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POLICY BRIEF

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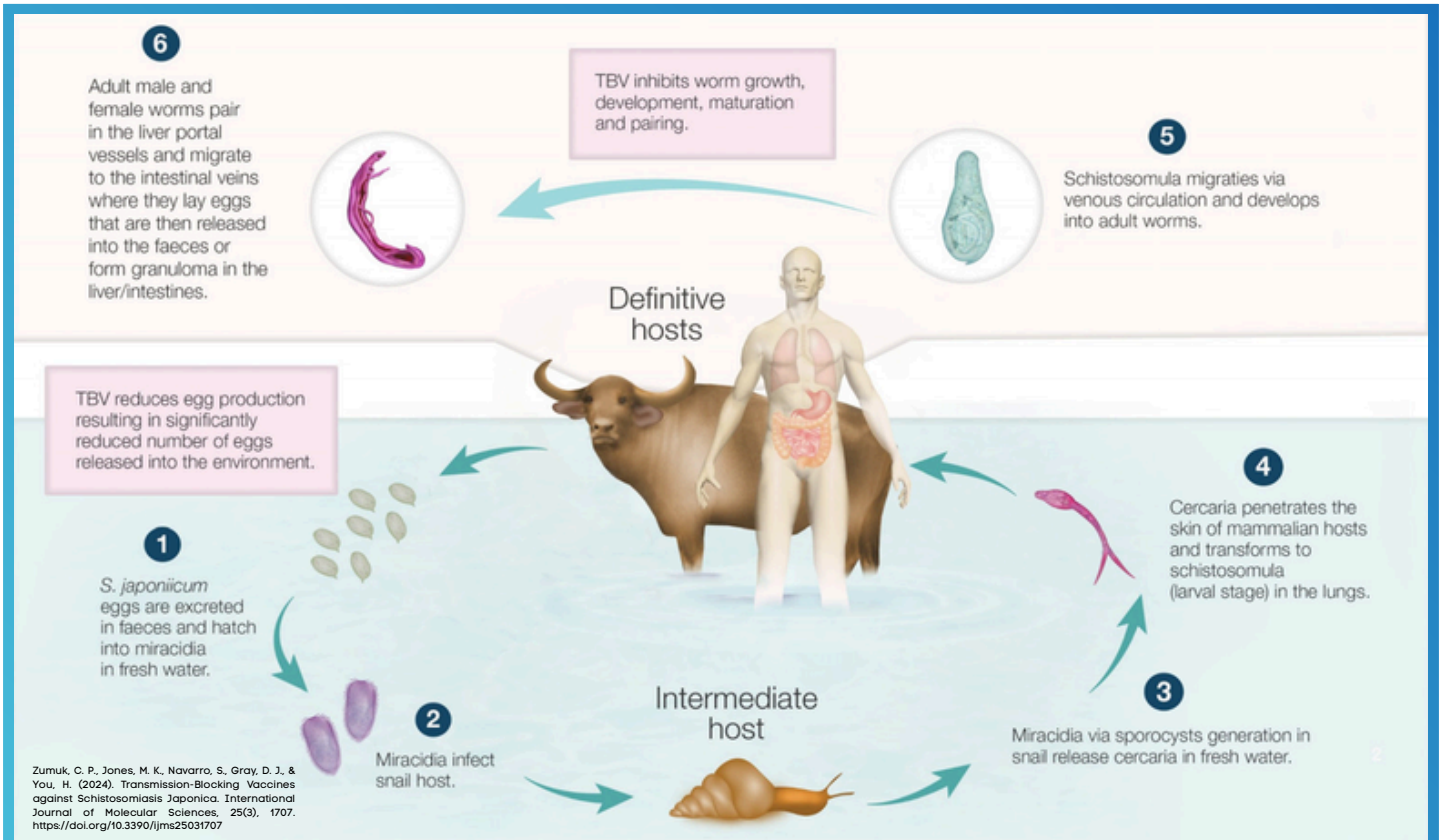

