Pesticides and the soil fauna

By

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Contents

I. Introduction ........................................... 2
   a) Historical ........................................... 2
   b) Types of pesticide involved ......................... 3
   c) Persistence of pesticides .......................... 3
   d) Adequate experimentation .......................... 4
   e) Methods ............................................. 4
   f) Scope of the review .................................. 5

II. Effects of pesticides on numbers of animals in soil ............... 6
   a) Nematoda ............................................ 7
   b) Acarina .............................................. 8
      1. Organochlorine insecticides ....................... 9
      2. Organophosphorus insecticides ................... 15
      3. Carbamate insecticides ............................ 17
      4. Molluscicides ..................................... 17
      5. Fumigants ......................................... 17
      6. Nematicides ....................................... 17
      7. Herbicides ....................................... 17
      8. Fungicides ....................................... 18
   c) Collembola .......................................... 18
      1. Organochlorine insecticides ....................... 18
      2. Organophosphorus and carbamate insecticides ... 20
      3. Other pesticides .................................. 20
   d) Myriapoda ........................................... 21
   e) Earthworms ......................................... 25
   f) Mollusca ............................................ 32
   g) Insecta ............................................. 33

III. Uptake of pesticides into soil animals ............................ 38
   a) Earthworms ......................................... 38
   b) Molluscs ........................................... 43
   c) Insects and larvae ................................ 44

IV. Other effects on soil animals .................................... 45
   a) Resistance ........................................... 45

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I. Introduction

a) Historical

The widespread use of insecticides1 and herbicides has greatly benefited agriculture, but has also led to many problems. One of the more important of these is that they may affect animals against which the chemicals are not directed, and which may be beneficial. Invertebrates that live in soil can be killed not only by chemicals applied directly to the soil, but also by those that reach the soil in drift from aerial sprays or are washed off foliage. The importance of the activities of some invertebrates such as Enchytraeidae, Pauropoda, and Protura in soil fertility is still not fully understood, but it is known that some soil animals are essential in the breakdown of some kinds of dead leaf material into its organic and inorganic constituents and in the incorporation of these materials into the soil structure (Stockli 1950, Mellanby 1960, Raw 1961). Earthworm feeding is very important in the breakdown of deciduous tree litter (Edwards and Heath 1963), and the same workers showed that enchytraeid worms, Collembola, some Acarina, and dipterous larvae all helped to disintegrate plant material and that many microorganisms were unable to attack intact plant tissues. Hence, any chemical which changes the numbers of saprophagous invertebrates in soil may ultimately influence its fertility, although it seems likely that pesticides are a greater potential hazard in forest and woodland soils than in arable ones. Raw and Lofty (1960) showed that when earthworms and other invertebrates were killed in orchards by copper fungicides, the soil structure was affected where those chemicals were

1 See Table XI for chemical designations of pesticides mentioned in text.