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Living organisms, cysts and gastro-intestinal parasites eggs in wells and spring water used by the populations in the city of Dschang – Cameroon.

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ABSTRACT

Water sources were censored in the city of Dschang (Cameroon). From the 1461 sources counted, 1431 are wells while 30 are natural springs. The percentages of the populations using these two sources were 33 % and 31.40 % respectively, while 31 % were found connected to the public distribution network.
From the investigations, it was noticed that 24.32 % of persons who use water from wells complain of itching, against 11 % and 6 % for those who use pipe borne water and spring water respectively. The highest prevalence's of gastrointestinal diseases were recorded in the consumers of pipe borne water.
Biological analysis revealed the presence of insect larvae, plant debris and large numbers of phytoplankton and zooplankton in some water sources.

INTRODUCTION

Because of lack of proper sanitation practices and wastewater treatment facilities in developing countries, liquid and solid wastes are generally rejected into the nearby waterways and public water sources, exposing them to contamination (Tchinda, 2002). In many agglomerations and shantytowns in Cameroon, water for consumption is collected from wells and other sources, and sanitation is made through the construction of traditional pit latrines. There are also no clear regulations for the construction of wells and latrines.
The proximity of wells and other water sources to pit latrines and other pollution sources, favour their biological contamination, and therefore increase the prevalence of waterborne diseases (Austin, 1993; Elhadi & Yagoub, 1993; Nshekanabo & Wozei, 1998, WHO, 2006). This study carried out in the city of Dschang (80000-100000 inhabitants) aimed at censoring the water sources and investigate on their biological contaminants.

MATERIAL and METHODS

Identifications of parasites and analysis were carried out following the identifications keys and procedures described by Durand & Lévêque (1980), APHA (1981) and Rodier (1996).

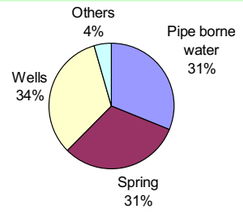
Identification of macro - invertebrates
Identification of insects and larvae were done through field collection and observations. Specimens were collected and filmed in the laboratory under magnifying glasses.

Microscopic organisms
One litre of water ample was filter through a 0.45 µm cellulose membrane. The substrate remaining on the filter was concentrated in 10 ml distilled water. A drop of about 1 µl of such concentrate substrate was observed under microscope with different magnifications (4x, 10x, 40x). During observations, living organisms, cysts and parasites eggs were identified and their pictures taken.

RESULTS and IMPLICATIONS

Water points and relative proximity with pollution sources

Water points	Number	Proximity to pollution sources		
		< 10 m	10-20m	> 20 m
Wells	1431	1073 (75%)	286 (20%)	72 (5%)
Springs	30	16 (53.33%)	8 (26 .66%)	6 (20%)



Proportions of the population using different sources of water in Dschang



Aspect of some spring water points in Dschang


Aspect of some wells in Dschang

Traditional filtration of water after collection

Concentrations of faecal indicators contaminants in water used in Dschang

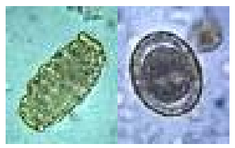
	Total coliforms (UFC/100 ml)	Fecal coliforms (UFC/100 ml)	Fecal streptoccoci (UFC/100 ml)
Pipe borne water	0 – 30	0 – 7	2 – 30
Springs	60 – 3000	40 – 600	0 – 118
Wells	20 – 15000	4 – 11000	0 – 2500

Some physicochemical characteristics of water used in Dschang

	pH	T°C	TDS (mg/l)	C (µS/cm)	COD (mg/l)	NO_3^- (mg/l)	PO_4^{2-} (mg/l)	SO_4^{2-} (mg/l)
Pipe water	6.70 – 6.94	21.3 – 23.7	42.5 – 54	84.7 – 108	0 – 6	4 – 63	0.34 – 3.68	8
Springs	5.21 – 7.04	21.1 – 22.5	10.1 – 347	55.9 – 200	0 – 118	2.4 – 51.4	0.06 – 0.90	0 – 8
Wells	4.28 – 6.97	20.9 – 24.0	27.8 – 100	1 – 693	0 – 103	1 – 56.8	0.04 – 1.24	0 – 22

Some wells and springs contains macroinvertebrates such as flies, mosquitoes and other insects larvae's, leeches and *Ascaris lumbricoides* eggs and cysts of other pathogen's.

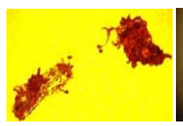
Fly larvae found in some wells



Asacaris lumbricoides eggs found in some springs

Leeches: *Hirudo* sp: found in some wells:


Living organisms observed moving in some water samples




Support debris for living organisms in water samples

Drinking water sources and prevalence of water borne diseases in Dschang

	Typhoid	Gastroenteritis	Dysenteries	Itching
Pipe borne water	18.95 %	11.15 %	10.11 %	6 %
Springs	9.80 %	8.81 %	8.02 %	11 %
Wells	5.68 %	4.09 %	5.45 %	24.32 %

- Very small proportion of the population in the city of Dschang has access to safe drinking water
- Water is generally collected from wells and springs.
- Some treatment practices include the utilisation of bleach, chloramines, and rock salt, without following any dosage.
- Traditional filtering with cotton or sand in locally prepared devices is also very common.

CONCLUSION

- All the water sources in the city of Dschang are contaminated
- The population of the city needs to be educated on the maintenance of water points
- Ecological sanitation methods should also be encouraged in the city specially the utilization of Urine Deviated (UD) toilets.
- Ecological sanitation practices would limit the contamination of ground water in the city.
- Utilization of conditioned urine and dried faeces as fertilizers would improve the living conditions of poor urban farmers.

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