Zumuk, C. P., Jones, M. K., Navarro, S., Gray, D. J., & You, H. (2024). Transmission-Blocking Vaccines against Schistosomiasis Japonica. International Journal of Molecular Sciences, 25(3), 1707. https://doi.org/10.3390/ijms25031707

Water Buffalo as a Reservoir for *Schistosoma Japonicum*: Policy Implications for Animal and Human Health

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Key Findings and Policy Implications

- A recent study in Gonzaga, Cagayan, Philippines found that water buffaloes in 14 barangays had high rates of *Schistosoma japonicum* (22.60%) and *Fasciola* (83.68%) infections. Only eleven barangays reported S, although all had *Fasciola* cases. *japonicum*, with the largest risk of infection and pollution found in Tapel and Magrafil. Severe S was substantially more common in older animals. *japonicum* infections; however, there was no discernible sex-based difference.
- Crucially, co-infection was widespread, and there was a strong association between *S. japonicum* and *Fasciola*. presence of, indicating that animals with one parasite infection are more vulnerable to the other. To safeguard animal welfare and reduce the danger of zoonotic transmission, these findings emphasize the necessity of focused veterinary interventions, farmer education, and enhanced parasite control programs.
- Stronger animal health surveillance and parasite management initiatives are urgently needed in endemic locations, as evidenced by the high frequency of *Schistosoma japonicum* and *Fasciola* infections among water buffaloes in Gonzaga, Cagayan. The necessity of regular veterinary deworming and focused treatment approaches is highlighted by the strong correlation between co-infection and increased illness severity, especially in older animals.
- Integrating livestock management within the Department of Health's current schistosomiasis control initiatives should be a top priority for policymakers. This involves community education on parasite transmission and safe livestock handling, frequent fecal surveillance, and veterinarian services that are subsidized. Putting money into these preventative measures can boost farm output, lessen the burden of disease in both humans and animals, and aid in the larger objective of zoonotic disease control in rural agricultural communities.

Background

In the Philippines, schistosomiasis is still a major agricultural and public health issue, especially in rural areas where livestock are essential to farming. Humans and animals can contract the parasite trematode *Schistosoma japonicum* by coming into touch with water sources that are home to infected snails. Carabaos, also known as water buffaloes, are frequently employed in rice cultivation and are important reservoir hosts that support the parasite's ongoing spread.

Because of the possible effects on both animal productivity and public health, local stakeholders in Gonzaga, Cagayan, are concerned about reports of probable illnesses in carabaos. Water buffaloes are especially susceptible to parasite illnesses, such as S, because to their wallowing nature and ongoing contact with rice paddies and irrigation canals. *Fasciola* and *japonicum.*

Designing efficient control strategies for water buffaloes requires an understanding of the prevalence and risk factors of these illnesses. The purpose of this study was to determine the degree of *Schistosoma japonicum* infection in water buffaloes in a few Gonzaga barangays and to look for potential correlations with age, sex, and co-infection with *Fasciola*. In order to lower infection risks, protect animal welfare, and slow the spread of zoonotic illnesses in the area, the findings are meant to serve as a guide for local farmers, veterinarians, and legislators as they adopt focused interventions.

Research Objective

This study aimed finding the prevalence of *Schistosoma japonicum* infection in water buffaloes in a few Gonzaga, Cagayan barangays and identifying risk variables including age, sex, and co-infection with *Fasciola* were the objectives of this study. In order to lower the danger of zoonotic transmission and decrease parasite illnesses in livestock, the results aim to support improved control measures.

Methodology

Experimental design

The experiment employed a descriptive design with correlation analysis. The study's significance was also evaluated using the T-test. The frequency of *S. Schistosome* eggs found in fecal samples were used to diagnose *japonicum* infection in water buffaloes. Five grams of excrement were counted for eggs. To determine its relevance in relation to the occurrence of S, the animals' ages were also taken into account. infection with *japonicum*. Pearson Product-Moment Correlation analysis (Pearson rho) and the associated t-test of the correlation's significance were used to ascertain this. Using a t-test for two independent samples, the association between sex and prevalence was ascertained by comparing the prevalence of male and female animals. The statistical significance was determined at a 0.05 level.

