881), *Phenacolimax annularis* (Martens, 1874).

The place of founded: Kazakhstan, Almaty province, defiles Talgar, Turgen, Kotur-Bulak, Bel'-Bulak, Maloe Almaty, Issyk (Zailiyskiy Alatau).

Distribution: worldwide.

Biology. *Hexameris albicans* is one year life cycle. In spring infected preparasitic stage proceed 1-1.5 months, parasitic - 3 months, postparasitic stage - 7-7.5 months. In autumn these stages proceed correspondingly 1-1.5 months, 8.5-9 and 3.5-4 months.

Material: 312 adult mermithids, 140 postparasitic larvae and above 3000 parasitic larvae.

Main references: B.Kh. Shaimardanova, 1984.

***Hexameris coccinellae coccinellae* Rubzov, 1971**

Postparasitic larvae (female). Length of body 94 mm. Head part on apical end bluntly-pointed and gradual widening behind. Head papillae are small and have 1-2 sensills. The tail end of body bluntly-rounded and have not large tail appendage length about 50. Cuticle with clear-cut crisscross fibers. Amphids very small, slit-shaped, arranged on level lateral papillae. Mouth opening terminal.

Host: *Coccinellae septem-punctata* L.

The place of founded: Kazakhstan, garden of Institute protection of plant near Almaty.

Material: holotype - postparasitic larvae, № 4915; paratypes - parasitic larvae, conserved in Zoological institute of R A S (S.-Peterburg).

Main references: I.A. Rubzov, 1971.

***Hexameris coccinellae adaliae* Rubzov, 1971.**

Two postparasitic larvae (females). L = 44-55 mm.

The body gradually narrow to head end. Cuticle with clear-cut crisscross fobers, thickness 10-11. The tail appendage length about 70, bend up.

Host - *Adalia bipunctata* L.

The place of founded: Kazakhstan, garden of Institute protection of plant, near Almaty.

Material: holotype - postparasitic larvae (female), № 4929, conserved in Zoological institute of Russian Academy of Sciences (S.-Peterburg).

Main references: I.A. Rubzov, 1971.

***Hexameris coccinellae byssoidea* Rubzov, 1971**

Postparasitic larvae (female). The body very long and thin. Head capsule in front bluntly-rounded and gradual widening behind. Cuticle with clear-cut crisscross fibers. The tail bluntly-rounded. Tail appendage length about 60. The trophosoma not reach posterior end on distance about 150.

Hosts: *Adalia bipunctata* L., *A. fasciatopunctata* Fald.

The place of founded: Kazakhstan, garden of village Kamenka, near Almaty.

Material: holotype - postparasitic larvae (female), № 4921, conserved in Zoological institute of Russian Academy of Sciences (S.-Peterburg).

Main references: I.A. Rubzov, 1971.

***Hexameris coccinellae exochomi* Rubzov, 1971**

Postparasitic larvae, females (n = 7). L = 21.4 (18-24) mm.

Head capsule in front bluntly-rounded, the tail pointed-rounded and have tail appendage length 30-35. Cuticle with clear-cut crisscross fibers, thickness about 7-8. The trophosome beginning behind nerve ring and a little not reach of end tail.

Hosts: *Adalia bipunctata* L., *A. fasciatopunctata* Fald.

The place of founded: Kazakhstan, garden of village Kamenka, near Almaty.

Material: postparasitic larvae, № 4924, deposited in Zoological Institute of Russian Academy of Sciences (S.-Peterburg).

Main references: I.A. Rubzov, 1971.

Hexameris sp.

Postparasitic larvae (n = 8). L = 63.5 (31.4-114.9) mm; a = 191 (123-267).

The body is long, thin. Head capsule round. Six head papillae in one plane. Mouth opening terminal, mouth tube is short. Amphids not large. Cuticle with clear-cut crisscross fibers, thickness in middle 5 (2.5-7.5). The genitals are weak develop. On tail end have spine-shaped appendage length 60 (50-80).

Host: *Agelastica alni orientalis* Baly.

The place of founded: Kazakhstan, Almaty botanic garden.

