

# ASSESSING LEAD LEVELS AS A POTENTIAL THREAT TO NAMIBIAN VULTURES



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# Objectives of the study

The aim of the current study was to evaluate the levels of lead in African White-backed Vultures (WBV; *Gyps africanus*) and Lappet-faced Vultures (LFV; *Torgos tracheliotos*) across different sites in Namibia using blood, bone and feather samples.

## **Specific Objectives are:**

1. To determine whether the blood, bone and feather lead levels are below or beyond the recognized threshold levels.
2. To determine and compare lead levels between male and female LFV chicks.
3. To determine and compare lead levels between male and female WBV adults.
4. To determine and compare lead levels between the rachis and barb of the same feathers.

# Results

## Sample size

### **Blood samples** (recent lead exposure)

- 49 blood samples were collected, 31 were WBV (5 chicks and 26 adults) and 18 were LFV (17 chicks and 1 adult).

### **Bone samples** (lead exposure over the total lifetime)

- 5 bone samples were collected (4 LFV and 1 WBV).

### **Feather samples** (lead exposure during the period of feather growth)

- 44 feather samples were collected

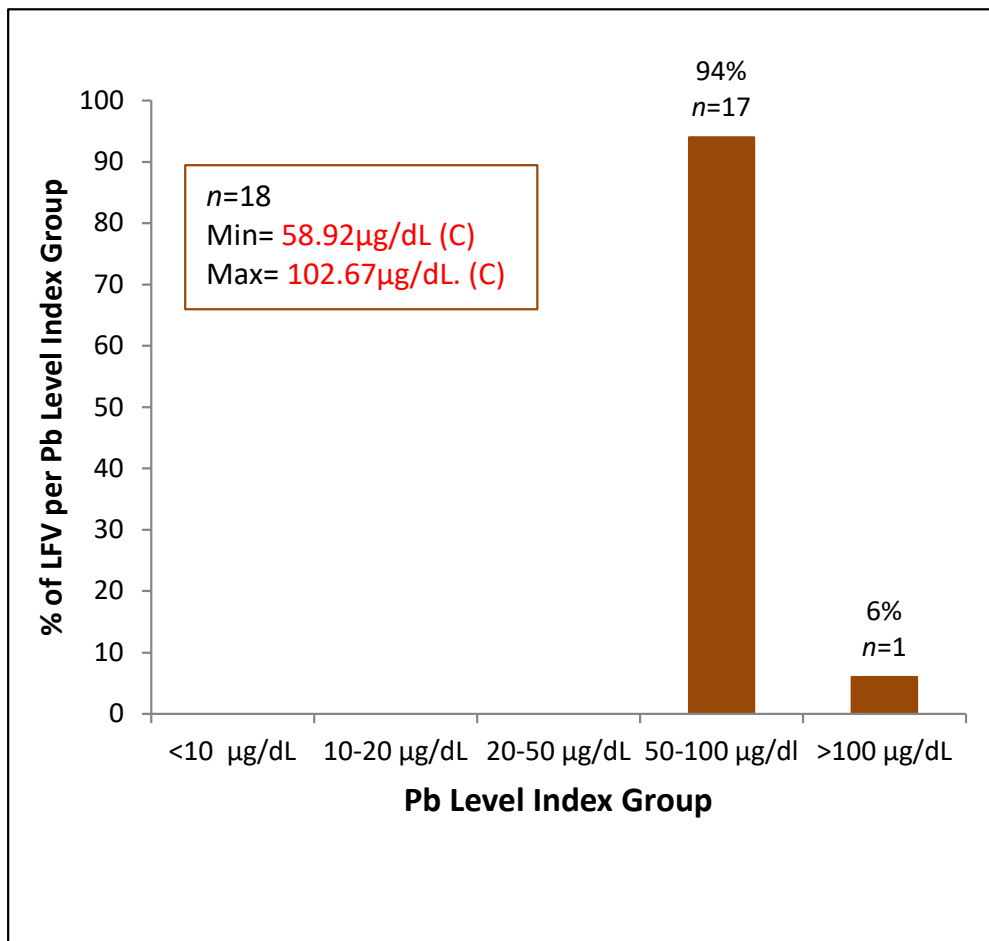
# Pb Level Index Group (threshold levels)