In particular, the total number of eggs in 10 g of fecal samples was used to calculate the degree of infection among water buffaloes in each endemic area. Additionally, according to Ardina (2014), the number of eggs in 10 g of feces was used to evaluate the strength of infection, which was then classified as light (1-400 eggs), moderate (101-400 eggs), or heavy (>400 eggs). Each animal's bovine contamination index (BCI) was calculated.

Table 1. Number of Animals Affected with the Parasite

PARASITE	NUMBER OF ANIMALS AFFECTED	PERCENTAGE
Number of Animals with Fasciola	400	83.68
Number of Animals with *S. japonicum*	109	22.80
Total	509	106.49

Key Findings

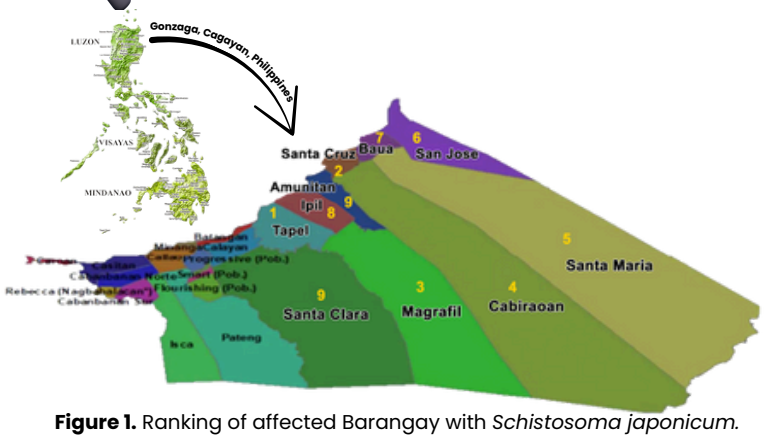

Figure 1. Ranking of affected Barangay with *Schistosoma japonicum.*

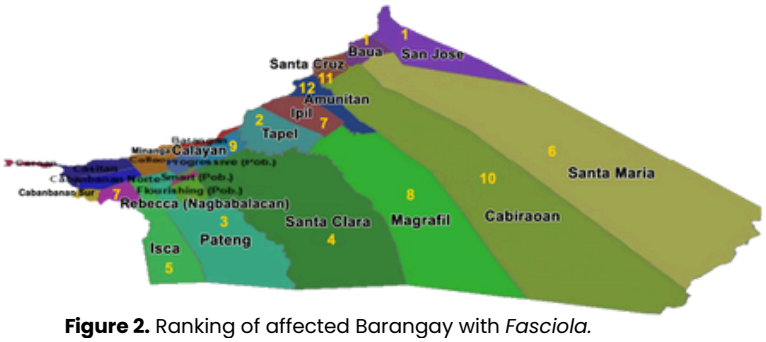

Figure 2. Ranking of affected Barangay with *Fasciola.*

Table 2. Number and percentage of eggs per sample

Variables	Total	Mean
Total Number of Treatments	478	
Total Eggs per gram (Fasciola)	16920	35.4
Total Eggs per gram (*S. japonicum*)	2265	4.74

Table 3. Number of animals affected by the parasite

Parasite	Number of animals affected	Percentage
Number of animals with *Fasciola*	400	83.68
Number of animals with *S. japonicum*	109	22.80
Total	509	106.49

Table 2 shows that out of 478 water buffalo tested *Fasciola* had a total of 16,920 eggs with a mean of 35.4, while the *S. japonicum* had a total of 2,265 eggs with a mean of 4.74.

Table 3 shows that out of the 478 samples, 400 were infected with *Fasciola*, which constitutes 83.68%. There were 109 heads infected with *S. japonicum*, which is 22.60% of the animals tested. Of the total animals infected, there were those who were infected with *Fasciola* alone, others were infected with *S. japonicum* alone, and still, others were infected by both parasites.

