

DIFFERENCE BETWEEN BLOOD LEAD LEVEL DETECTION TECHNIQUES: ANALYSIS WITHIN AND AMONG THREE TECHNIQUES AND FOUR AVIAN SPECIES

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EXTENDED ABSTRACT.—It can often be difficult to compare and interpret results among studies measuring lead levels in varying tissues because of different tissue uptake rates. Further, it can be difficult to directly compare data among studies that sample the same tissue if different methods are used to determine lead levels (e.g., graphite furnace atomic absorption vs. inductively coupled mass spectrometry) without adjusting for discrepancies between techniques. Several recent studies have utilized a relatively new technology (ESA LeadCare® portable field tester) to assess blood lead levels in birds (e.g., Parish et al. 2007, Craighead and Bedrosian 2008). For human blood samples, Pineau et al. (2002) found the LeadCare® system (LCS) tended to underestimate blood lead levels when compared with graphite furnace atomic absorption spectrometry (GFAAS), and others have called into question the validity of this technique (Bossarte et al. 2007). Similarly, Parish et al. (2007) found that the LCS underestimated blood lead levels of California Condors (*Gymnogyps californianus*) when compared with laboratory techniques.

We investigated potential discrepancies of blood lead level detection techniques among four avian species and three techniques. We sampled blood from California Condors, Common Ravens (*Corvus corax*), Bald Eagles (*Haliaeetus leucocephalus*), and Golden Eagles (*Aquila chrysaetos*) and compared inductively coupled plasma mass spectrometry (ICPMS), graphite furnace atomic absorption spectrometry, and the LCS. In general, we found that ICPMS and GFAAS are directly comparable for all four species, but ESA LeadCare® systematically underestimates the blood lead levels of all species, as compared to ICPMS and GFAAS. Further, we found that the differences between techniques may vary among species. We conclude that while the LCS may underestimate the lead levels of individuals, it is a useful technique to gather data inexpensively and rapidly if a species-specific technique differential can be determined. If precise data are required, or to adequately compare LCS results to GFAAS and/or ICPMS, then a species-specific calibration between techniques must be designed by analyzing a sub-set of samples with different techniques. *Received 5 September 2008, accepted 22 October 2008.*

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