Material: Eight postparasitic larvae.

Main references: N.A. Gubaidulin, S.L. Batuev, 1998.

Tribe *Amphimermithini* Gafurov, 1997

Genus *Amphimermis* Kaburaki et Imamura, 1932

Synonyms: *Mermis* Dujardin, 1842 (part.); *Complexomermis* Filipjev, 1934.

Diagnosis: Usually medium and long nematodes. Cuticle with clear-cut crisscross fibers. Six head papillae in one plane. Mouth opening terminal. Amphids large, flask-shaped (or bottle-shaped). Vulva is oblique. Vagina is long, S-shaped curvature. Eggs are large, with thick envelope. Spicules paired, very long, binding, their distal ends attire in common spiculare case. The tail moderately pointed, on end rounded. Larvae has sharp-conical tail appendage.

Hosts: Orthoptera, Lepidoptera, Coleoptera.

Type species: *Amphimermis zuimushi* Kaburaki, Imamura, 1932.

The genus contain 13 species, one species founded in Kazakhstan.

Amphimermis elegans (Hagmeier, 1912) Filipjev, 1934

Synonym: *Complexomermis elegans* (Hagmeier, 1912).

Male (n = 1). L = 16 mm; a = 106; b = ?; c = 71.4; length spicules 1.2 mm.

Usually medium nematodes. Head rounded. The body narrow to anterior. Cuticle thick, pellucid, with clear-cut crisscross fibers. Amphids medium, flask-shaped. Mouth opening terminal. Spicules very long, at basis lay separated, thereupon binding; tops of spicules lay free in pellucid cuticular case.

Host unknown.

The place of founded: Kazakhstan, Almaty province, Enbekshikazakh territory, defile Turgen, swampy reservoir.

Distribution: Worldwide.

Material: one adult male.

Main references: B.B. Bekturganov, N.A. Gubaidulin, 1996.

Subfamily *Gastromermithinae* Gafurov, 1997

Tribe *Gastromermithini* Gafurov, 1997

Genus *Gastromermis* Micoletzky, 1923

Synonyms: *Mesomermis* Dujardin, 1842 (part.); *Paramermis* Linstow, 1898 (part.).

Diagnosis: Cuticle thin, without crisscross fibers. Six head papillae, arranged hexagonalic. Amphids oval, pear-shaped or retort-shaped. Eight longitudinal chords. Mouth opening with ventral shift. Oesophagus compose 1/3-1/4 length of body. Vagina is long, S-shaped curvature. Spicule one, long. Larvae with lengthening tail appendage.

Hosts: Simuliidae, Chironomidae.

Type species: *Gastromermis gastrostoma* (Steiner, 1918).

The genus contain omnifarious 109 species; A.K. Gafurov (1997) propose stay 81 species, which described on adults and larvae having signs adults; five species founded in Kazakhstan.

Gastromermis chironomi Bekturganov, Gubaidulin, Dubitsky, 1991

Holotype - adult male. L = 12.5 mm; a = 144; b = 1.8; c = 99.2; length spicule 182.

Paratypes: females (n = 6). L = 22.6 (21.5-23.0) mm; a = 77.3 (63.1-98.0); b = 1.9 (1.8-2.0); V = 57.3 (52-64)%; males (n = 2). L = 12.5 mm; a = 144-150; b = 1.8-2.0; c = 99.2-100.0.

Usually short nematodes. Head bluntly-round, symmetrical. The tail is conic, on end rounded. Cuticle thin, without crisscross fibers. Six head papillae. Amphids small, their pouch oval-rounded. Mouth opening lightly ventral. Length of oesophagus compose approximately of half length of body. Vulva arranged behind of middle body. Vagina cylindrical, S-shaped curvature. One spicule, wide near basis. Tail papillae in three single rows.

Hosts: larvae of Chironomidae.

The place of founded: Kazakhstan, Almaty province, Enbeksikazakh territory, Turgen defile (1100 m above sea level).

Material: Six adult females and two males..

Main references: B.B. Bekturganov, N.A. Gubaidulin, A.M. Dubitsky, 1991.