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Recommendations

- To prevent *Schistosoma japonicum* and *Fasciola* infections, it is advised that local government entities, in collaboration with the Department of Agriculture and the Department of Health, conduct routine, community-wide water buffalo deworming programs. Treatment plans should give priority to older animals because they display higher infection levels.
- Additionally, barangays like Magrafil, Tapel, and Sta. Cruz of Gonzaga, Cagayan, Philippines have the highest rates of pollution and infection. should be prioritized for focused treatments, such as fecal screening, snail management, and restricting buffalo access to water bodies and irrigation canals, which are known to be transmission sources.
- Support should also be given to initiatives aimed at increasing capacity, such as educating farmers on environmental sanitation, animal husbandry, and parasite prevention. Including livestock parasite control in schistosomiasis prevention programs will lower the danger of zoonotic transmission to humans while simultaneously safeguarding farm productivity and animal health.

Conclusions

According to the study, *Schistosoma japonicum* is common in water buffalo, indicating that these animals have a role in the parasite's transmission in human-infecting water bodies. There will be a significant decrease in the quantity of parasites in the Gonzaga area that is afflicted if the proper steps are taken to limit the animals' accessibility to water bodies and to conduct widespread deworming.

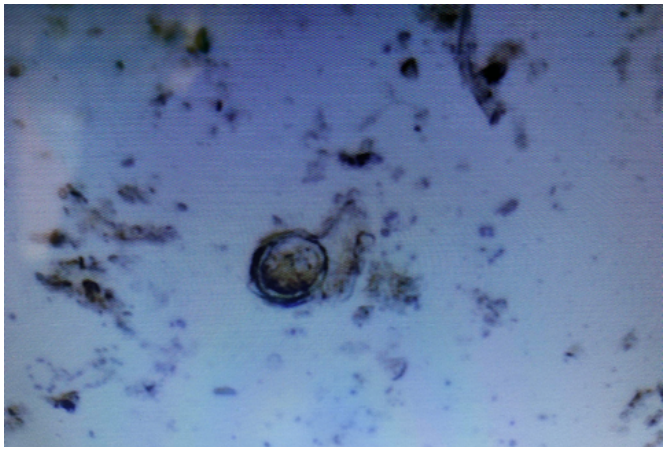

Figure 3. Egg of *Schistosoma japonicum.*

Regulatory and Legislative Agencies/ Organizations Benefiting from the Results

Figure 4. Identifying a parasite egg with a microscope at the Municipal Health Office in Gonzaga.

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formalin–ethyl acetate sedimentation-digestion (FEA–SD) tech-nique

Figure 5. Fecal samples collected from different barangays in Gonzaga, Cagayan, were placed in labeled plastic cups.

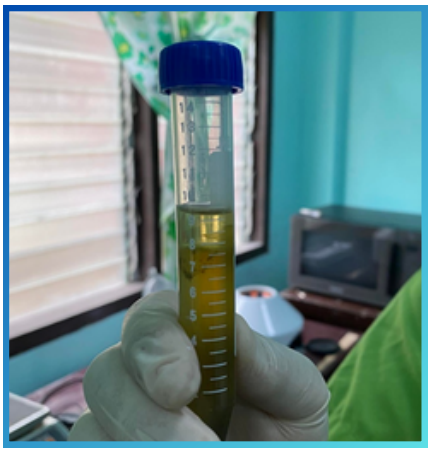

Figure 6. The mixture of fecal sample, formalin, and ethyl acetate was centrifuged.

Figure 7. The residue from the mixed sample was placed on a glass slide for direct microscopy.

Figure 8. Identification of parasite egg using microscope.

EDITOR'S NOTE

This policy brief is based on results of the CSU-funded project "Water Buffalo as a Reservoir for Schistosoma japonicum: Policy Implications for Animal and Human Health" This project was implemented by the Cagayan State University - Gonzaga Campus. The CSU - Gonzaga Campus project is composed of Dr. Vincent Jim P. Palor.

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