

***Cervicaprastrongylus*, a new genus proposed for the nematode species *Ostertagia skrjabini* Singh & Pande, 1963 (Trichostrongyloidea, Trichostrongylidae)**

Lynda M. GIBBONS and L.F. KHALIL

Commonwealth Institute of Parasitology*, 395A Hatfield Road, St. Albans, Herts AL4 0XU, England

Summary

A new genus, *Cervicaprastrongylus*, is proposed for *Ostertagia* (*Grosspiculagia*) *skrjabini* Singh & Pande, 1963, previously renamed *Ostertagia* (*Grosspiculagia*) *malviyai* by Chaturvedi & Kansal in 1977. The new genus is distinguished from *Hyostromgylus* by the structure of the spicules, the branching of the dorsal ray, the structure of the genital cone and the arrangement of the rays of the lateral lobe of the bursa. Other species transferred to the new genus in new combinations are *Hyostromgylus gabonensis* Durette-Desset & Chabaud, 1974 and *H. moreli* Durette-Desset & Denke, 1978. The genera *Bergheia*, *Hyostromgylus* and *Parostertagia* are discussed and the present position of the four separate species named *Ostertagia skrjabini* is reviewed.

Introduction

Ostertagia skrjabini is the name given to four separate species; *O. skrjabini* Kamensky, 1929, *O. skrjabini* (Schulz, Andreeva & Kadenatsii, 1954), *O. (Grosspiculagia) skrjabini* Shen, Wu & Yen, 1953 and *O. (Grosspiculagia) skrjabini* Singh & Pande, 1963. Orloff (1933) and Skrjabin *et al.* (1952) considered *O. skrjabini* Kamensky, 1929 a synonym of *O. (Grosspiculagia) occidentalis* Ransom, 1907 which is now the type species of the genus *Grosspiculagia* (Orloff, 1933) Sarwar, 1956. Sarwar (1956) included *O. skrjabini* Kamensky, 1929 in the genus *Grosspiculagia* and pointed out that Travassos (1937) separated these two species. He also

suggested that a study of their genital cones could help to decide their validity. *Ostertagia skrjabini* (Schulz, Andreeva & Kadenatsii, 1954) was originally the type and only species of the genus *Capreologia* Schulz, Andreeva & Kadenatsii, 1954. Andreeva (1956) transferred the species to the genus *Ostertagia* and proposed the new name *Ostertagia capreoli* for it. Drózdź (1965) listed both species names as synonyms of *O. leptospicularis* Assadov, 1953. *O. (Grosspiculagia) skrjabini* Shen, Wu & Yen, 1953 was described from the abomasum of a Chinese goat and Singh & Pande (1963) described *O. (Grosspiculagia) skrjabini* from the Indian antelope *Antilope cervicapra*. Chaturvedi & Kansal (1977) proposed the new name *O. (Grosspiculagia) malviyai* for Singh & Pande's specimens.

After examining specimens identified as *Ostertagia okapiae* and species of *Hyostromgylus* and *Parostertagia*, it was thought that a new genus should be erected and the taxonomic position of *Ostertagia (Grosspiculagia) skrjabini* Singh & Pande, 1963 should be reviewed.