***Gastromermis cozhiensis* Komardina, 1992**

Female. L = 42.8 mm; a = 113.8; b = ?; V = 50.3%.

Male. L = 32 mm; a = 86; b = 4.2; c = 84.2.

Usually long, light-yellow nematodes. The body is cylindrical, narrow anteriorly. Cuticle without crisscross fibers. Head capsule convex-rounded with neck constriction. Six head papillae. Eight longitudinal chords. Mouth opening lightly ventral. Length of oesophagus compose 1/4 length of body. Amphids oval. Vulva in middle of body in the form of oblique slit. Vagina weak S-shaped curvature. One spicule, thin, sculptural, weak curvature, wide to basis. Tail papillae in three single rows.

Hosts: chironomids of genus *Chironomus* Meig.

The place of founded: Kazakhstan, Pavlodar province, lake Kozha.

Material: adult female and male.

Main references: L.S. Komardina, 1992.

***Gastromermis simulii* Bekturganov, Gubaidulin, Dubitsky, 1990**

Female. L = 18.2 mm; a = 93; b = 2; V = 58%.

Male. L = 13.4 mm; a = 106; b = 4.7; c = 119/

The color of living nematodes is light-green. Head in front is convex, mouth opening ventral on 1/2 radius from centre of head. The body is cylindrical, narrow anteriorly. On tail end it rounded. Length of tail appendage larvae 112. Length of oesophagus compose 1/2 (at female) and 1/4 (at male) length of body. Vulva opening behind of middle body. Vagina S-shaped curvature. One spicule length 224, its walls are wavy. Tail papillae in three single rows.

Hosts: larvae of blackflies *Tetisimulium alajense hiemalis*.

The place of founded: Kazakhstan, Almaty province, affluent of river Assy (more 2000 m above level of sea).

Material: adult female and male.

Main references: B.B. Bekturganov, N.A. Gubaidulin, A.M. Dubitsky, 1990.

***Gastromermis turgenica* Bekturganov, Gubaidulin, Dubitsky, 1991**

Holotype - adult male. L = 8.4 mm; a = 120; b = 2; c = 75; length spicule 154.

Paratypes: females (n = 5). L = 9.9 (7.8-12.3) mm; a = 75 (60-98); b = 2.6 (2.5-2.8); V = 55.8 (55-57)%; males (n = 7). L = 6.2 (4.5-8.4) mm; a = 84 (60-120); b = 2.2 (2.0-2.4); c = 61 (46-75).

The color of living nematodes is white; usually they short. Head bluntly-rounded, tail conical with rounded end. Cuticle thin, without crisscross fibers. Six head papillae. Amphids small, its pouches rounded (at females) or oval (at males). Mouth opening ventral on 1/2 radius from centre of head. Length of oesophagus compose approximately half length of body. Vulva opening almost behind of middle body. Vagina cylindrical, S-shaped curvature. One spicule, tail papillae in three single rows.

Hosts: larvae of chironomids.

The place of founded: Kazakhstan, Almaty province, Enbekshikazakh territory, Turgen defile (1100 m above level of sea).

Biology. Laying of eggs begining over 5-6 days after copulation. Eggs laying by bit on 500-600, surrounded thin slime envelope. Productiviness one female compose about 2000 eggs. The embryonal develop continue 7-8 days, develop out of host - 12-14 days.

Material: Eight adult females and six males.

Main references: B.B. Bekturganov, N.A. Gubaidulin, A.M. Dubitsky, 1991.

***Gastromermis* sp.**

Females (n = 6). L = 23.5 (23.3-23.8) mm; a = 138 (136-142); b = 6.1; V = 55.5 (55-56)%.

The color of living nematodes is white with a touch of yellow. The body anteriorly narrow, tail rounded. Larvae have tail appendage. Cuticle is thin, without crisscross fibers. Six head papillae. Amphids small. Mouth opening lightly ventral. Oesophagus composed about 1/8 length of body. Vulva opening almost behind middle of body. Vagina cylindrical, S-shaped twist over again.

Hosts: larvae of blackflies *Tetisimulium alajense hiemalis*.

