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NEW DEVELOPMENTS IN RODENTICIDES

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Rodenticides have become the "standard" for rodent control, and anticoagulants have been the quid pro quo. For three decades warfarin (and other dicoumarols) and then the indandiones have been the control element for commensal rodents. However, excessive and indiscriminant uses have selected for resistant populations of Norway rats, roof rats, and house mice in many parts of the U.S. (Jackson and **Ashton**, 1979). Though resistance is often referenced to warfarin, it is a cross-resistance to all of the currently available, "first-generation" **anticoagulants**.

The first of the "second-generation" anticoagulants has just been **labelled** by EPA for commercial use. Talon, an ICI-U.S. product, is a dicoumarin but is effective against anticoagulant-resistant rats and mice (Kaukeinen, 1979). Another feature distinguishes it: a single dose is lethal. But death is delayed until the third or fourth day; and the animal continues to feed during the interval. Another very similar compound, **Maki**, now under experimental use permit (EUP), will be introduced commercially by the Chempar Co., hopefully in 1980.

These new compounds do not produce bait shyness; indeed, consumption is enhanced. Because bait consumption continues, sufficient bait placement must be made for both dominant and subordinate animals. However, baiting could be done at intervals, since continuous feeding for several days is not required, as with the "first-generation" compounds.

Talon is registered for indoor, non-agricultural uses only at this time. Expedited registrations will be sought as quickly as possible.

Experimental program? in orchards and tree crops as well as on farms indicate that it is a highly effective general rodenticide in all these environments. Further information on hazards to non-target species, especially birds, is being sought vigorously. Vitamin K is a specific antidote.

A totally new compound is under development by the Eli Lilly Co. (Dreikorn, et al., 1979). Currently known only under the code name EL-614, it is expected to be field tested under an EUP in 1980. Chemically, it is a diphenyl-amine and thus not an anticoagulant. The compound is characterized by being a single-dose **toxicant** with enhanced bait consumption and delayed death (3-4 days). Unlike with other **materials**, feeding stops after the ingestion of a lethal dose on the first day of feeding.

Acute (single dose) rodenticides remain important tools. Compounds 1080 and 1081, though currently under **RPAR**, may be retained for **PCO** use, though such uses certainly will be highly restricted. Zinc phosphide, long an established tool, has been refitted recently into new **bait** formulations and tracking powder, and we're likely to hear more of this old compound. Red **Squill**, frequently unavailable now, may be supplemented by a synthetic variant (Scillirosid) at some future time.

Vacor, the newest of the acute rodenticides, was totally withdrawn from **the** market earlier this year by the Rohm and **Haas** Co. Its manufacture and sale is not likely to be reinstated.

Calcium cyanide (A-dust) for burrow fumigation is no longer manufactured for the domestic market by American Cyanamid because of high potential risks and low economic return. Efforts to transfer manufacture and distribution to another company have not been totally successful to date.

are forbidden, their popularity is increasing.

Ultrasonics represent **still** another tool that may be employed in an integrated management program. Generation of sufficient high-frequency sound pressure at the floor (mouse) level is essential. Critical areas (food packing **and** preparation **areas, pet** foot storage, loading docks) may be protected by directional installations. Shadow areas can be sites for traps and bait stations. Certainly ultrasonics cannot be regarded as the "magic black box" on the wall that simply solves all rodent infestation problems.

Electra-magnetic units of various manufacturers (certainly not to be confused with ultrasonics) have been determined to be **non-
efficacious** by EPA. Their withdrawal from the market has been ordered by EPA and largely effected (Smith, 1979).

Pest Rodent Management aims to take the population forces (natality, mortality, migrality) and manipulate environmental factors, inter- and intra-specific competition so that population reduction is achieved. Sanitation, whether it involves best maintenance of stored foods in a warehouse or utilization of closed garbage cans in backyards, is essential. Its effectiveness can be enhanced by appropriate use of traps and rodenticides, but sole reliance on these methods of **man-made** predation results in little more than rat-farming. The integration of all pest management tools, including people forces, is necessary if permanent reductions in these pest populations are to be achieved through reduced environmental carrying capacity.

Summary of presentation at Great Plains Wildlife Damage Control Workshop,
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