Committee(s):	Date(s):	Item no.
Port Health & Environmental Services	1st May 2012	

Subject: Study into presence of salmonella in imported reptiles and amphibians.	**Public**
Report of: Director of Markets & Consumer Protection.	**For Information**

Summary

This reports sets out the details and results surrounding a study into the prevalence of Salmonella in a sample of the some 300,000 reptiles and amphibians that are shipped through the HARC each year.

Reptiles are widely acknowledged as carriers of salmonella bacteria, and as such present a health risk to those coming into contact with the animals or their excreta. The study was conducted with the aim of ascertaining the specific serotypes of the Salmonellas found, in order to better quantify the risk to staff and visitor.

This study has revealed that whilst Salmonella bacteria in transported reptiles is highly prevalent, evaluation of the results concludes that the control measures currently used against Salmonella infection are adequate.

Recommendation:

Your Committee is requested to note the content of this report

Main Report

Background

1. Reptiles are widely acknowledged as carriers of Salmonellas, and as such present a zoonotic risk to those coming into contact with these animals or their excreta.

2. There are two species within the Salmonella genus; S. enterica and S. bongori. S. enterica has six sub species; enterica (I), salamae (II), arizonae (IIIa), diarizonae (IIIb), houtenae (IV) and indica (VI). There are over 2500 Salmonella serotypes with approximately 60% belonging to subspecies I; S. enterica enterica[3]. S. enterica enterica is present in both endothermic and ectothermic animals whilst the other subspecies are generally associated with ectothermic species [4]. S. enterica arizonae are usually associated with reptiles, particularly snakes, but are considered one of the less common subspecies of Salmonellas found in humans [5].

Current Position

3. Around 300,000 reptiles and amphibians are transported through London Heathrow Airport's Live Animal Border Inspection Post every year[1]. Each shipment is physically inspected and endangered species are subject to additional

checks by the UK Border Agency. A significant number of HARC staff, UK Border Agency Officers and visiting students will have contact with these imported reptiles, in addition to industry workers and the pet owners for whom the animals are intended.

4. The severity of salmonella infection in humans is variable depending on age and health status, as well as the particular serotype of the bacteria in question. Most cases of infection are expected to result in a period of absence from work ranging from one to three weeks. The risk of infection from the more common serotypes is adequately controlled through protective clothing and promotion of good hygiene measures. However, should more hazardous serotypes be found in species transiting through, or temporarily housed at the ARC, current procedures and control measures would require further consideration.

5. This study sampled shipments from varying origins and included a range of species, with the aim of identifying the presence or absence of identified salmonella serotypes, and determining the level of the risk to the health of those in contact. Samples were collected and tested between June 2010 and July 2011. Presence/absence data was initially required and so viable faecal matter was collected opportunistically and the details of the shipment recorded. 23 samples were collected between June 2010 and July 2011. Those samples testing positive for the presence of Salmonella bacteria were forwarded for serotyping. Table 1 provides the full results of the study including species and serotypes where identified. In summary, tortoise, snake, lizard and amphibian species were sampled from Ghana, Tanzania, Zambia, Egypt, Uzbekistan, Turkey, Prague, Indonesia, Canada and USA. Faecal matter was pooled by species where multiple samples were available.

6. Eleven positive results were recorded (47.8%), with the remaining twelve samples absent of Salmonella bacteria. However, due to the limited availability of samples in each consignment, it is very likely that the true presence of infection is higher than that observed. Nine of the positive samples returned a serotype of group I, S. enterica enterica, and two returned serotypes of group II, S. enterica salamae. 5 species of amphibian were sampled, with one returning a positive result which was serotyped as S. enterica enterica serovar SaintPaul. 4 samples were collected from Ghanaian shipments with each of these returning a positive result for a serovar of S. enterica enteric.

Implications

7. None of the Salmonella enterica arizonae serotypes typically associated with reptiles were seen in the imported species sampled. The results observed suggest that further sampling of a greater range of species including repeat testing of negative samples where these can be made available, would reveal at least a 50% presence of Salmonella bacteria, or potentially substantially higher.