**Table1.** Interpretation of Pb levels in blood, bones and feathers, adapted from Franson and Pain (2011).

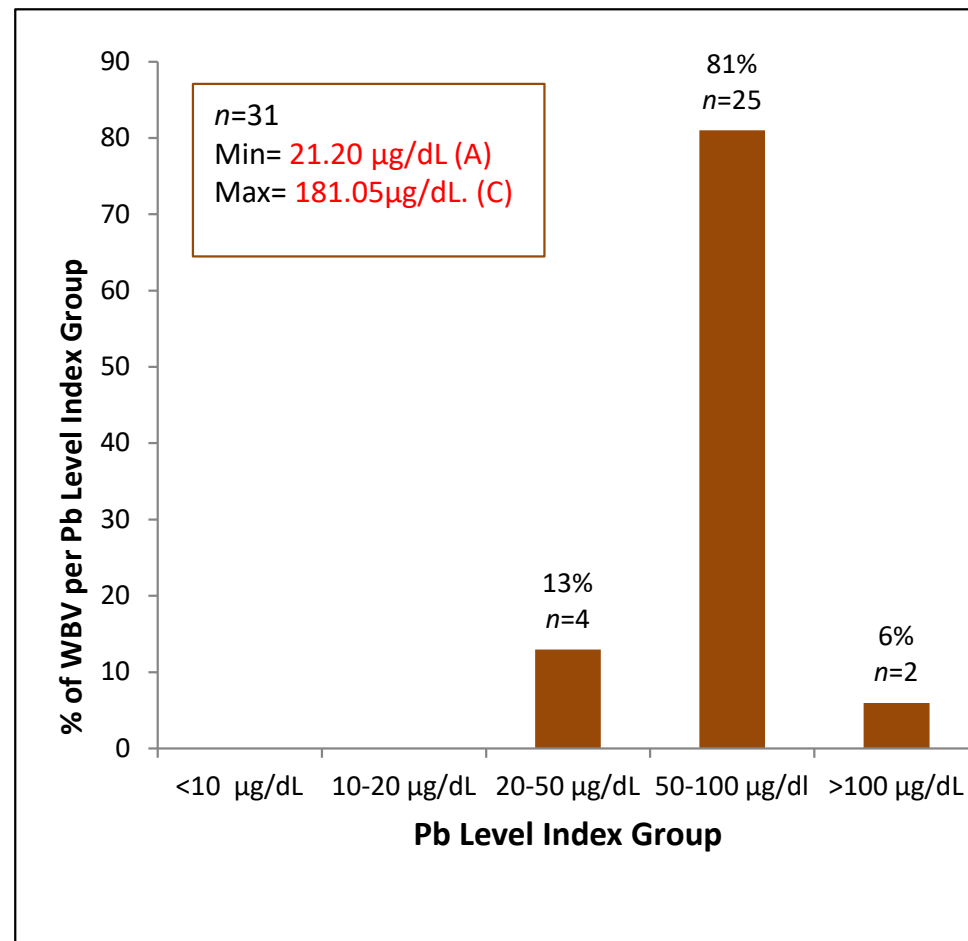
Type of tissue	Range	Interpretation
Blood ( $\mu\text{g}/\text{dL}$ )	<10	Background
	10-20	Mild to moderate subclinical effects
	20-50	Significant subclinical effects
	50-100	Clinical Poisoning
	>100	Severe clinical poisoning
Bone ( $\mu\text{g}/\text{g}$ )	<10	Background
	10-20	Subclinical to clinical poisoning
	>20	Severe clinical poisoning
Feather ( $\mu\text{g}/\text{g}$ )	>4	Threshold levels in wild birds

