Economic entomology

From Wikipedia, the free encyclopedia

Economic entomology is a field of entomology, which involves the study of insects that benefit or harm humans, domestic animals, and crops. Insects that cause losses are termed as pests. Some species can cause indirect damage by spreading diseases and these are termed as vectors. Those that are beneficial include those reared for food such as honey, substances such as lac or pigments and for their role in pollinating crops and controlling pests.

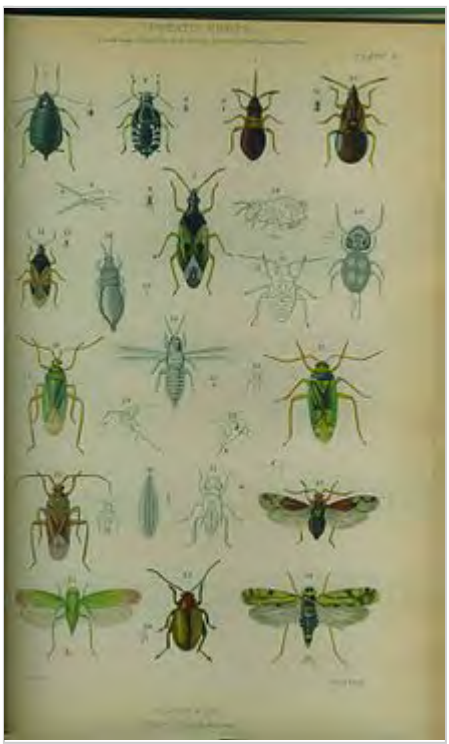
Contents

History

In the 18th century many works were published on agriculture. Many contained accounts of pest insects. In France Claude Sionnest (1749–1820) was a notable figure.

19th Century

The most able exponent of this subject in Great Britain was John Curtis, whose treatise *Farm Insects*, published in 1860, was once the standard British work dealing with the insect pests of corn, roots, grass and stored corn. The



"Insects infesting potato crops": a plate from John Curtis's *Farm Insects*, 1860

most important works dealing with fruit and other pests were by Saunders, Joseph Albert Lintner, Charles Valentine Riley, Mark Vernon Slingerland and others in America and Canada. In Europe the earliest works were by Ernst Ludwig Taschenberg, Sven Lampa (1839 –1914), Enzio Reuter (1867–1951) and Vincenze Kollar. Charles French (1842–1933), Walter Wilson Froggatt (1858–1937) and Henry Tryon (1856–1943) pioneered in Australia. It was not until the last quarter of the 19th century that any real advance was made in the study of economic entomology. Among the early writings, besides the book of Curtis, there was also a publication by Pohl and Kollar, entitled *Insects Injurious to Gardeners, Foresters and Farmers*, published in 1837, and Taschenberg's *Praktische Insecktenkunde*. During the 19th century Italian entomologists made significant progress in controlling diseases of the Silk moth which supported the silk industry, in the control of agricultural pests and in stored product entomology. Significant figures were: Agostino Bassi (1773–1856), Camillo Róndani (1808–1879), Adolfo Targioni Tozzetti (1823–1902), Pietro Stefanelli (1835, 1919), Camillo Acqua (1863–1936) Antonio Berlese (1863–1927), Gustavo Leonardi(1869–1918) and Enrico Verson (1845–1927). In France Etienne Laurent Joseph Hippolyte Boyer de Fonscolombe, Charles Jean-Baptiste Amyot, Émile Blanchard, Valéry Mayet and Claude Charles Goureau were early workers, as was Jean Victoire Audouin, the author of *Histoire des insectes nuisibles à la vigne et particulièrement de la Pyrale*, Philippe Alexandre Jules Künckel d'Herculais and Jean-Étienne Girard. American literature began as far back as 1788, when a report on the Hessian fly was issued by Sir Joseph Banks; in 1817 Thomas Say began his writings; while in 1856 Asa Fitch started his report on *Noxious Insects of New York*. Also in America, Matthew Cooke wrote *Treatise on the Insects Injurious to Fruit and Fruit Trees of the State of California, and*

Remedies Recommended for Their Extermination, published in 1881. The Englishman Frederick Vincent Theobald wrote A textbook of agricultural zoology in 1890. It became a standard text worldwide. Notable foresters were Herman von Nördlinger (1818–1897) and Julius Theodor Christian Ratzeburg (1801–1871)

20th Century

Among the most important reports early in the 20th century were those of Charles Valentine Riley, published by the U.S. Department of Agriculture, extending from 1878 to his death, in which is embodied an enormous amount of valuable material. At his death the work fell to Professor Leland Ossian Howard, in the form of *Bulletin of the U.S. Department of Agriculture*. The chief writings of J. A. Lintner extend from 1882 to 1898, in yearly parts, under the title of *Reports on the Injurious Insects of the State of New York*. Another significant contributor to the entomological literature of the United States was Charles W. Woodworth. The Florida entomologist Wilmon Newell was a pioneer of pest control as was Clarence Preston Gillette. In India Thomas Bainbrigge Fletcher, who succeeded Harold Maxwell-Lefroy and Lionel de Nicéville as the first Imperial Entomologist, wrote *Some South Indian insects and other animals of importance considered especially from an economic point of view*, an influential work in the subcontinent. In France Alfred Balachowsky was a key figure. In the last quarter of the 20th century new techniques were pioneered and new theories developed, for instance Integrated Pest Management by Ray F. Smith.

