

Preface to the 19th Edition of *The Pesticide Manual*

This newly-revised edition includes information on 34 new active ingredients, 30 of which have recently received an ISO common name or WHO-INN. Thus, *The Pesticide Manual* now includes data on 839 active ingredients.

Improvements in this Edition

A particular effort has been made in this edition to find and fill as many physical chemical property data gaps as possible and to include all available data on newly registered and approved pesticides. As with every field in *The Pesticide Manual*, data are only included if they are either (a) provided by the company which either develops the pesticide or currently maintains the regulatory package, (b) published by a regulatory body (e.g. EFSA, EPA, APVMA), or (c) published in a peer-reviewed journal or book. We caution users to be wary of data on pesticides found solely on the internet. We find that many of these data are incorrect: often the data are actually for a derivative of a pesticide (e.g. an ester instead of the acid) or are calculated and not measured.

A continuing goal of *The Pesticide Manual* is to present data in formats which allow for simple comparisons between active ingredients. In this edition we have divided “Stability” into three sections – Hydrolytic Stability, Aqueous Photolytic Stability and Thermal Stability. While these fields are currently located in the Physical Chemistry section, ultimately it is our intent to include these as a part of an entirely revamped and updated Environmental Fate section.

We have also revised the Analysis section so that methods reported for analysis of Products (the active ingredient or a formulation) and Residues are separated for clarity. In addition, this edition now includes the Collaborative International Pesticides Analytical Council (CIPAC) code, where available. There continue to be major advances in techniques and methodologies used for analysis of pesticides and, particularly, their residues in the environment. Consequently, many of the analytical methods described in the literature or included in *The Pesticide Manual* are now or may well become obsolete. Persons interested in analysis of a particular pesticide or residue are *strongly* encouraged to contact the company which currently holds the regulatory package for advice as to the method most appropriate for a particular analytical problem.

The Herbicide Resistance Action Committee (HRAC) has updated their resistance classification system to use number instead of letter mode of action codes and aligned these with the codes used by the Weed Science Society of America (WSSA). The new coding system is indicated in *The Pesticide Manual* as “HRAC/WSSA”. The older HRAC coding system, based on letters, is still relevant to the community and is listed in *The Pesticide Manual* as “HRAC Legacy.” Similarly, for fungicides, *The Pesticide Manual* now includes only the numerical Fungicide Resistance Action Committee (FRAC) class code and not the associated mode of action code.

Users of *The Online Pesticide Manual* will still find structural codes/identifiers, in the form of InChI, InChI Key and SMILES, for all active ingredients and associated esters, isomers and salts. These identifiers can be used with drawing software to generate chemical structures for personal use. The InChI Key can be used directly within a search engine for an internet search for the chemical substance. The searching capabilities of the online version also provide for facile retrieval of data on individual compounds or groups of pesticides. Further, *The Online Pesticide Manual* includes direct links to company websites, online databases and other useful references and resources as well as full details on the 791 pesticides currently classified as Supplementary.

Related information from BCPC

The British Crop Production Council (BCPC) has recently assumed responsibility for the popular online *Compendium of Pesticide Common Names*, developed and edited for many years by Alan Wood. The *Compendium* provides basic information (nomenclature, structure, uses, structural codes/identifiers) on over 2000 pesticides and serves as a companion to *The Pesticide Manual* and *The Online Pesticide Manual* with their vast collections of additional datatypes. The BCPC plans to continue to provide the *Compendium* as a free, online resource for the scientific community.

Emerging Trends

Two disturbing trends have emerged from a review of the past few editions of *The Pesticide Manual*. First, while the 30 new pesticides included in this edition compares favourably with the 32 in the 18th edition (2018) it represents a significant decline from the 40 new actives reported in the 2015 edition and the 45 in 2012. Second, there has been a substantial decrease in the number of EU “Approved” pesticides. The 18th edition recorded 324 EU Approved pesticides yet, in this edition, that number has fallen to only 277 – a 15% decrease in only three years. Notably, in the past three years 53 pesticides have been recategorized by the EU from Approved to Not Approved yet only 8 active ingredients have been newly Approved. (See the report “Recent trends in the EU status of pesticides” at bcpc.org for further analysis on this trend.)

Together, these data suggest a worrying, potential decline of innovation in pesticide discovery. There are likely many reasons for this including (a) industry consolidation, (b) increasing costs associated with discovery and development and maintenance of products which meet both performance needs as well as the requisite levels of human and environmental safety, and (c) external pressures generated by consumer and regulatory concerns. But, at least in Europe, the decrease in the number of pesticides available to the farmer seems directly tied to the EC pressures of which the latest is the Farm to Fork Strategy with stated goals of reducing the risk and use of most pest management products by as much as 50%. An optimist might see this as an opportunity to encourage innovation in pest management practices in the form of new highly-effective, safe, and environmentally-friendly products. Instead, the EC’s stated desire is to replace the use of pesticides in current pest management practices with a shift to organic farming and a focus on approval of such alternatives as biologicals and basic substances (e.g., cow’s milk as a fungicide or sodium chloride as a herbicide). Generating less product with more inputs now seems the new definition of “sustainability” in Europe. In spite of this trend, pesticide science must (and will) continue to evolve and contribute in order to meet the world’s ever-increasing demands for safe, environmentally-friendly and effective food production

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I am also grateful to those who, over the years, have contributed information on products on the behalf of their Companies. This reference relies on such generosity to ensure the included data is of the highest standards.

The Pesticide Manual strives for perfection but recognizes real-world limitations. The editor (pm@bcpc.org) welcomes reports of any errors or omissions. Corrections will be made in a timely manner to the online version of *The Pesticide Manual*.

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