The place of founded: Kazakhstan, Almaty province, Enbekshikazakh territory, river Turgen (1100 m above level of sea).

Material: Six postparasitic larvae (females).

Main references: B.B. Bekturganov, N.A. Gubaidulin, A.M. Dubitsky, 1990.

Genus *Brevimermis* Rubzov, 1972

Synonyms: *Gastromermis* Micoletzky, 1923 (part.); *Limnomermis* Daday, 1911 (part.); *Hydromermis* Corti, 1902 (part.); *Paramermis* Linstow, 1898 (part.).

Diagnosis: Cuticle without clear-cut crisscross fibers. Six head papillae. Eight longitudinal chords. Amphids large with rounded aperture. Mouth opening ventral. Length of oesophagus composed about half length of body. The tail rounded. Single spicule short, lightly curvature. Vagina S-shaped. Larvae have appendage.

Hosts: larvae of chironomids.

Type species: *Brevimermis rosea* (Hagmeier, 1912).

The genus contain 23 species, one subspecies founded in Kazakhstan.

Brevimermis obovata ekibastusiensis Komardina, 1991

Females (n = 3). L = 48 (43-53) mm; a = 157 (151-164); b = ?; V = 45.9 (45.2-46.5)%.

Males (n = 3). L = 31 (28-34) mm; a = 123 (120-126); b = 3.4; c = 126 (117-141).

Trophosome rose-coloured. Cuticle without crisscross fibers. Head capsule round-convex with clear-cut the neck constriction. Six head papillae. Eight longitudinal chords. Mouth opening ventral (on 1/2 radius of head). Vulva direct, vagina S-shaped curvature, length 296. Single spicule thick, weak curvature, equal on the width, lightly wide to basis.

Hosts: larvae chironomids *Chironomus plumosus* L.

The place of founded: Kazakhstan, Pavlodar province, valley of river Irtysh and reservoir in town Pavlodar.

Material: 9 females and 14 males.

Main references: L.S. Komardina, 1991.

Genus *Hydromermis* Corti, 1902

Synonyms: *Neolimnomermis* Rubzov, 1978; *Eumermis* Daday, 1911 (part.); *Paramermis* Linstow, 1898 (part.).

Diagnosis: Cuticle thin, without crisscross fibers. Six head papillae. Amphids medium, with commissure. Eight longitudinal chords. Mouth opening terminal. Length of oesophagus about 1/2 length of body. Vagina long, S-shaped. One spicule often with longitudinal rib. The tail pointed.

Hosts: larvae of chironomids and midges.

Type species: *Hydromermis contorta* (Linstow, 1889).

The genus contains 47 species, four species in Kazakhstan.

Hydromermis angusticauda Rubzov, 1972

Females (n = 4). L = 11.2 (9.6-13.2) mm; a = 65.7 (56.4-77.6); b = 1.7 (1.59-1.98); V = 43.1 (41.6-44.6).

Males (n = 4). L = 10.6 (8.3-11.4) mm; a = 136 (110-148); b = 1.8 (1.56-2.01); c = 58 (56-62).

The living nematodes rose-coloured. Cuticle thin, without crisscross fibers. Eight longitudinal chords. Six head papillae, arranged hexagonal. Mouth opening terminal. Length of oesophagus almost more half length of body. Vulva in the form of transverse slit arranged before middle of body. Vagina strong S-shaped curvature with three expressive bends. Amphids very small, narrow, draw in the length. Near basis two spicules, to top join, arc-shaped curvature. Tail papillae arranged in three rows.

Hosts: larvae chironomids *Tanytarsus gregarius* Kieff.

Distribution: Leningrad province, Luzhsky territory, rivers Luga, Vrevka, Obla, Oredezh. In Kazakhstan founded in Pavlodar province, in valley river Irtysh.

Material: 11 adult females and 5 males.

Main references: I.A. Rubzov, 1972; L.S. Komardina, 1991.

***Hydromermis borokii* Rubzov, 1972**

Females (n = 6). L = 43 (36.9-49.7) mm; a = 157 (134-179); b = 2.3; V = 45.6 (42.3-52.1)%.