# Blood lead levels in LFV and WBV

A

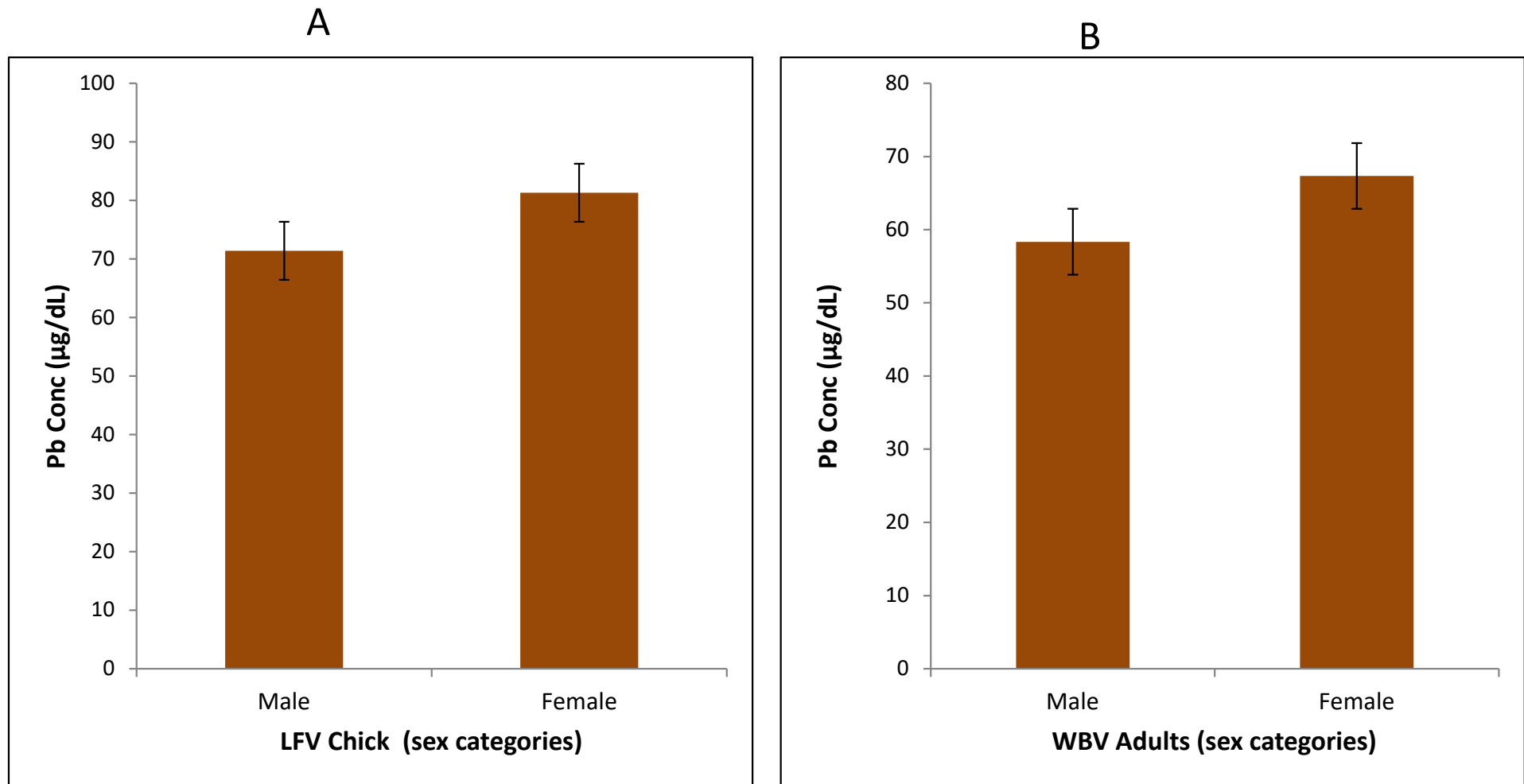


B