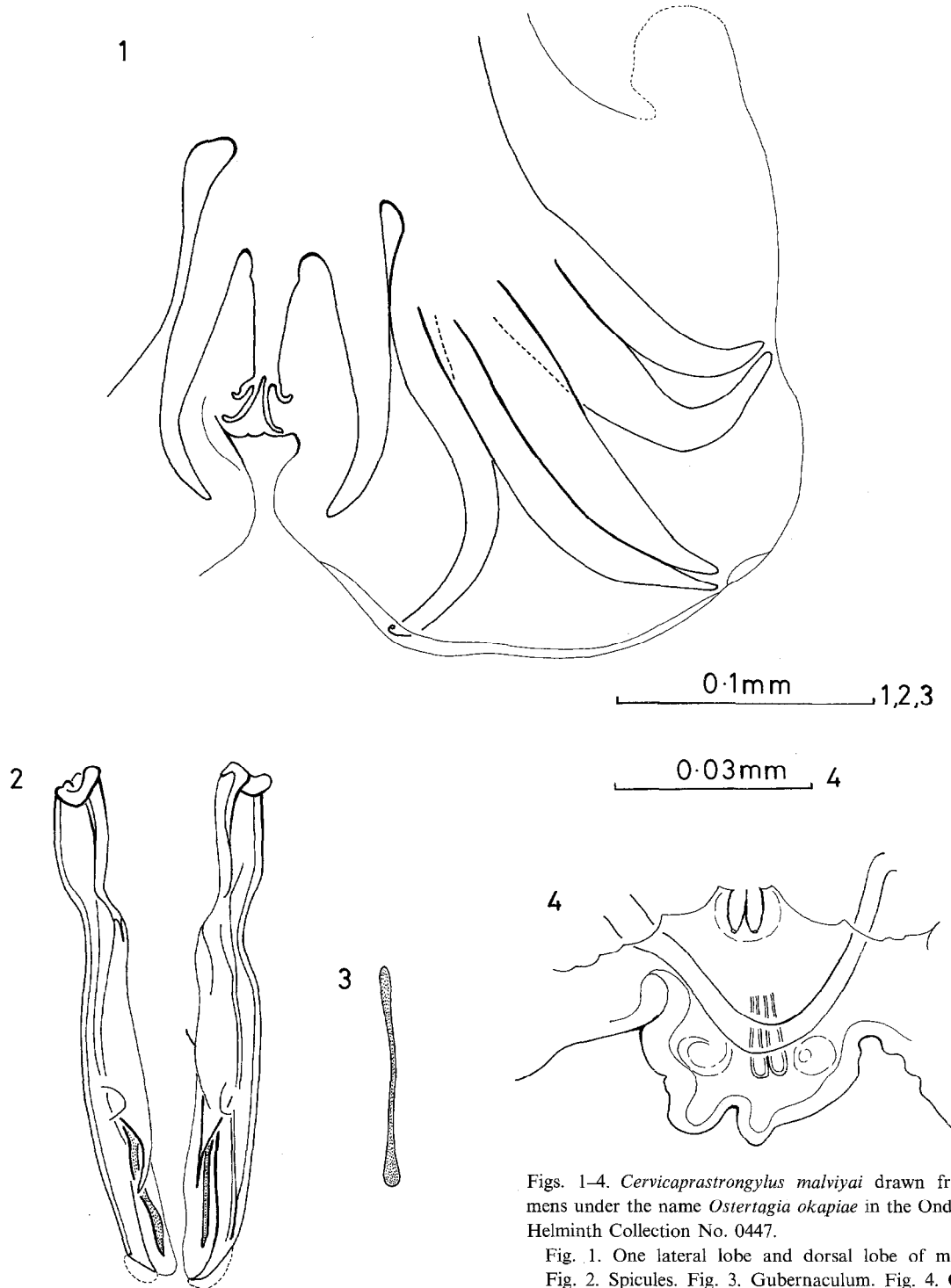
Material and methods

One male and one female identified as *Ostertagia okapiae* collected from okapi in Pretoria Zoo, Onderstepoort Helminth Collection No. 0447; two males and two females of *Hyostromgylus rubidus*, London School of Hygiene and Tropical Medicine Collection No. 2639; one male and two females of *Hyostromgylus moreli*, Museum National d'Histoire Naturelle, Paris, collection No. 707HA; one male and one female of *H. gabonensis* Museum National

d'Histoire Naturelle, Paris, Collection No. 695H(a); two males and two females of *Parostertagia heterospiculum* (paratypes) United States Department of

Agriculture, National Parasite Collection No. 30166.

The specimens were cleared in either lactic acid, lactophenol or Berlese's Fluid. The specimens from

