

# parasite paradigms

## Evidence of a Need For Change

### Molecular Revolution Improves Parasite Diagnosis

The field of diagnostic microbiology has been revolutionised in the last decade by the evolution of molecular diagnostic techniques. Parasitology is a field of microbiology that has particularly benefited from the increase sensitivity and specificity offered by molecular methods.

*[Click here to read the abstract of a review paper on: 'Newer Diagnostic Approaches To Intestinal Protozoa'](#)*

### The Metamatrix Parasitology Profile

The **Parasitology Profile** is great test to screen patients with chronic gut problems suspected of having parasites. The test includes a total of 28 DNA probes for parasites at both a genus and species level. Each probe is listed in the table below.

Genus Probe	Species Probe	
<i>Cryptosporidium</i> sp.	<i>Entamoeba coli</i>	<i>Ascaris lumbricoides</i>
<i>Entamoeba</i> sp.	<i>Giardia intestinalis</i> ( <i>lamblia</i> )	<i>Clonorchis sinensis</i>
<i>Taenia</i> sp.	<i>Chilomastix mesnili</i>	<i>Strongyloides stercoralis-nematode</i>
<i>Trichuris</i> sp.	<i>Dientamoeba fragilis</i>	Tapeworm
<i>Giardia</i> sp.	<i>Endolimax nana</i>	<i>Blastocystis hominis</i>
<i>Schistosoma</i> sp.	<i>Entamoeba hartmanni</i>	<i>Necator americanus</i> (hookworm)
<i>Strongyloides</i> sp.	<i>Entamoeba dispar</i>	<i>Schistosoma mansonii-trematode</i>
<i>Trichomonadinae</i> ( <i>Trichomonas</i> ) sp.	<i>Iodamoeba butschlii</i>	<i>Taenia solium</i>
	<i>Trichomonas hominis</i>	<i>Trichuris trichiura</i>
		<i>Entamoeba histolytica</i>
<b>Universal Parasite Probe</b>		
Detect DNA from all protozoa and helminths		

At the time the **Parasitology Profile** was developed, it was thought that the above list encompassed the majority of medically significant or pathogenic parasites. A discussion with any leading infectious disease specialist today would also likely confirm that the above list represent the majority of medically significant parasites.

However, paradigms on the pathogenicity of parasites have changed recently for some well known parasites, like *Blastocystis hominis* and *Endolimax nana*, so it is reasonable to suspect that there could be a number of pathogenic parasites additional to those listed above that emerge in coming years. To add to this, data collected at Diagnostic Insight in the past three years would seem to suggest that a number of other pathogenic parasites exist. Below we will present a range of information in support of this changing paradigm.

## Observations in Parasite Findings

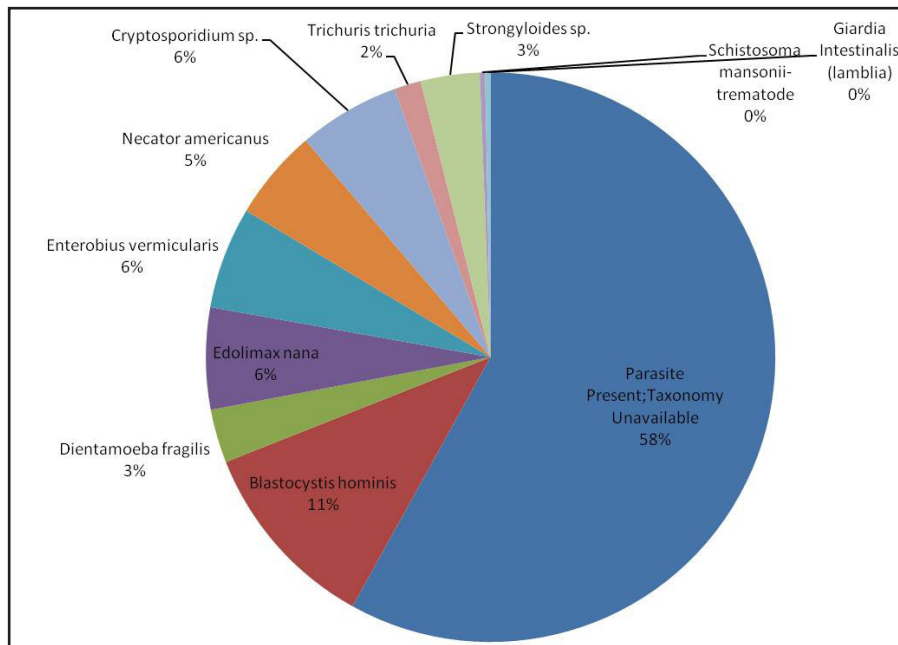
In the three years that Diagnostic Insight has been selling the **GI Effects™ Profiles**, we have observed the following trends with regard to parasites.