Males (n = 10). L = 32.4 (24.5-38.6) mm; a = 113 (99-128); b = 2.4 (2.0-3.9); c = 74 (57-89).

The body length thinning, narrow to anterior and tail ends. The tail is short, pointed. Cuticle smooth, without crisscross fibers. Head rounded, with six papillae in one plane. Mouth opening terminal or lightly ventral. Amphids small, oval-rounded. Oesophagus finished in anterior half of body. Vulva in the form of transverse slit. Vagina S-shaped curvature, its canal goes obliquely forward often turns back. Spicule one, lightly curved, on end rounded, shagreened.

Hosts: larvae of chironomids *Chironomus plumosus* and *Glyptotendipes polytomus*; the extensive of invasion compose, correspondingly, 0.09 and 1.65%, the intensive - 1-2 nematodes in one host.

The place of founded: Kazakhstan, Akmola province, Kurgaldzhin territory, lake Sultan-Keldy; Pavlodar province, Bajan-aul territory, lake near village Koytas.

Distribution: Russia, Yaroslavl province, reservoir near village Borok.

Material: 13 adult females, 17 males and many postparasitic larvae.

Main references: D.Sh. Kukashev, N.A. Gubaidulin, 1985; L.S. Komardina, 1991.

***Hydromermis contorta* (Linstow, 1889)**

Females (n = 10). L = 37.9 (32.8-41.0) mm; a = 131 (122-146); b = 3.7 (2.7-4.5); V = 50 (41-59)%.

Males (n = 10). L = 21.8 (17.0-24.6) mm; a = 105 (90-117); b = 3.6 (3.3-3.9); c = 66 (51-82).

Head rounded, homocephalic. Tail is conic, on end pointed. Cuticle thin, without crisscross fibers. Six head papillae in one plane. Amphids medium-sized, rounded. Mouth opening terminal, stoma is narrow. Oesophagus compose 1/3-1/4 length of body. Vulva in the form of transverse slit arranged in middle of body. Vagina is cylindrical, S-shaped. Tail papillae in three single rows.

Hosts: larvae of chironomids *Chironomus plumosus* L.

Biology. Across 3-4 days after copulation beginning the laying of eggs and continue 24-36 hours. One female lay about 5-8 thousands eggs. The embryonal development continues 11-14 days. Full life cycles finished for 25-28 days.

The place of founded: Kazakhstan, Almaty province, slimy reservoir near town Almaty.

Distribution: Russia (Chelyabinsk, Saratov, Leningrad provinces); Ukraine (Kiev, Cherkassk provinces); Austria (Vienna forest); England; British Columbia (Marien Lake); Germany (Heidelberg, Freyburg, Hottingen and al.); Italy (Modena, Pavia); USA (Michigan, Illinois, Indiana); France (Paris, Turin); Switzerland (Silvaplannersee, Noyenburgersee).

Material: many adult females, males and postparasitic larvae.

Main references: B.B. Bekturganov, N.A. Gubaidulin, 1989.

Hydromermis (Neolimnomermis) sp.

Male. L = 32.1 mm; a = 114.6; b = ?; c = 63.5.

White nematode. Head capsule pointed in apex third. Mouth opening terminal. There is neck constriction. Six head papillae arranged hexagonally. Six longitudinal chords. Amphids large, rounded. Spicule one, however near basis look over it twice character. Tail sharp, length 560.

This mermithid was diagnostic what *Neolimnomermis sp.*, however later, according to classification of A.K. Gafurov, removed to genus *Hydromermis*.

Host unknown.

The place of founded: Kazakhstan, Pavlodar Province, valley of river Irtysh.

Material: one adult male.

Main references: L.S. Komardina, 1991.

Tribe *Limnomermithini* Gafurov, 1997**Genus *Limnomermis* Daday, 1911**

Synonym: *Paramermis* Linstow, 1898 (part.).

Diagnosis: Cuticle thin, without crisscross fibers. Six head papillae in one plane.

