

Current status of Lymnea and Bulinus species in Wasai part of Jakara dam, Kano state, Nigeria and their public health implications

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Abstract: This paper reports the current status of Lymnea and Bulinus species in Wasai part of Jakara dam in Minjibir local government area of Kano state. Altogether 199 snails were collected comprising of twenty-one Lymnea snails made up of seventeen species and 175 Bulinus snails made up of eighty-seven different species. The Bulinus species encountered are Bulinus jousamme, B. succinoides, B. natalensis, B. angolensis, Bulinus depressus, B. truncatus trigonus (Martens), B. Abyssinicus, Gambia. B. senegalensis, B. nyassanus (Smith), Lake Nyasa, etc. while the Lymnaea species comprises of Lymnaea natalensis, Lymnaea ovata and other unidentified species. Many of the species encountered has never been reported in Nigeria. Another freshwater snail that has been reported as a predator to smaller snails elsewhere outside Nigeria was also encountered. Although none of them was emitting any cercariae there is the need for proper investigation to ascertain the potentials of these new species as intermediate hosts of trematode infections.

Keywords: Lymnea species, Bulinus species, Pomaceaspp, Jakara dam, Kano state

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I. Introduction

Wasai part of Jakara dam has for long been used for irrigation, fishing and recreation. While this water body is used by humans for these purposes, snail vectors has also found it as a good habitat for quick proliferation. Bulinus and Lymnea species are freshwater snails of medical importance because of their roles in the transmission of trematode infections. The freshwater planorbid genus *Bulinus* Müller, 1781 contains several species that are intermediate hosts for schistosomes, mammalian blood flukes in humans and livestock that cause the disease schistosomiasis. *Bulinus* is widespread across Africa and the Middle East and occurs sporadically in the Mediterranean Area (Brown, 1994). Mandahl-Barth (1965) reported the presence of many different species of *Bulinus* that has been implicated in the transmission of urinary schistosomiasis. Some of those reported by Duwa (2017b) were also emitting non schistosome cercariae. The genus is divided into four species groups, that is, the *Bulinus africanus* group, the *B. forskali* group, the *B. reticulatus* group and the *B. truncatus/tropicus* complex. Duwa (2017a) reported the presence of ten different species of *Bulinus* in three parts of Jakara dam in a previous study. Lymnaea snails serve as intermediate host for Fascioliasis and other trematode infections. Previous studies has shown a single Lymnaea snail emitting more than five different types of cercariae (Duwa, 2017b). Torgerso and Claxton (1999) reported that globally about 20 species of Lymnaeidae were described as potential intermediate hosts of Fasciola spp. The aim of the present study is therefore to assess the current status of Lymnaea and Bulinus species in Wasai part of Jakara dam.

II. Materials and methods

Study area

This study was carried out in Wasai part of Jakara dam between April and December 2017. Jakara dam was constructed in 1976 and this part of it is situated in Minjibir Local Government Area (LGA) in the North Eastern part of Kano metropolis about 41.5 Km from the city centre. The area in terms of geology falls within the tip end of the Basement complex adjoining the Chad formation, which is characterized by disappearing type of streams. Jakara dam is one of the most grossly polluted dam in West Africa, because during the dry season all the streams that feed it dry up with the exception of the major Jakara stream which sustain it. The water bodies contain muddy substrata and gentle flowing, low turbidity water with rich growth of algae and macrophytes.



Fig.1: Map of Jakara dam

Snail collection

Wasai part of Jakara dam in Minjibir Local government area of Kano state was investigated for the presence of freshwater snails between April to December, 2017. Samples were collected with a long-handle snail sieve net (mesh size: 3mm-4mm) (10). The sieve net was dragged through the water thereby collecting snails clinging to aquatic plants (water hyacinth). Snails were also handpicked when it was convenient. The snails were fed with lettuce during this study and were identified using keys provided by Vinarski (2016) and Mandahl-Barth (1965) and Brown (1994). Snapshots of the snails were taken using a Sony digital camera (DSC-W610).

III. Results and discussion

Altogether one hundred and ninety-nine (199) snails comprising of 21 (10.55%) Lymnea, 175 (87.93%) Bulinus, 1 *Bithynia tentaculata* (0.5%) and 2 *Melanoides* (1.00%) snail were collected. The Lymnea snails were made up of 17 different species while the Bulinus snails were made up of 87 different species. The most dominant species among the Bulinus and Lymnea snails are *B. natalensis* (depressed) (10) and an unidentified Lymnea specie (3) respectively. A Pomaceaspp was also encountered. The number of each specie encountered more than once is shown on its picture or image.