Harmful insects

Insects considered *pests* of some sort occur among all major living orders with the exception of Ephemeroptera (mayflies), Odonata, Plecoptera (stoneflies), Embioptera (webspinners), Trichoptera (caddisflies), Neuroptera (in the broad sense), and Mecoptera (also, the tiny groups Zoraptera, Grylloblattodea, and Mantophasmatodea). Conversely, of course, essentially all insect orders

primarily have members which are beneficial, in some respects, with the exception of Phthiraptera (lice), Siphonaptera (fleas), and Strepsiptera, the three orders whose members are exclusively parasitic.

Insects are considered as pests for a variety of reasons including their

- direct damage by feeding on crop plants in the field or by infesting stored products
- indirect damage by spreading viral diseases of crop plants (especially by sucking insects such as leafhoppers)
- spreading disease among humans and livestock
- annoyance to humans

Examples

- The Phylloxera plague

- Migratory locust
- Colorado potato beetle
- Boll weevil
- Japanese beetle
- Aphids
- Mosquitoes
- Cockroach
- Western corn rootworm
- Some fly species

The phylloxera, a true gourmet, finds out the best vineyards and attaches itself to the best wines
Cartoon from Punch, 6 September 1890)

See also

In the past entomologists working on pest insects attempted to *eradicate* species. This has rarely worked except in islands or controlled environments and raises ethical issues. Over time the language has changed to terms like

control and *management*. The indiscriminate use of toxic and persistent chemicals and the resurgence of pests in the history of cotton growing in the US has been particularly well studied.

Beneficial insects

Honey is perhaps the most economically valuable product from insects. Apiculture is a commercial enterprise in most parts of the world and many forest tribes have been dependent on honey as a major source of nutrition. Honeybees can also act as pollinators of crop species. Many predators and parasitoid insects are encouraged and augmented in modern agriculture.

Boll Weevil Monument, erected by the citizens of Enterprise, Alabama to honour the pest that ended their dependence on cotton, a poverty crop.

Silk is extracted from both reared caterpillars as well as from the wild (producing wild silk). Sericulture deals with the techniques for efficient silkworm rearing and silk production. Although new fabric materials have substituted silk in many applications, it continues to be the material of choice for surgical sutures.

Lac was once extracted from scale insects but is now replaced by synthetic substitutes. The dye extracted from cochineal insects was similarly replaced by technological advances.

The idea of insects as human food, entomophagy, has been proposed as a solution to meet the growing demand for food, but has not gained widespread acceptance.

References

- D. S. Hill (1983). *Agricultural Insect Pests of the Tropics and their Control*. Cambridge University Press
- Metcalf, C. L. and W. P. Flint (1925) Destructive and Useful Insects.

External links

- Homepage of the Applied Entomology Group ETH Zurich (http://www.em.ipw.agrl.ethz.ch/index.php)
- Bibliography of the more important contributions to American economic entomology (Volume 7) (1889-1905) (https://archive.org/details/bibliographyofmo07unitiala) Free book.History.
- Pest Management Glossary (http://www.pestmanagement.co.uk/lib/glossary.shtml)
- History of Pest Control Timeline (http://www.pestmanagement.co.uk/lib/history.shtml)
- North Carolina State University Department of Entomology (http://www.cals.ncsu.edu/entomology/pestlink.html)
- Pest Control Experts (http://www.faculty.ucr.edu/~legneref/bcimage/worker.htm) Publications, portraits.
- Principal Groups of Insect parasites and predators (http://www.faculty.ucr.edu/~legneref/taxonomy/taxnames.htm#explain)
- Urban Entomology (http://www.entomology.ucr.edu/ebeling/) Seminal work by Walter Ebeling
- Bibliography of synanthropic control of synanthropic Diptera (http://www.faculty.ucr.edu/~legneref/biotact/bcdipt.ref.htm)
- Insect and Mite Pests in food (http://www.afpmb.org/pubs/tims/tg27/docs/Insect%20and%20Mite%20Pests%20in%20Food%20Gorham.pdf)U.S.D.A. Goreham 316 pages, illustrated.
- Pests and Diseases Image Library (http://www.padil.gov.au/aboutOverview.aspx)
- Veterinary Parasitology at Sao Paolo University (http://www.icb.usp.br/~marcelcp/)

- Featured Creatures (http://entomology.ifas.ufl.edu/creatures/) at University of Florida / IFAS
- OPIE (http://www.insectes.org/)
- Journal of Economic Entomology (http://www.entsoc.org/pubs/periodicals/jee/index.htm)
- European and Mediterranean Plant Protection Organisation (http://www.eppo.org/) Leads through to species accounts through the Quarantine List [1] (http://www.eppo.org/QUARANTINE/listA1.htm) See also the Alert List [2] (http://www.eppo.org/QUARANTINE/Alert_List/alert_list.htm)
- Insect Vectors of Plant Pathogens (http://www.cals.ncsu.edu/course/ent425/text18/plantvectors.html)
- European Dictionary of Domestic and Utilised Animals (http://www.genres.de/CFDEV/edda/template01.php?page=uselist&use=12)
- Woody Ornamental Pests and Beneficial Arthropods (http://entomology.ifas.ufl.edu/fasulo/woodypest/) at University of Florida / IFAS
- PADIL (http://www.padil.gov.au/browsePestRegions.aspx?menu=p2&group=1&o=1&id=6&paging=No) Extensive image library. Australia but mamy of the species are cosmopolitan.
- FEHD (http://www.fehd.gov.hk/safefood/risk-pest-arthropod_list.html) Very useful Hong Kong website.
- Forest Insect Pest data in Canada since 1990 (http://nfdp.ccfm.org/insects/background_e.php)

Categories: Pest insects | Subfields of entomology | History of zoology

---