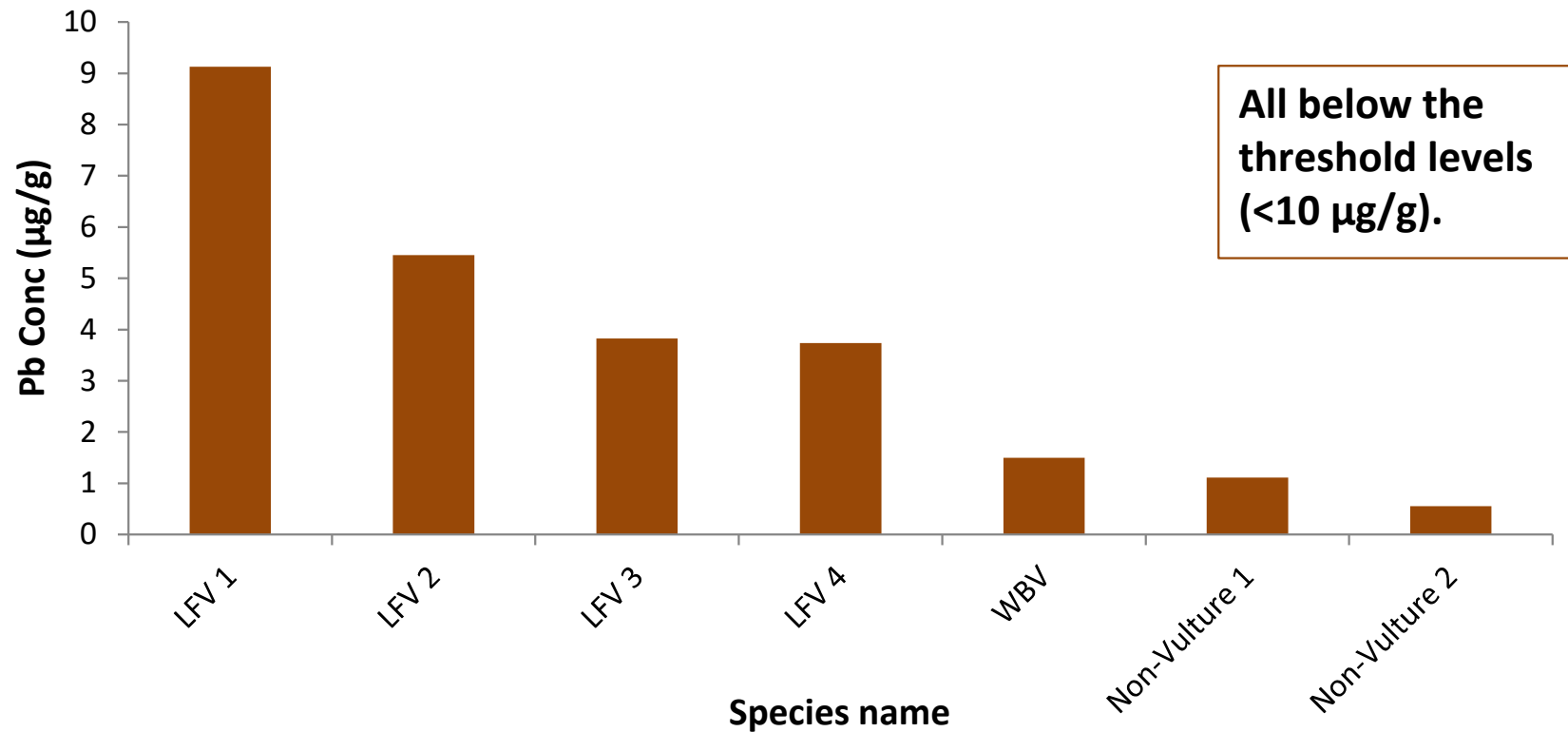
**Fig.1.** Percentage of LFV (A) and WBV (B) within each blood Pb level index group.