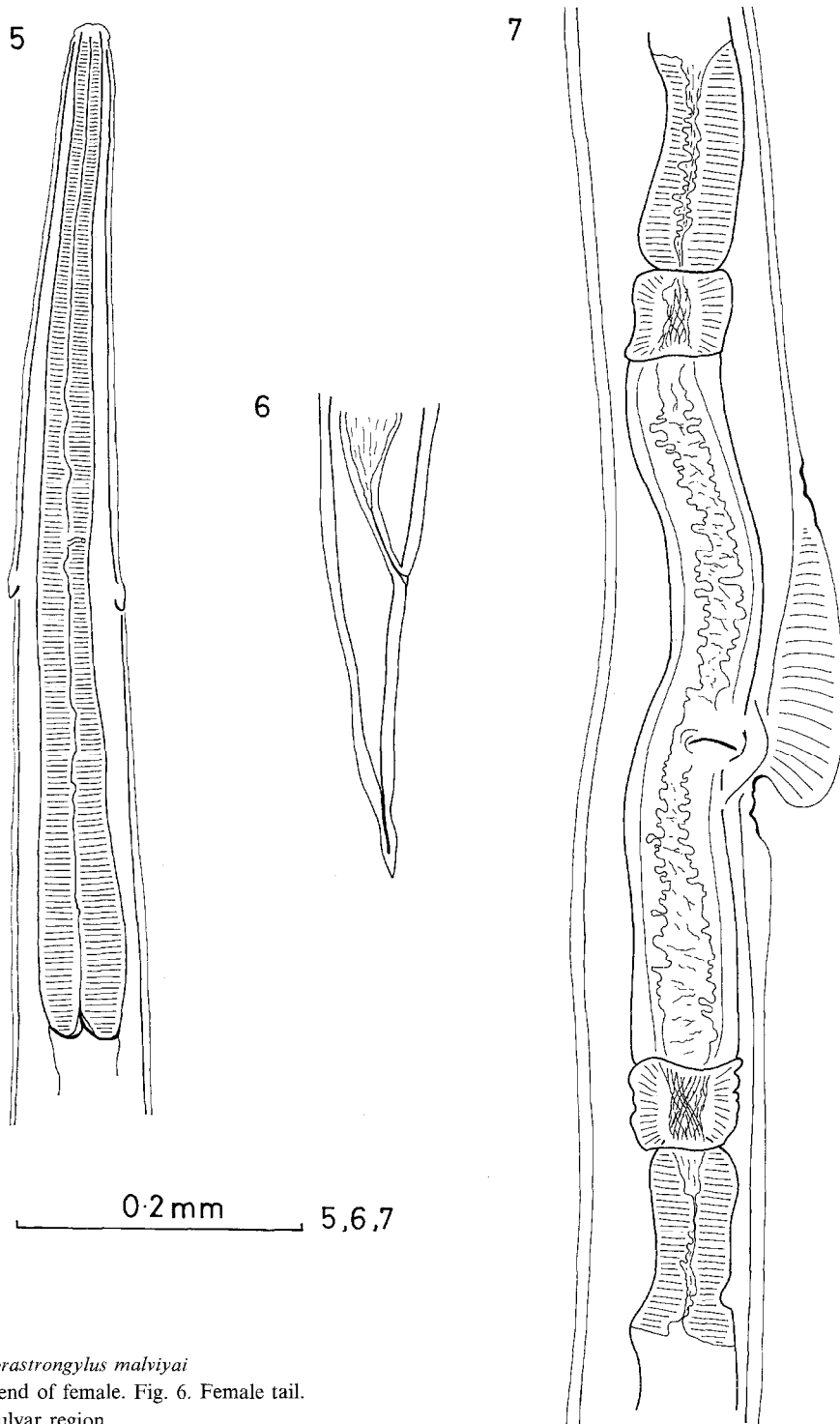


Figs. 1-4. *Cervicaprastrongylus malviyai* drawn from specimens under the name *Ostertagia okapiae* in the Onderstepoort Helminth Collection No. 0447.

Fig. 1. One lateral lobe and dorsal lobe of male bursa. Fig. 2. Spicules. Fig. 3. Gubernaculum. Fig. 4. Composite drawing of the genital cone.

Onderstepoort identified as *Ostertagia okapiae* are here very briefly described but as only one male and

one female were available for study, it was not possible to examine the synlophe in cross section.



Figs. 5-7. *Cervicaprastrongylus malviyai*
Fig. 5. Anterior end of female. Fig. 6. Female tail.
Fig. 7. Female vulvar region.

Cervicaprastrongylus malviyai* (Chaturvedi & Kansal, 1977) n.g., n.comb.Description*

Male: Body 10.95 mm long; 0.130 mm wide just anterior to the bursa; head diameter, including a slight vesicle, 0.022 mm; excretory pore 0.368 mm from anterior end; asymmetrical cervical papillae project from body surface 0.390 and 0.410 mm from anterior end; nerve ring not seen; oesophagus 0.770 mm long; longitudinal cuticular ridges numerous, of more or less even height; prebursal papillae large; spicules 0.203, 0.206 mm long; gubernaculum 0.086 mm long; genital cone with two papillae or raylets ventral to the cloaca and a complex structure dorsal to the cloaca incorporating two modified rays or papillae. (Figs. 1–4.)

