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# PREDATOR AND NONTARGET HAZARDS TO GALLINACEOUS BIRDS IN A SIMULATED FIELD STUDY USING ZINC PHOSPHIDE TO CONTROL VOLES

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**Abstract:** An investigation was conducted by the Denver Wildlife Research Center (DWRC) at Oregon State University's (OSU) Hyslop Farm to determine the potential nontarget hazards to ring-necked pheasants (Phasianus colchicus) and California quail (Callipepla californica) when using a 2.0% zinc phosphide treated grain bait for control of gray-tailed voles (Microtus canicaudus). The simulated field study was undertaken in 12 enclosures, 0.2-ha (0.5-ac) each, separated by 1m metal walls, and planted in alfalfa (Medicago sativa). The research was performed in cooperation with staff from OSU's Department of Fisheries and Wildlife and was sponsored by the California Department of Food and Agriculture (CDFA). Voles were introduced and established within each enclosure (23 or 24) prior to baiting. Similarly, pen raised pheasants (52) and quail (51) were randomly distributed within weight classes to either pheasant or quail enclosures, with 8 or 9 birds per enclosure. All birds were wing-clipped and provided water and game bird flight conditioner as an alternative food. Following an acclimation and pre-baiting period of 7 days, 0.0% $Zn_3P_2$ (control) or 2.0% $Zn_3P_2$ bait was randomly applied on September 30, 1993 to 6 enclosures assigned to each bird species (e.g. 3 enclosures were baited with 0.0% $Zn_3P_2$ and 3 with 2.0% $Zn_3P_2$). Because the enclosures were not covered, predation and escape losses were anticipated, 4 birds in each enclosure were equipped for radiotelemetry. Their locations and movements were monitored twice daily, morning and late afternoon. Also, 146 h of mammalian and avian predator observations were recorded during daylight hours. Overall mortality associated with predators (6%), accidents and sickness (4%), and escapes (3%) was not significantly different between quail and pheasants, bait groups, or presence/absence of radiocollars. Six birds were killed by nocturnal avian predators, and 8 birds (8/103) were missing at the completion of the study. Nontarget mortality related to $Zn_3P_2$ was associated with 62% (16/26) of the baited pheasants and none (0/26) of the baited quail. In addition, 2 pheasants died after they escaped from control baited enclosures into ones baited with $Zn_3P_2$. A necropsy was performed on each bird, and results confirmed all $Zn_3P_2$ suspected deaths. The occurrence of all but one $Zn_3P_2$ pheasant death (17/18) within 24 h of exposure was highly significant ($p < 0.00001$) versus mortality observed pre-baiting and $>$ 1 day post-baiting. Postulated attributes of the efficacious bait ($>$ 94% mortality for voles) that may have decreased nontarget exposure and environmental risks (particularly to quail) were grain, color, and carrier deterioration characteristics. These findings suggested the need to further assess the $Zn_3P_2$ hazard to wild, free-ranging pheasants following a typical vole control program in alfalfa, and this study is underway.