Statistical Analysis

Data analysis was carried out descriptively



Fig.2: Bulinus species collected from Wasai part of Jakara dam

1. Unidentified Bulinus specie 2. Unidentified Bulinus specie 3. Unidentified Bulinus specie 4. Unidentified Bulinus specie 5. *B. truncatus* 6. *B. depressus* 7. Unidentified Bulinus specie 8. *B. natalensis* 9. *B. natalensis* 10. Unidentified Bulinus specie 11. Unidentified Bulinus specie 12. *B. natalensis* (resembling *P natalensis* of Krauss) 13. Unidentified Bulinus specie 14. Unidentified 15. Unidentified Bulinus specie 16. Unidentified Bulinus specie 17. Unidentified Bulinus specie 18. *B. trigonus* 19. *B. natalensis* 20. Unidentified Bulinus specie 21. Unidentified Bulinus specie 22. Unidentified Bulinus specie 23. Unidentified Bulinus specie 24. *B. algonensis* 25. Unidentified Bulinus specie 26. *B. hexoploidus* 27. Unidentified Bulinus specie 28. Unidentified Bulinus specie 29. *B. truncatus* 30. Unidentified Bulinus specie 31. *B. natalensis* 32. Unidentified Bulinus specie 33. Unidentified Bulinus specie 34. *B. welwitsch* 35. *B. nyassanus* 36. *B. truncatus* Egypt 37. Unidentified Bulinus specie 38. Unidentified Bulinus specie 39. *B. natalensis* 40. *B. natalensis* 41. Unidentified Bulinus specie 42. Unidentified Bulinus specie 43. Unidentified Bulinus specie 44. Unidentified Bulinus specie 45. *B. abyssinicus* 46. Unidentified Bulinus specie 47. Unidentified Bulinus specie 48. Unidentified Bulinus specie 49. Unidentified Bulinus specie 50. Unidentified Bulinus specie 51. Unidentified Bulinus specie 52. Unidentified Bulinus specie 53. *B. natalensis* (resembling *P zuluensis*) 54. *B. natalensis* (depressed) 55. *B. camerunensis* 56. Unidentified Bulinus specie 57. Unidentified Bulinus specie 58. Unidentified Bulinus specie 59. Unidentified Bulinus specie 60. *B. senegalensis* 61. *B. truncatus* 62.

unidentified Bulinus specie 63. *B. succinoides* 64. *B. truncatus* 65. Unidentified Bulinus specie 66. *B. truncatus* 67. Unidentified Bulinus specie 68. Unidentified Bulinus specie 69. Unidentified Bulinus specie 70. Unidentified Bulinus specie 71. Unidentified Bulinus specie 72. Unidentified Bulinus specie 73. Unidentified Bulinus specie 74. Unidentified Bulinus specie 75. Unidentified Bulinus specie 76. *B. natalensis* (resembling *P. zuluensis*) 77. *B. hightoni* 78. Unidentified Bulinus specie 79. *B. Jousseaumei* (Dautzenberg), Gambia, 80. *Bulinus natalensis* 81. *B. truncatus* 82. Unidentified Bulinus specie 83. Unidentified Bulinus specie 84. Unidentified Bulinus specie 85. *B. truncatus* 86. Unidentified Bulinus specie 87. Unidentified Bulinus specie