Female: Body 14.55 mm long; 0.122 mm wide in region of vulva; in addition there is a cuticular inflation lateral to vulva 0.196 mm long, 0.056 mm wide; head diameter, including a slight vesicle, 0.025 mm; excretory pore 0.350 mm from anterior end; cervical papillae project from body surface 0.375 mm from anterior end; longitudinal cuticular ridges numerous, of more or less even height; combined length of opposed ovejectors including sphincters 0.605 mm; anterior trompe 0.150 mm long; posterior trompe 0.131 mm long; vulva opens 2.10 mm from posterior end; tail 0.205 mm long; no eggs in ovejectors. (Figs. 5–7.)

Discussion

Molin (1860) described a nematode from a white-lipped peccary, *Dicotyles albirostris*, and named it *Strongylus attenuatus*. Railliet (1898) established that the specific name had been preoccupied and proposed the name *Strongylus molini* for it. Before this, Hassall & Stiles (1892) described and named the same parasite *Strongylus rubidus* from the stomach of pigs slaughtered in Washington, D.C., USA. Travassos (1921) included *Strongylus rubidus* in the genus *Ostertagia*. Hall (1921) considered *Strongylus rubidus* had more affinities with the genera of the family Trichostrongylidae than with

those of the Strongylidae and proposed a new genus *Hyostromylus* with *H. rubidus* n.comb. as the type species. Hall (1921) described the dorsal ray as bifurcated at its distal tip, with two small branches about two thirds of the distance from the base. Travassos (1937) showed the dorsal ray as having three pairs of branches, one half-way along the length of the ray and two near its distal tip. The genital cone is shown with a pair of small rays or papillae joined at the base, ventral to the cloaca and a pair of ray associated with a simple membrane dorsal to the cloaca.

Durette-Desset & Chabaud (1974) described *Hyostromylus gabonensis* from *Hyemoschus aquaticus* in Makokou, Gabon, and considered their species near to *Ostertagia* (*Grosspiculagia*) *skrjabini* Singh & Pande, 1963 in the structure of the spicules and the genital cone. Durette-Desset & Denke (1978) added a third species to the genus *Hyostromylus*, *H. moreli* from *Lepus capensis* in Mali, Africa. Durette-Desset & Chabaud (1974) pointed out that there are four species named *Ostertagia skrjabini* described by Kamensky, 1929, Schulz, Andreeva & Kadenatsii, 1953, Shen, Wu & Yen, 1959 and Singh & Pande, 1963, which are not synonyms. They considered it premature to give them new names until a satisfactory generic status had been established for *Ostertagia sensu lato*. Chaturvedi & Kansal (1977) have, however, proposed the name *Ostertagia* (*Grosspiculagia*) *malviyai* for *Ostertagia* (*Grosspiculagia*) *skrjabini* Singh & Pande, 1963.

Berghe (1937) described a new species *Ostertagia okapiae* from okapi in the Belgian Congo. He considered this species to be near to *Hyostromylus rubidus* in the form and dimensions of the spicules and bursa but differed from it and from *Ostertagia trifurcata* Ransom, 1907 (later moved to the genus *Teladorsagia* Andreeva & Sakubaldin, 1954 by Drózdź, 1965) in the length of the oesophagus, the posterior end of the female and the size of the eggs. Baer (1950) examined the type and paratypes of *O. okapiae* but unfortunately no male specimens were present. Baer was not able, therefore, to determine either the shape of the spicules or the presence or absence of a gubernaculum and considered the affinities of this species to the genus *Ostertagia* as

suggested by Travassos (1937) as uncertain. Drózdź (1965) considered *Ostertagia okapiae* sufficiently different from all other species of the genus *Ostertagia* to create a new genus, *Bergheia*, for it.

Unfortunately, the type specimens of *Ostertagia okapiae* could not be traced but from the description given by Berghe (1937) and the drawings of his specimens, the species is very close to *Hyostromylus rubidus* and is possibly a synonym of it.

The specimens received from the Pretoria Zoo, identified as *Ostertagia okapiae* and made available to the authors for examination, came from an okapi which had been captured in Zaire (Belgian Congo). The specimens, however, do not correspond to the description of Berghe's species but are similar to *Ostertagia (Grosspiculagia) skrjabini* described by Singh & Pande (1963) from the Indian antelope, *Antilope cervicapra*, and now named *Ostertagia (Grosspiculagia) malviyai*.