8. Since the serotypes found are those present in both endothermic and ectothermic species, and are transmissible to humans, Salmonella as a zoonoses must continue to be considered a risk and all reptiles, regardless of species, country of origin or breeding status, can be considered as more likely to be infected than not. The serotypes identified are commonly occurring and therefore whilst reptiles are more likely to be carrying these bacteria than not, the severity

of an infection is akin to that of other common sources such as household handling and cooking of poultry. Therefore the management of reptile consignments and assessment of their risk is unchanged.

Conclusion

9. Heathrow Animal Reception Centre is in a unique position with regards to the number and range of species seen. The screening of groups of species transiting through the Centre serves as a useful tool for monitoring trends relating to animal and public health and for informing the assessment of risk to those coming into contact with potential pathogens. This study has revealed that whilst Salmonella bacteria in transported reptiles are highly prevalent, there is currently no evidence of a greater risk than was our previous assumption.

10. However, should new patterns of the global trade in such species become apparent in the future, it is advised that sampling recommence to enable early identification of likely sources of infection of the more hazardous Salmonella types.

References

1. Heathrow Animal Reception Centre, (2012).

2. Health Protection Agency, (2008). Identification of Salmonella Species. Issue no: 2.1. [Online] Retrieved on 10th August 2011 from: www.hpa-standardmethods.org.uk

3. World Health Organisation, (2004). Waterborne zoonoses: identification, causes, and control. Cornwall: IWA publishing

4. Di Lappe, N., (2009). Salmonella Taxonomy, Dept. of Medical Microbiology, Division of Clinical Microbiology, Galway University Hospitals. [Online] Retrieved on 10th August 2011 from: www.nuigalway.ie/research/salmonella_lab/downloads/salmonella_taxonomy.pdf

5. Di Bella, S., Capone, A., Bordi, E., Johnson, E., Musso, M., Topino, S., Noto, P., and Petrosillo, N. (2011) Salmonella enterica ssp. arizonae infection in a 43-year-old Italian man with hypoglobulinemia: a case report and review of the literature. Journal of Medical Case Reports 5 (323).

Appendices

1. Table 1; Complete results of salmonella testing 2010-2011

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Table 1; Complete results of salmonella testing 2010-2011

Ref	Species	Origin	Status	Result	Serotype
1	Varanus albigularis	Tanzania		+	S. Albany sub genus 1 (Serogroup:C£)
2	Varanus niloticus	Ghana		+	3,15,34,:-:-NM subgenus 1 (serogroup: E1)
3	Geochelone sulcata	Ghana		+	S. Nottingham, subgenus 1 (serogroup: 1)
4	Stigmochelys pardalis	Zambia		-	
5	Python regius	Ghana		+	S. Lome, subgenus 1 (serogroup:D1)
6	Stigmochelys pardalis	Zambia		-	
7	Uroplatus sp.	Canada	cb	+	
8	Dendrobates auratus	Prague	cb	-	
9	Pogona vitticeps	Prague	cb	+	S. cholerasuis spp. Azizone
10	Epicrates cenchria	Prague	cb	-	
11	Trachycephalus resinifictrix	Prague	cb	-	
12	Hyperolius sp.	USA	cb	-	
13	Python regius	Ghana		+	S. schwarzengrund sub genus 1 serotype B
14	Rana madagascariensis	Egypt		-	
15	Boa constrictor	UK	cb	-	
16	Testudo horsfieldii	Uzbekistan		-	
17	Geochelone elegans	USA	cb	-	
18	Boa constrictor	UK	cb	+	S. senftenberg subgenus 1 serotype E4
19	Testudo horsfieldii	Uzbekistan		+	serotype 4,12:-:1,6 subgenus II Group B
20	Testudo hermanni	Turkey		-	
21	Polypedates otilophus	Indonesia		+	S. saintpaul sub genus 1 serogroup B
22	Varanus doreanus	Indonesia		-	
23	Testudo horsfieldii	Uzbekistan		+	4, 12:-:1,6 sub genus II serogroup B