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## EFFECTIVE VOLE CONTROL WITH ZP RODENT BAIT AG

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Since the loss of DDT, Vacor (DPL 787) and other acute rodenticides and the serious use restrictions placed upon strychnine and 1080 for field use, it has become quite apparent that control of field rodents, more particular pine and meadow voles, with standard anticoagulants has become a difficult task, and in some instances impossible.

Bell Laboratories, Inc. has chosen to take a very serious look at many of the older compounds and rework and reformulate these compounds into palatable and efficacious finished baits. After 5 years of research and development, Bell Laboratories, Inc. has recently registered, with the Environmental Protection Agency, a new acute single dose bait formulation containing 2% zinc phosphide, namely ZP Rodent Bait AG.

ZP Rodent Bait AG is registered for control of ground squirrels in noncrop areas, prairie dogs in rangeland, rats in sugar cane and meadow and pine voles in apple orchards and noncrop areas.

Prior to the EPA registration of Bell Laboratories' ZP products (tracking powder, commensal rodent bait and ag bait) it was generally believed and accepted that the active ingredient, zinc phosphide, reacted with the moisture in the atmosphere to release phosphine gas. Based upon field and laboratory studies, it has been determined that zinc phosphide is an extremely stable compound and degradation occurs only when the compound comes in direct contact with dilute acids or by the mechanical factors of weathering (wind and rain) where the compound is physically removed from the base material.

Further, zinc phosphide reacts with stomach acids to yield phosphine gas and naturally occurring zinc salts. Phosphine gas is not stored in muscle or tissue of poisoned animals, so there is no true secondary poisoning with this rodenticide. In studies conducted by the U.S. Fish and Wildlife Service, where zinc phosphide poisoned nutria were ground and fed to golden eagles, bald eagles, vultures, kit fox, coyotes and mink, the test animals demonstrated no adverse effects, however a few of the test animals regurgitated the ground nutria which was due to the natural emetic action of zinc phosphide.

Zinc phosphide has always been considered to be an extremely toxic compound. The acute oral LD<sub>50</sub> for 94% technical zinc phosphide is 27 mg/Kg. The acute oral LD<sub>50</sub> of ZP Rodent Bait AG (2% zinc phosphide) is approximately 1350 mg/Kg. and is rated a Category III pesticide by the EPA, however, due to the broad use pattern of the product, ZP Rodent Bait AG is a restricted use pesticide.

Technical zinc phosphide shows very slight toxicity by means of dermal exposure (LD<sub>50</sub> 2000-5000 mg/Kg.) However, once zinc phosphide is formulated into a 2% finished bait the dermal hazards are even further reduced.

Acute Inhalation LC<sub>50</sub> study was performed on a product (in dust form) at 5 times the concentration of a dry bait (2% ZP Rodent Bait AG) and found to be nontoxic at a rate of 19.6 mg/liter of air.

Zinc Phosphide is not considered to be an acute eye irritant nor is it considered to be a primary skin irritant.

Based upon the mode of action, low secondary hazards, and toxicity data: zinc phosphide can be generally regarded as being a relatively safe compound when used according to label directions.

The secret behind manufacturing quality rodenticides is the base materials used. With a chronic rodenticide the bait must be palatable so that the rodent returns for repetitive feedings. The same principle holds true in dealing with acute poisons where ideally the target rodent will ingest a lethal dose in just one feeding. Bell Laboratories, Inc. has approached and solved the palatability problem by using a scientific blend of food grade cereals. In using food grade inerts, two primary obstacles have been overcome: 1. The product is extremely palatable so that it can be competitive against naturally occurring foods and 2. The product is much more stable.

Into these food grade cereals is blended a 2% concentration of zinc phosphide using special binding agents to adhere the active to the base materials. Prior to the registration of ZP Rodent Bait AG all other zinc phosphide formulations were either coated on oat groats, cracked corn or other feed grade inerts, in doing so, the product was perhaps economical to produce, but was not attractive to the rodent.

ZP Rodent Bait AG is currently registered for control of pine and meadow mice (voles, Microtus, spp.) in apple orchards. Hand baiting, trailbuilder and broadcast baiting directions have been incorporated into the label directions.

In preliminary studies conducted by Winchester Fruit Research Laboratory in both the field and laboratory, ZP Rodent Bait AG has demonstrated to be a very effective control measure for pine and meadow vole control reducing field populations a minimum of 94%.