Examination of specimens of both *Hyostromylus gabonensis* and *H. moreli* showed some similarities to *Ostertagia (Grosspiculagia) malviyai* but the three species differ from *Hyostromylus rubidus* in the structure of the spicules, the branching of the dorsal ray, the structure of the genital cone and the arrangement of the rays of the lateral lobe of the bursa. These differences are of generic value in the family Trichostrongylidae and for these reasons a new genus, *Cervicaprastrongylus*, is proposed with *C. malviyai* n.comb. as type species. The two species *Hyostromylus gabonensis* Durette-Desset & Chabaud, 1974 and *H. moreli* Durette-Desset & Denke, 1978 are transferred to the new genus as *Cervicaprastrongylus gabonensis* n.comb. and *C. moreli* n.comb. respectively. Although it was not possible to section the specimens identified as *Ostertagia okapiae* made available to the authors, it was possible to section *Hyostromylus gabonensis* to examine the longitudinal cuticular ridges. This section and the published drawings of Durette-Desset & Chabaud (1974) and Durette-Desset & Denke (1978) show numerous longitudinal cuticular ridges of more or less even height, as seen in other genera of the subfamily Ostertagiinae. The small cephalic vesicle, the small cervical papillae projecting from the body surface, the number and arrangements

of the longitudinal cuticular ridges place the genus *Cervicaprastrongylus* in the subfamily Ostertagiinae.

Cervicaprastrongylus n.g.

Diagnosis: Trichostrongylidae. Ostertagiinae. Body filiform with small cephalic vesicle. Cervical papillae small but project from body surface. Longitudinal cuticular ridges numerous, of approximately even height and symmetrically arranged.

Male: Prebursal papillae large. Bursa with well developed symmetrical lateral lobes and a slightly reduced dorsal lobe; ventral rays diverge and come together at their distal tips; anterolateral and mediolateral rays close and parallel; dorsal ray dividing only near its distal tip to form two pairs of branches. Genital cone with two papillae ventral to the cloaca and a complex structure dorsal to the cloaca incorporating two modified rays or papillae. Spicules equal, with two equal or unequal branches and a main stem curve at its distal tip. Gubernaculum present.

Female: Vulva in posterior third of the body. Tail bluntly pointed. Parasites of lagomorphs and ruminants.

Type species: *C. malviyai* (Chaturvedi & Kansal, 1977) n.comb. (= *Ostertagia (Grosspiculagia) skrjabini* Singh & Pande, 1963).

Other species: *C. gabonensis* (Durette-Desset & Chabaud, 1974) n.comb., *C. moreli* (Durette-Desset & Denke, 1978) n.comb.

Hyostromylus Hall, 1921

Emended diagnosis:

Male: Bursa with well developed lateral lobes and a slightly reduced dorsal lobe; ventral rays diverge and come together at their distal tips; anterolateral and mediolateral rays diverge at their distal tips, the anterolateral curving towards the ventrals; the dorsal ray with one pair of branches half-way along its length which curve, a second pair of thin branches which arise at the level of bifurcation near the distal

end of the ray and which forms the third pair of branches. Genital cone with a pair of shortrays dorsal to the cloaca associated with a simple accessory bursal membrane. Spicules equal with a single branch and main stem.

Type and only species: H. rubidus (Hassall & Stiles, 1892) Hall, 1921.

The genus *Parostertagia* was established by Schwartz & Alicata (1933) for *P. heterospiculum* from North American Peccary (*Dicotyle angulatus angulatus*). Travassos (1937) considered the genus *Parostertagia* to be a synonym of *Hyostongylus*. Skrjabin *et al.* (1952) disagreed with this synonymy and separated the two genera. Paratypes of *P. heterospiculum* examined by the authors had no cephalic vesicle and no cervical papillae could be seen. The bursa has well developed symmetrical lateral lobes and an unreduced dorsal lobe. The ventral rays diverge and do not come together at their distal tips, the anterolateral ray is straight or curves towards the other laterals, the dorsal ray only divides at its distal end. For these reasons we agree with Skrjabin *et al.* (1952) that the two genera are separate and valid.

Acknowledgements

The authors are grateful to Professor A.G. Chabaud, Dr. M.C. Durette-Desset, Dr. A. Verster and Dr. J.R. Lichtenfels for making specimens available for this study.

