

Piperazine Compounds Successfully Used as Worm-Destroying Agents

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Because of our inadequate knowledge of the pharmacology of compounds that are successful in removing worms from man and other animals, we usually resort to screening methods to test the anthelmintic — worm-destroying — efficiency of new drugs. These methods are, at best, “shots in the dark” with very few successful compounds being discovered. Frequently, chemical compounds with promising characteristics will sit on the shelf for many years, either to be “discovered” by chance or, more frequently, to be forgotten.

Fortunately, some of these compounds are “discovered” and their application to new uses and the replacement of old methods does much to increase the income of livestock raisers by the production of healthier animals. The piperazine compounds are among the more recent to be rediscovered and placed in widespread use.

“Hetrazan” or 1-diethyl — 4-methylpiperazine hydrochloride has been successfully used for controlling infections with filarial worms in man, dogs and rats. It is also effective against ascarids in dogs. Various piperazine compounds, especially the citrate, have been used for controlling ascarids in man. Piperazine adipate is an effective anthelmintic in controlling the small strongyles and ascarids of horses. It may prove to be quite effective in other animals.

To date the best results with the piperazine compounds have been with poultry. Experimental data gathered by the authors in trials at this station and in field trials show that piperazine citrate is highly effective in removing the large round worm, *Ascaridia galli*, from chickens. It is also the easiest wormer to use. Medication consists of simply adding the palatable, highly soluble compound to the drinking water. This compound is effective in dosages of 4,000 milligrams in one gallon of water. By effective, we mean that over 90 per cent of the worms are removed. At 2,000 milligrams and 1,000 milligrams per gallon of water, it is less effective, removing anywhere from 40 to 90 per cent of the worms.

However, when used as a preventative constantly in the drinking water, concentrations of 2,000 and 1,000 milligrams per gallon of drinking water effectively prevented large roundworm infections even though the infective, viable eggs of this worm were introduced into the birds.

Most anthelmintics are highly toxic and extreme care must be exercised in their dispensing and use. Piperazine citrate can be

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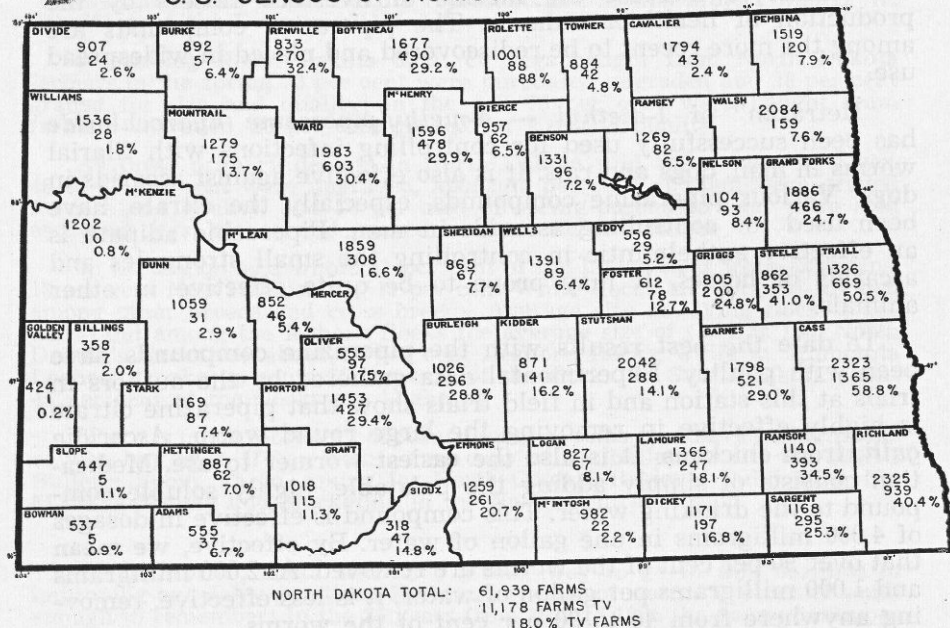
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administered in doses exceeding 20 times those recommended without toxic effects. It is, therefore, one of the few safe anthelmintics. No disturbance in feed or water consumption has been noted. No loss of egg production due to the drug has been recorded. The loss of worms from the chickens, of course, is to their and the poultryman's advantage. Greater and more efficient weight gains, higher egg production and a generally healthier flock result.

Field trials show that the drug is effective for the removal of large roundworms in turkeys. Preliminary studies indicate that it may also be efficient in removing large roundworms from swine. Before recommendations for its use in the latter animal are made, however, more extensive trials must be made.

FARMS WITH TELEVISION SETS, OCT.-NOV. 1954 U. S. CENSUS OF AGRICULTURE



Source: U. S. Census figures as compiled by Broadcasting-Telecasting Magazine. In North Dakota there are currently four television stations in operation, and figures in the above map should be scanned with a knowledge of when and where these stations went on the air. The stations: KCJB-TV, Minot, on the air in April, 1953; WDAY-TV, Fargo, on the air in June, 1953; KFVY-TV, Bismarck, on the air in December, 1953, and KXJB-TV, Valley City, went on the air in July, 1954.