Six longitudinal chords. Amphids medium, arranged behind level of head papillae. Mouth opening terminal. Oesophagus not reach of middle body. Vagina S-shaped, not long. Spicule one, curvature. Tail rounded or lightly pointed, on end rounded.

Hosts: larvae of chironomids and blackflies.

Type species: *Limnomermis limnobia* Daday, 1911.

The genus contains 34 species, two species and one subspecies founded in Kazakhstan.

***Limnomermis angustifrons* Rubzov, 1974**

Females (n = 3). L = 33.4 (30.4-35.4) mm; a = 123 (108-149); b = 2.2 (2.1-2.4); V = 47 (44-53)%.

Males (n = 6). L = 22.9 (21.1-23.9) mm; a = 79 (74-86); b = 3.1 (2.5-3.9); c = 105 (90-110).

Cylindrical nematodes bitterly narrowing anteriorly from level of nerve ring. Cuticle thin, smooth. Head rounded, with weak-cut of neck constriction. Mouth opening slightly ventral. Head papillae in one plane. Amphids small, rounded oval. Slit of vulva oblique; vagina S-shaped, its first bend direct oblique forward, the second - parallel first, but direct behind, and third - crossways of body and opening in uterus. Spicule one, curvature.

Hosts: larvae *Chironomus plumosus* L.; the extensive of invasion 0.39%, the intensive - 1-2 nematodes in one insect.

The place of founded: Kazakhstan, Almaty province, Kurgaldzhin territory, lake Sultan-Keldy.

Distribution: Russia, river Pechora, village Mutny Materik.

Material: 3 adult females and 6 males.

Main references: D.Sh. Kukashev, N.A. Gubaidulin, 1985.

***Limnomermis angustifrons maraldiensis* Komardina, 1991**

Females (n = 3). L = 52 (46-57) mm; a = 118.3 (110-135); b = 2.2 (2.1-2.3); V = 50 (48-53)%.

Males (n = 4). L = 28 (26-31) mm; a = 102 (95-110); b = 3.0 (2.9-3.1); c = 79.2 (75.7-82.0).

Cuticle without crisscross fibers. Head capsule rounded-convex. Six head papillae. Six longitudinal chords, lateral chords have three rows of cells. Mouth opening terminal. Length of oesophagus at female under a half length of body, at males - almost short. Amphids pear-shaped with rounded aperture. Tail is pointed. Vulva in middle of body in the form of transverse slit. Vagina S-shaped. The eggs globular. One spicule, lightly curvature, end bluntly-rounded with spine-shaped organizations. Genital papillae arranged in three rows.

Hosts: larvae chironomids *Camptochironomus tentans* F., *Chironomus plumosus* L.

The place of founded: Kazakhstan, Pavlodar province, lakes Yamyshevo and Maraldy.

Material: 16 postparasitic larvae rearing before adult.

Main references: L.S. Komardina, 1991.

***Limnomermis* sp.**

At larvae of chironomids from bottom slime of lightly leak reservoir founded parasitic mermithids, placed in the genus *Limnomermis*; to define them before species not possible since adult mermithids is absent.

Hosts: larvae chironomids *Tanytharsus* sp.

Biology. Intensive of invasion - 1-6 nematodes in one host, often 1-2 nematodes.

All invasion larvae of chironomids, founded in August - September, at growth ruined before pupation.

The place of founded: Kazakhstan, Pavlodar province, valley of river Irtysh.

Material: 121 parasitic and 85 postparasitic larvae.

Main references: V.G. Vakker, S.S. Monakov, 1980.

Subfamily *Heleidomermithinae* Artyukhovsky, 1990**Genus *Heleidomermis* Rubzov, 1970**

Diagnosis. Cuticle without crisscross fibers. Head conic pointed, tail rounded. Mouth opening with slight ventral shifting. Six head papillae arranged in two storey. Amphids medium-sized, pear-shaped. Eight longitudinal chords. Oesophagus reach before posterior end of body. Vagina pear-shaped; vulva in the form of transverse slit, perpendicular to longitudinal axis of body. Two spicules, short, almost direct. Larvae without tail appendage. Live-barring.

Hosts: biting-midge (Ceratopogonidae).

