



An analysis of the usefulness of a microbial respirometer for identification of bacterial infection in orangutan in field conditions.

A Case Study from Nigel Hicks BVSc MRCVS Orangutan Veterinary Aid (OVAID)

A 'Speedy Breedy'® microbial respirometer was used over a three week period to test samples of serum and faeces from orangutan in field conditions in Indonesia during March / April 2016.

The machine was supplied by Bactest Ltd a Cambridge, UK based company that has developed a microbial respirometer (Speedy Breedy) that can be used to detect and monitor microbial activity in liquid and macerated solids.

Speedy Breedy is a portable, sensitive, precision respirometer which detects and monitors microbial activity as a consequence of pressure transients relating to gaseous exchanges within a closed culture vessel of 50 ml working volume, as a result of microbial respiration.

Samples are added to a culture vessel containing a suitable medium and where present, contaminating microorganisms begin to grow. Speedy Breedy has advanced mixing technology that homogenises the culture conditions for rapid growth of microbes and efficiently converts gaseous changes in the culture medium into pressure variances in the headspace, therefore allowing detection of pressure transients due to metabolic processes where microbes are present. The change in pressure caused by microbial growth and respiration can then be visualised in near real time with the help of Speedy Breedy software, displaying the data either as a graph or in numbers which can be easily exported into Excel.

Bacteria can be grown in a highly controlled, automated environment without the use of agar plates and the associated lab and auxiliary equipment, but still using the familiar growth and selective media. Speedy Breedy is a very user friendly culture system with two chambers which can independently heat and cool. Through the innovative use of sterilised sealed pre-filled with media vessels and non-invasive mixing Speedy Breedy can be used as a rapid, portable bacterial test. The machine will function using either a mains voltage supply or alternatively a 12V battery source making it completely portable and usable for microbial testing in the field or remote areas where having a lab or even transporting it to one might not be feasible.

Most orangutan rescue centres / teams are of necessity found in remote locations in Indonesia making submission of samples for laboratory analysis difficult or impossible. There is almost always an inevitable delay between sampling and analysis which often results in inconsistent, unreliable or invalid results.

39 samples of serum (2ml) and faeces (1-2gm) from orangutan held in a rescue centre were analysed over a three week period in a screening exercise for gram negative bacilli and enterobacteriaceae during March/April 2016.

The machine proved simple to use requiring little training for the operator and reliable in function. Software supplied with the machine and requiring a Windows application allowed real time observation of the tests and post-test analysis using a laptop.

Sealed organism specific test vessels are required and the Speedy Breedy has two chambers which can be run simultaneously but independently allowing two different samples to be analysed at any time. Tests require from 10hours to 48 hours depending on the organism involved.

During our screening testing 9 samples returned positive results indicating a positive infection. In two of these cases treatment with antibiotic was instituted for a period of 7 days and the test repeated. In both cases a negative result was then obtained.

A more comprehensive and statistical analysis needs to be undertaken but our initial impression is that Speedy Breedy could prove to be an extremely useful tool in the early detection of certain specific infections in orangutan (and other species?) in difficult field conditions where laboratory analysis of samples is difficult or unreliable.

As with many wild animals orangutan will attempt to 'mask' symptoms of illness making diagnosis challenging, Speedy Breedy is capable of producing an analytical result within a few hours allowing tailored early antibiotic intervention which may be vital in certain conditions e.g where a septicaemic infection is suspected.

Nigel Hicks BVSc MRCVS
Orangutan Veterinary Aid (OVAID)
info@ovaid.org



Orangutan Veterinary Aid (OVAID) was established as a charity in 2014 by husband and wife team Nigel Hicks and Sara Fell Hicks.

Following a varied practice career in the UK Nigel started working with orangutan in 2009 and currently works freelance spending much of each year in orangutan rescue centres in Indonesia.

OVAID is dedicated to improving orangutan welfare through the provision of essential veterinary medicines, equipment and practical expertise to orangutan rescue groups in Indonesia and Malaysia. Activities focusing on veterinary mentoring enables OVAID to bridge the critical skills gap and is achieved by volunteering alongside local counterparts. OVAID also provides valuable insights into issues threatening the endangered orangutan, their rainforest habitat and increasing human / orangutan conflict.

Recent successes in 2015 include providing 6 respected orangutan charities with veterinary equipment and supplying basic medicines and equipment for a new orangutan rescue centre clinic together with placing a volunteer vet and lay nurse at International Animal Rescue's Orangutan Rescue and Rehabilitation Centre in Kalimantan for a period of nine months. Three anaesthetic machines were purchased and supplied to centres in Malaysia and Borneo by OVAID in 2015.

More information is available from OVAID's website www.ovaid.org or from its social media site.

The Bornean orang-utan is now estimated to number less than 50,000 and despite recent research evidence placing numbers of Sumatran orangutan at maybe 14,600 rather than the previously believed 6,000 it still remains at threat and classified as critically endangered according to the IUCN 'Red List'.

Destruction of lowland dipterocarp forest - prime orangutan (and countless other species) habitat, continues unabated directly related to the global increase in demand for palm oil. Most orangutan live outside so called protected areas and are therefore vulnerable to their prime predator - man.

In Indonesia most orangutan rescue centres are over capacity and rescued orphans continue to present at centres in high numbers. It is not unusual for rescued orangutan to enter centres on a weekly or certainly monthly basis.

Almost all orangutan rescue centres are NGO funded and there are always financial constraints on the functioning of the centres with the veterinary budget often small. Due to the remoteness of the centres equipment is often too expensive or difficult to source, in-date antibiotics a luxury and laboratory services difficult to access.

OVAID functions to relieve some of this pressure by supplying essential equipment and medicines and by working within the centres supplementing the professional veterinary care and assisting with the nursing and rehabilitation of the mentally and physically traumatised rescued orangutan. With over seven years of experience, gaining practical orangutan experience the charity is increasingly being used on a consultancy basis.

In March 2016, receiving an urgent request for assistance to help investigate problems in one centre OVAID was able to secure the loan of a recently developed microbial respirometer together with some testing chambers which are still under development. The machine had previously been used to incubate and enumerate bacteria and detect and measure biological activity and contamination in potable water, beer, food and beverage, paint, oil and many other applications but had not been used in the field of veterinary diagnosis.



BACTEST: turning microbial activity into data

BACTEST designs develops and markets microbial respirometry products based on its proprietary patented technology platform.