# Blood lead levels in different age class and sex categories



**Fig.2.** Blood Pb levels in LFV chicks (A) and WBV adults (B), with no significant difference.

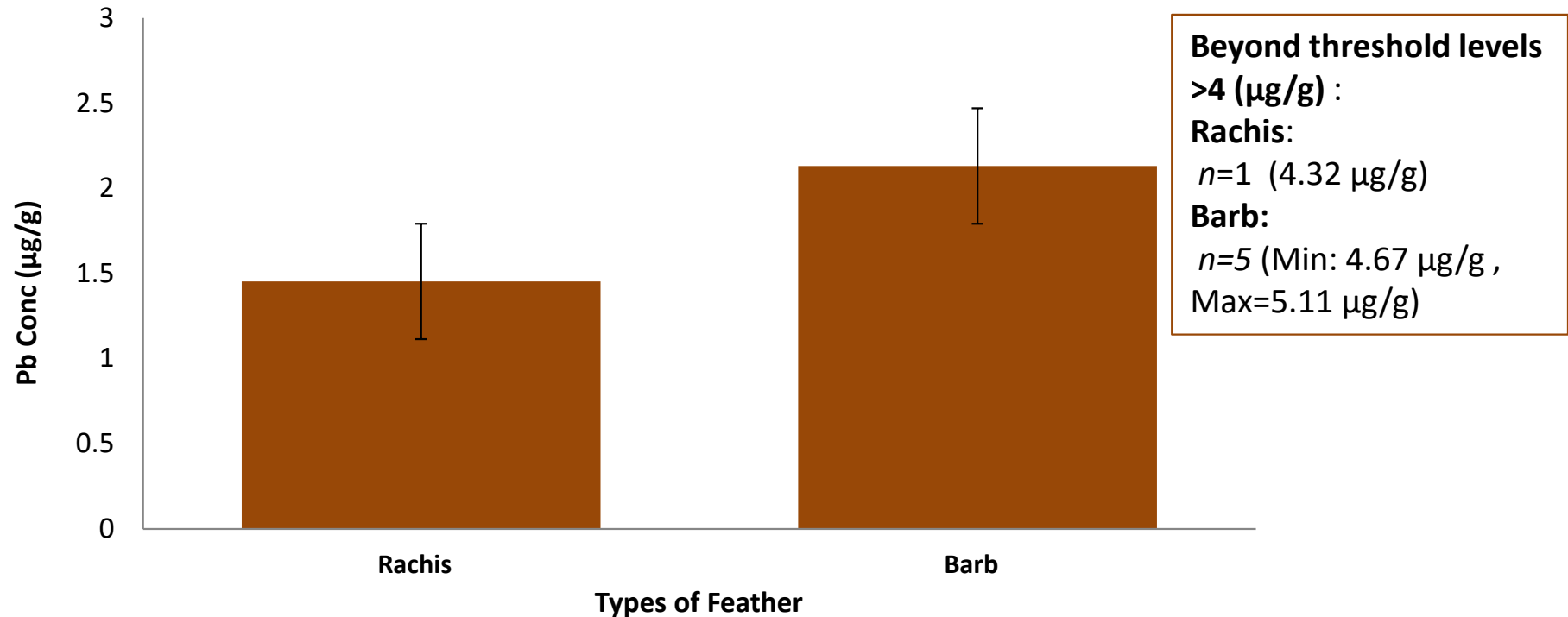
# Bones Pb levels



**Fig.3.** Bone Pb concentration (µg/g) of LFV, WBV and Non-vulture species in Namibia.

Statistical analysis was not carried out-sample size too small.

# Lead levels in Feathers



**Fig. 4.** Pb Concentration (µg/g) in the rachis and barbs of feathers in Namibian vultures, with significant difference ( $mean=-0.249\pm0.362$ ;  $t_{43}=-4.566$ ;  $n=44$ ;  $p=0.00$ ).

•The barb mean Pb levels ( $2.113\pm1.210$ ) is greater than the rachis mean Pb levels ( $1.371\pm0.519$ ).



# Conclusion

- The results from blood samples indicate alarming lead exposure of Namibian vultures. All blood samples are beyond the threshold levels.
- The high blood lead levels could result in clinical poisoning (which can cause anemia, leg paralysis, wing droop and decrease reproductive success) and could contribute to the decline in the population of Namibian vultures.
- It is recognized that the source of elevated lead levels is likely from ingestion of lead from metallic lead fragments from lead ammunitions embedded in hunted carcasses.
- All bone sample are below the threshold levels. However, the sample size is too small to come up with a statistical conclusion.
- The barb feathers has the greatest Pb mean levels as compared to the rachis which is likely to be associated with external contamination.

# Recommendations

- Further studies are recommended to determine the sources of lead exposure in Namibian vultures for example using Isotope analysis.
- Further studies must also be carried out on non-scavenging birds to compare their lead levels to scavenging vultures.
- Further studies are also recommended for the study to be carried out over a longer period of time and to collect data during hunting and non-hunting seasons.
- For lead analysis or other environmental pollutant studies using feathers, the rachis is recommended as it is less prone to accumulating surface contamination as compared to the barb.

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