Type species: *Heleidomermis vivipara* Rubzov, 1970.

The genus contain two species, one species founded in Kazakhstan.

***Heleidomermis vivipara* Rubzov, 1970.**

Females (n = 16). L = 12.5 (9.9-15.4) mm; a = 62 (48-81); b = 1.02 (1.01-1.03); V = 52 (44-62)%.

Males (n = 38). L = 8.0 (5.8-9.4) mm; a = 54 (40-75); b = 1.04 (1.01-1.07); c = 23 (16-28).

The body thickening in anterior of a third. Head and tail ends are conic, rounded. Cuticle have three layers. Amphids medium-sized. Six head papillae. Mouth opening ventral. Oesophagus is long, almost reach posterior end of body. Females are live-born. Vulva in the form of transverse slit, perpendicular to length of body. Vagina is pear-shaped. Two spicules, direct, narrow to top and rounded.

Biology. Embryonal develop of live-bearing mermithid proceed in the body of female. Formation larvae-1 finished on third day. On 4-5 day begining birth parasitic larvae-2. Parasitic phase continue 15-20 days. Nematods forsake larvae of biting-midge with already develop sexual organs. The last molt proceed in the time of forsake from host; copulation proceed in first day. Productiviness one female - 1000 larvae.

Hosts: *Culicoides circumscriptus*, *C. helveticus*, *C. hubeculosus*, *C. lailae*, *C. machurensis*, *C. odibilis*, *C. pulicarius*, *C. pulicarius punctata*, *C. puncticollis*, *C. riethi*, *C. salinaris*, *C. stigmae*, *C. v. variipennis*.

The place of founded: Kazakhstan, Taldykorgan province, Panfilov territory, salt-wather reservoirs valley of river Ili; Zhambyl province, Shu territory, Nord-East part of Tasutkol' reservoir; Almaty province, Pervomay lakes.

Distribution: Russia, Burjatia (Mirzaeva, 1971; Rubzov, 1974), Karelia (Rubzov, 1970, 1972); Uzbekistan (Gafurov, Saidalieva, 1984; Saidalieva, 1985; Lebedeva, 1987); Kazakhstan (Gubaidulin, Bekturganov, 1986); USA (Mullens, Rutz, 1982).

Material: 100 adult females and 40 males.

Main references: N.A. Gubaidulin, B.B. Bekturganov, 1986.

Genus *Agamomermis* Stiles, 1903

The genus was argumented K.V. Stiles (1903) for *Agamomermis culicis*, described on larvae forms from gnat. Later on to genus *Agamomermis* begining ascribe all species mermithids, described on larvae. Collection charakter of genus *Agamomermis*, according to I.A. Rubzov (1972), not liable doubt.

In 1978 I.A. Rubzov argumented new genus *Ceratomeremis*, including *Agamomermis heleis* in quality Type species. A.K. Gafurov (1977) made revision and 17 genus mermithids, seted on larvae without adult including *Ceratomeremis*, counted not valid and bring together in gathering genus *Agamomermis* Stiles, 1903.

Agamomermis heleis Rubzov, 1967

Synonym: *Ceratomeremis heleis* Rubzov, 1978.

Female. L = 7.8 mm; a = 84.7; b = 3.1; V = 44%.

The body thin, rounded on anterior and posterior ends. Head capsule on diameter twice in narrow of diameter of body in middle. Cuticle thin, without crisscross fibers. Amphids small, cup-shaped, with apertures on level head papillae. Mouth opening terminal. Extent of oesophagus aproximately to middle of body. Vagina barrel-shaped, length 56, its canal perpendicular to longitudinal axis of body.

Larvae this species of mermithids detail described by I.A. Rubzov (1967).

Hosts: larvae biting-midge *Culicoides odibilis*.

The place of founded: Kazakhstan, Taldykorgan province, Panfilov territory, reservoir in valley river Ili.

Material: one adult female.

Main references: B.B. Bekturganov, 1991.

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Резюме

Губайдулин Н.А., Бектурганов Б.Б. Аннотированный список семейства Mermithidae Braun, 1883 - паразитов беспозвоночных животных.