References

- Andreeva, N.K. (1956) [Revision of *Ostertagia* (Trichostrongylidae) of ruminants.] *Trudy Instituta Veterinari Kazakhskogo Filiala Vsesoyuznoĭ Akademii Sel'skokhozjaĭstvennykh Nauk* **8**, 473–487. [In Russian.]
- Baer, J.G. (1950) Etude critique des helminthes parasites de l'Okapi. *Acta Tropica*, **7**, 164–186.
- Berghe, L. van den (1937) Contribution à l'étude des parasites de l'Okapi (Troisième Partie). *Revue de Zoologie et de Botanique Africaines*, **30**, 117–139.
- Chaturvedi, Y. & Kansal, K.C. (1977) *Checklist of Indian nematodes (animal parasites)*. Records of the Zoological Survey of India. Miscellaneous Publication, Occasional Paper No. 5, vii + 148 pp.
- Drózdź, J. (1956). Studies on helminths and helminthiasis in Cervidae. 1. Revision of the subfamily Ostertagiinae Sarwar,

- 1956 and an attempt to explain the phylogenesis of its representatives. *Acta Parasitologica Polonica*, **13**, 445–481.
- Durette-Desset, M.C. & Chabaud, A.G. (1974) Trois nouveaux nématodes parasites du Chevrotain aquatique *Hyemoschus aquaticus* au Gabon (Collection G. Dubost). *Bulletin du Muséum National d'Histoire Naturelle*, Paris, 3e Sér. No. 205 *Zoologie* **135**, 75–87.
- Durette-Desset, M.C. & Denké, M. (1978) Description de nouveaux nématodes parasites d'un lièvre africain et compléments à l'étude morphologique de quelques Trichostrongylidae. *Bulletin du Muséum National d'Histoire Naturelle*. Paris 3e Ser. No. 515 *Zoologie*, **354**, 331–347.
- Hall, M.C. (1921) Two new genera of nematodes, with a note on a neglected nematode structure. *Proceedings of the United States National Museum*, **59**, 541–546.
- Hassall, A. & Stiles, C.W. (1892) *Strongylus rubidus* a new species of nematode, parasitic in pigs. *Journal of Comparative Medicine and Veterinary Archives*, **13**, 207–209.
- Molin, R. (1860) Trenta species di nematodi. *Sitzungsberichte der Akademie der Wissenschaften Wien. Math. Naturw. Cl.*, **40**, 331–358.
- Orloff, I.W. (1933) Sur la reconstruction de la systématique du genre *Ostertagia* Ransom, 1907. *Annales de Parasitologie humaine et comparée*, **11**, 96–114.
- Railliet, A. (1898) Rectification de la nomenclature d'après les travaux récents. *Recueil de Médecine Vétérinaire*, viii^e Serie, **5** (5), 171–174.
- Schwartz, B. & Alicata, J.E. (1933) Description of two parasitic nematodes from the Texas Peccary. *Proceedings of the United States National Museum*, **82**, 1–6.
- Shen, S.S., Wu, S.C. & Yen, W.C. (1959) [A new nematode, *Ostertagia* (*Grosspiculagia*) *skrjabini* sp. nov. from the abomasum of the chinese goat.] *Acta Zoologica Sinica*, **11**, 565–569, Figs 1–11. [In Chinese.]
- Skrjabin, K.I., Shikhobalova, N.P. Schults, R.S., Popova, T.I., Boev, S.N. & Delyamure, S.L. (1952) *Key to parasitic nematodes III. Strongylata*. Moscow: Academy of Sciences of the USSR. [English translation published by the Israel Program for Scientific Translations 1961, 890 pp.]
- Skrjabin, K.I., Shikhobalova, N.P. & Schults, R.S. (1954) Essentials of nematology. Vol. III Trichostrongylids of animals and man. Academy of Sciences of the USSR, Moscow. [English translation published by the Israel Program for Scientific translations, 1960, 704 pp.]
- Singh, S.P. & Pande, B.P. (1963) Helminths collected from the Indian antelope *Antilope cervicapra*. *Annales de Parasitologie humaine et comparée*, **38**, 439–457.
- Travassos, L. (1921) Contributions à l'étude de la faune helminthologique du Brésil XIII. Essai monographique sur la famille des Trichostrongylidae Leiper 1909. *Memórias do Instituto Oswaldo Cruz*, **13**, 1–82. [French translation.]
- Travassos, L. (1937) *Revisão de familia Trichostrongylidae Leiper, 1912*. Monographias do Instituto Oswaldo Cruz, Rio de Janeiro, No. 1, 512 pp.