Lymnea species

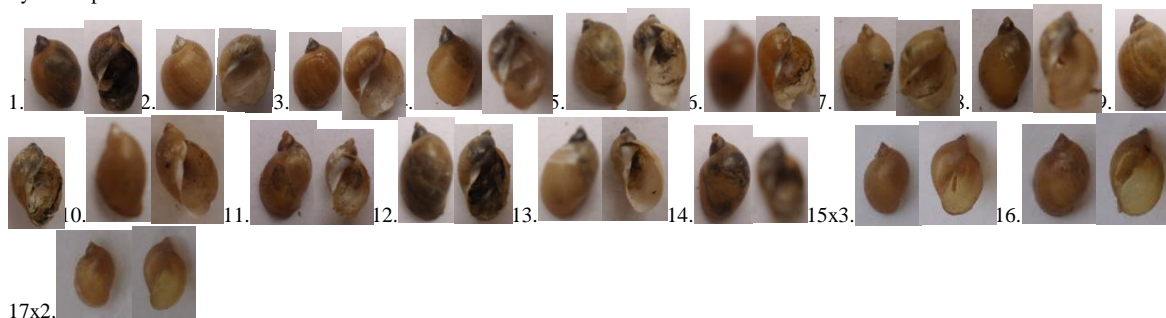


Fig.3: Lymnea species collected from Wasai part of Jakara dam

1. *Lymnea ovata* 2. Unidentified Lymnea spp 3. Unidentified Lymnea spp 4. Unidentified Lymnea spp 5. Unidentified Lymnea spp 6. Unidentified Lymnea spp 7. Unidentified Lymnea spp 8. Unidentified Lymnea spp 9. Unidentified Lymnea spp 10. Unidentified Lymnea spp 11. *Limnaea humerosa* von Martens, 1897, the lectotype 12. Unidentified Lymnea spp 13. Unidentified Lymnea spp 14. Unidentified Lymnea spp 15. *Lymnea natalensis*? 16. *Limnaea lagotis* var. *costulata*? 17. *Lymnea natalensis*?



Fig.4 : Pomacea species found in Wasai part of Jakara dam

Figure 2 and 3 above showed that this part of the dam is now been invaded by different Lymnea and Bulinus species that were not encountered in previous studies. *Lymnea natalensis* and *Bulinus globosus* the intermediate host of Fascioliasis and *S haematobium* respectively were the only Lymnea and Bulinus species reported in a previous study (Duwa and Oyeyi, 2009; Duwa, 2017a) in this study site but in this present study other Lymnea and Bulinus species were seen to have invaded this part of the dam which could be due to the fast flowing nature of the water during the rainy season thereby moving the water hyacinth in which the snails and eggs were attached from other parts of the dam. This is the first report of *Bulinus senegalensis*, *B. natalensis*, *B. angolensis*, *Bulinus depressus*, *B. truncatus*, *trigonus* (Martens), Lake Victoria, *B. Jousseaumei* (Dautzenberg), Gambia, *B. nyassanus* (Smith), Lake Nyasa, etc. in this part of the dam. It may be that *Bulinus globosus* has been displaced by other Bulinus species because its presence has not been reported again after its first and second report by Duwa and Oyeyi (2009) and Duwa (2017a). *B. Jousseaumei* (Dautzenberg), Gambia is a proved intermediate host in Gambia and Senegal (Smithers, 1956). It has also been reported in Ogun state, south western Nigeria (Salawu and Odaibo, 2012). None of the snails was found to shed any cercaria but were laying eggs. *Bulinus succinoides* and *nyassanus* are both endemic in Lake Malawi and have been found to be intermediate hosts of urinary schistosomiasis. This is also the first report of *Lymnea ovata*, *Limnaea lagotis* var. *costulata*, *Limnaea humerosa* von Martens and others that cannot be identified in this part of the water body. Most of these snails cannot be identified as this is the first time their presence was noted and reported in Kano state and in Nigeria as a whole to the best of my knowledge. Those that can be identified were only named based on morphology. Since this is the first time most of these snails are reported they may not be exactly the same with the ones they have been compared with considering their location. Although there are many species of these two snails only a few representatives of them were encountered, this may be due to the presence of a new freshwater snail species Pomacea (fig.4) that has been reported to serve as a predator to smaller freshwater snails. Kwong et al., (2009) reported that the apple snail *Pomacea canaliculata* caused significant mortality to all of the early stages of the five snails examined, as well as adults of the pulmonates *A. ollula*, *B. straminea* and *P. acuta*, but did not consume adults of the prosobranchs *M. tuberculata* and *S. quadrata*. The description of this Pomacea species and others of its kind collected elsewhere is discussed in another paper.

IV. Conclusion

Virtually all the Bulinus and Lymnea species that has been reported as intermediate host of urinary schistosomiasis or fascioliasis are present in this part of the dam. Reports from previous studies showed that snails are spreading to other parts of the dam and may spread to other water bodies in the state. The snails collected during this study may not be many but they did represent the types of Bulinus and Lymnea species that have colonised this water body. There is therefore the need for a molecular study of these species so as to identify the snails and their public health implication as their presence may give rise to a public health emergency. There should also be a proper control strategy and dam management.

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