

BOOK REVIEW

Mahaffee W.F., Pethybridge S.J., Gent D.H. 2009.
Compendium of Hop Diseases and Pests. APS Press
The American Phytopathological Society. St. Paul,
Minnesota, USA, 93 pp. ISBN 978-0-89054-376-4

As indicated in the "Preface" (p. III) this compendium refers to pests, pathogens and physiological disorders of hop (*Humulus lupulus* L.). This compendium is a practical reference for academic teachers, commercial growers, and others interested in management of hop diseases and pests. To achieve this goal the editors invited 46 specialists from Australia, Czech Republic, Germany, Japan, New Zealand, Poland, Slovenia, United Kingdom and USA who contributed to this book according to their scientific and practical experiences in botanical, agrotechnical, chemical and plant protection areas.

In "Introduction" (p. 1–14) the reader will find voluminous information on uses and botanical characters of the genus *Humulus*, its growth, development and germplasm resources. The section "Hops as a commodity" (p. 4–5) addressing technological advances in storage and extraction of the resins and essential oils and the sections "Hop production" (p. 5–8), "Cone use and chemistry" (p. 8–11) and "Hop cultivars and breeding" (p. 11–14) contain several interesting information for all interested in hop cultivation. Table 7 titled "Country of origin, usage and characteristics of selected hop cultivars and accessions" (p. 12–14) illustrates the hop cultivars with their chemical characteristics and resistance level against powdery mildew, downy mildew and verticillium listed by countries.

Part I. "Infectious/Biotic Diseases" (p. 15–58) contains information on four categories of diseases. In section titled "Diseases caused by Fungi and Oomycetes" (p. 15–38) the following 15 hop diseases are characterized: (1) *Alternaria* Cone Disorder (*Alternaria alternata*) (p. 15), (2) Armillaria Root Rot (*Armillaria* spp.) (p. 16), (3) Ascochyta leaf spot (*Ascochyta humuli*) (p. 16), (4) Black root rot (*Phytophthora citricola*) (p. 16–17), (5) Cone tip blight (*Fusarium* spp. and *Giberella* spp.) (p. 17–18), (6) Downy mildew (*Pseudoperonospora humuli*) (p. 18–22), (7) Fusarium canker (*Fusarium sambucinum*/*Giberella pulicaris*) (p. 24–25), (8) Gray mould (*Botrytis cinerea*/*Botryotinia fuckeliana*) (p. 24–25), (9) Powdery mildew (*Podosphaera macularis*) all characterized according to symptoms caused by various strains, (10) Red crown rot (*Phacidiopycnis* sp.), (11) Septoria leaf spot (*Septoria humuli*) (p. 22); (12) Sclerotinia wilt (*Sclerotinia sclerotiorum*) (p. 32–33), (13) Sooty

mold (*Cladosporium* spp., *Aureobasidium* spp.), (14) Verticillium wilt (*V. albo-atrum*, *V. dahliae*), (15) Fungal diseases and pathogens of minor importance (*Alternaria humuli*, *Cladosporium* sp., *Cercospora cantauriensis*, *Macrosporium* spp., *Phoma exigua*, *Rhicoctonia solani*, *Rosellinia necatrix*). In section titled "Diseases caused by viruses and viroids" (p. 39–52) the following causative agents are characterized: (1) "Apple fruit crinkle" (p. 1), (2) "Apple mosaic" (p. 39–41), (3) "Arabidopsis mosaic" (p. 41–44), (4) "American hop latent virus, Hop latent virus and Hop mosaic virus" (p. 44–46), (5) *Humulus japonicus* latent virus (p. 46–47), (6) "Hop latent viroid" (p. 47–48), (7) "Hop stunt" (p. 48–51), (8) "Viruses of minor importance" (p. 51). In Section titled "Diseases caused by Nematodes" (p. 52–54) a "Cyst nematode – *Heterodera humuli* (p. 96–97) and "Other nematode species associated with hop" (p. 53–54) are presented.

In section titled "Diseases Caused by Bacteria and a Phytoplasma" (p. 54–58) "Crinkle disease", "Crown gall" and "bacterial diseases of minor importance" are discussed.

Part II. "Arthropod Pests" contains characteristic of the following pest species: (1) "California *Prionus* beetle" (p. 59–60); (2) Damson-hop aphid (*Phorodon humuli*) (p. 60–62), (3) Garden symphylan (*Scutigera immaculata*) (p. 62–63), (4) Hop flea beetles (*Psylliodes punctulatus*, *P. attenuatus*, *Chaetocnema concinna*) (p. 63–64), (5) Hop looper (*Hypera humuli*), (6) lepidopterans – *Bertha armyworm*, *Hydraecia micacea*, *Mamestra configurata*, (7) root weevils (*Otiorhynchus* spp.), (8) two-spotted spider mite (*Tetranychus urticae*), (9) wireworms *Agriotes* spp., *Ctenacera* spp. and others. Of interest is to mention that the western spotted cucumber beetle (*Diabrotica undecimpunctata*) – a well known pest of corn (*Zea mays*) is in the USA recognized as pest of hop (*Humulus lupulus*).

In Part III. "Postharvest disorders and diseases" (p. 73–81) nutrient imbalances and abiotic disorders of hop are described and illustrated with several photographs. Of special value are recommendations on proper fertilizing with microelements such as magnesium, molybdenum, boron, calcium, iron, zinc and manganese to secure proper development of hop plants and their resistance to environmental stress.

An excellent description of pests, pathogens and nutrient deficiencies in hop plants are well illustrated with excellent photos. A list of 251 references, voluminous "Glossary" (p. 83–89) of useful technical and scientific terms, 153 excellent photos and detailed "Index" (p. 91–93) all facilitate use of this excellent book on hop diseases and pests which I strongly recommend to all agricultural libraries and to attention of plant protection specialists.

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