- Surprisingly high incidence of helminths
- Relatively high individual incidence of parasites as a whole
- High incidence of ‘unidentified’ parasites
- Greater diversity of protozoan other than blasto & dientamoeba

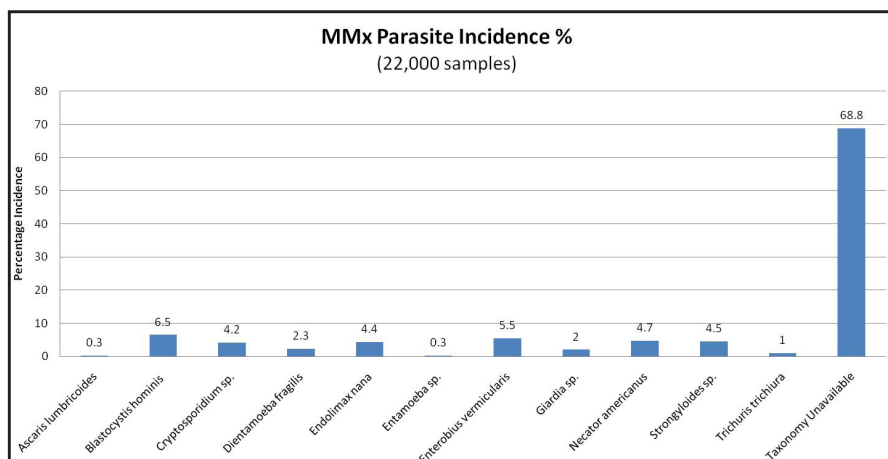
## Explaining ‘Unidentified’ or ‘Unknown’ Parasites

The high incidence of unidentified parasites has been one of the most surprising findings. Such parasites are identified by means of a universal parasite probe that can detect DNA from all protozoa and helminths. When this probe is positive and none of the genus or species specific probes are positive, the finding; ‘Parasite present;taxonomy unavailable (i.e. PP;TU) is reported.

The graph below shows the incidence of the major parasites detected on a range of **GI Effect™ Profiles** from a sample of 202 patients sourced from customers of Diagnostic Insight.



The graph below shows the incidence of parasites from 22,000 consecutive samples collected by Metamatrix from both national and international patients. As with the above graph, the incidence of ‘Parasite Present; Taxonomy Unavailable’ is high.



## Factors Explaining High Incidence of Unknown Parasites

One factor explaining the high incidence of ‘unidentified’ parasites may be the changing nature of our food-supply.

[Click here to read a abstract of the study: ‘Emerging Food-Borne Parasites’.](#)

The table below is taken from the above study. The parasites in pink are ones not measured directly on the **GI Effects™ Profiles**. However, presence of anyone of these parasites would return a positive PP;TU finding on the **Parasitology Profile**. It is reasonable to suspect that these parasites may be making an important contribution to the high incidence of PP;TU shown in the above chart and graph.

	Protozoa	Helminths
<b>Meat borne</b>	<i>Taxoplasma gondii</i>	<i>Trichinella spp.</i>
	<i>Sarcocystis spp.</i>	<i>Taenia spp.</i>
<b>Reptile, amphibian borne</b>		<i>Spirometra spp. (sparganosis)</i>
		<i>Gnathostoma spp., Diphylobothrium spp.</i>
		<i>Alaria spp.</i>
<b>Fish borne</b>		<i>Anisakis spp.</i>
		<i>Capillaria philippinensis</i>
		<i>Gnathostoma spp.</i>
		<i>Diphylobothrium spp.</i>
		<i>Clonorchis sinensis</i>
		<i>Opisthorchis spp.</i>
	<i>Minute intestinal flukes</i>	
<b>Arthropod borne</b>	<i>Paragonimus spp.</i>	
	<i>Macracanthorhynchus hirudinaceus</i>	
<b>Mollusc borne</b>	<i>Giardia spp.</i>	<i>Angiostrongylus cantonensis</i>
	<i>Cryptosporidium spp.</i>	<i>Echinostoma spp.</i>
<b>Plant borne</b>	<i>Giardia spp.</i>	<i>Fasciola spp.</i>
	<i>Cryptosporidium spp.</i>	<i>Fasciolopsis buski</i>
	<i>Cyclospora cayetanensis</i>	<i>Echinococcus granulosus</i>
	<i>T. gondii</i>	<i>Echinococcus multilocularis</i>
	<i>Trypanosoma cruzi</i>	

One other factor thought to be involved in the increased transmission of parasites from animals to humans (i.e. zoonoses) is the changing behaviour of humans in modern day society. Such changes include:

- Land Use & Urbanization
- Increased Tourism
- Demographics
- Increased Globalization & Livestock Movement

[Click here to read an abstract of a study on ‘Human Behaviour and the Epidemiology of Parasitic Zoonoses’.](#)

## Parasites Still A Pressing Problem

Many clinicians may not be aware that in August of this year, Melbourne was host to the **12th International Congress of Parasitology (ICOPA)**. The main theme of the conference was “Understanding the Global Impact of Parasites: from Genomes to Function and Disease.” Over 1700 scientists in the field of parasitology from all over the world participated in this conference. Most of the attendees were scientists working for governments, universities, international health organizations, and research institutions. Sadly very few medical doctors in private practice were in attendance.

The first lecture was “Conquering Parasitic Diseases: the Time has Come” by Sir Gustav Nossal from Australia. The magnitude of the global impact of parasites for morbidity and mortality is so profound that he called for

the 'will of the people' to demand that governments combat global parasite related problems.

During the week of the conference a Melbourne Conversations event was held at the Melbourne Recital Hall, where scientific experts highlighted the potential threats and disruption to our society imposed by parasite infection in a changing environment. For interested customers, an online video of Sir Gustav Nossal discussing the significance of climate change and parasites at this event can be viewed at the following link:

[Online Video: Climate Change, New Diseases & Parasites](#)

There is still a tremendous amount of work needed to educate the medical community about the valid threat that parasite infections pose to the average patient. The **Parasitology Profile** represents a cost-effective valuable tool to screen patients for a large range of parasitic infections.