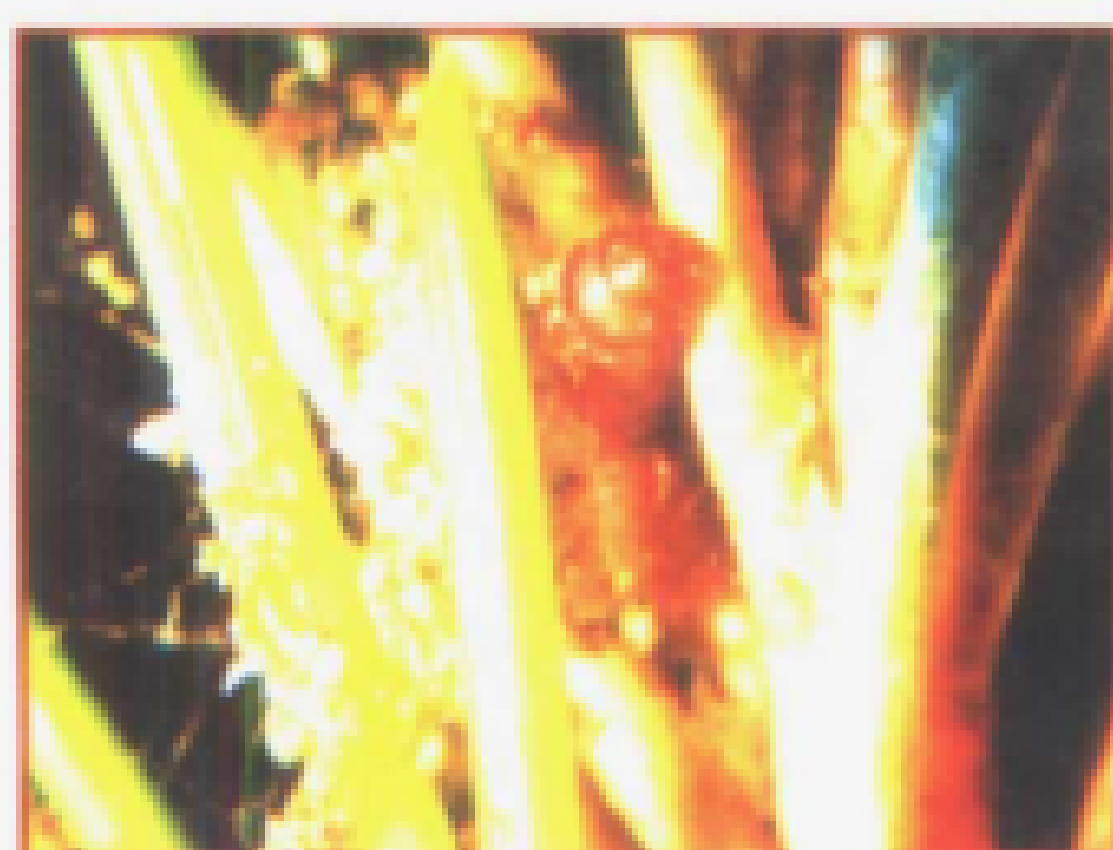


# 中国 针叶树 种实害虫



李宽胜 主编  
中国林业出版社

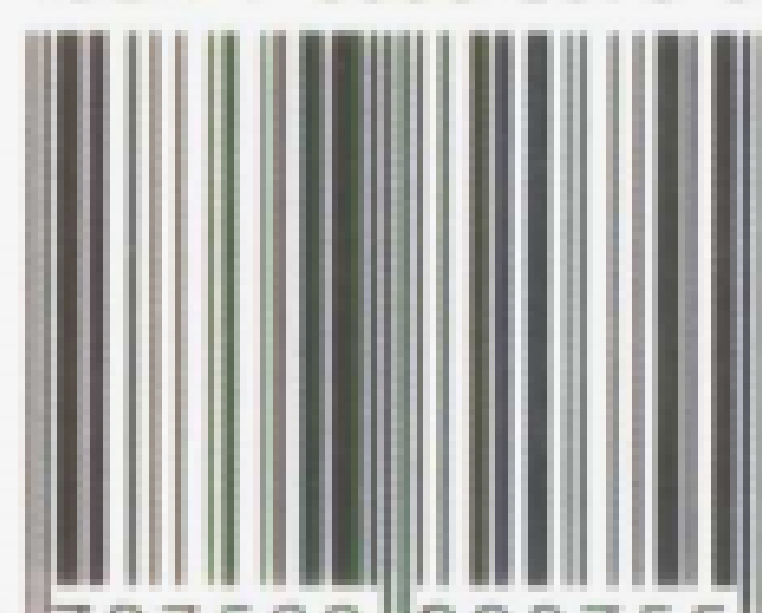


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# CONE AND SEED INSECT PESTS OF CHINA CONIFERS

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## 序 一

目前,我国针叶林面积和木材蓄积量分别占全国森林总面积和森林总蓄积量的52.22%和56.24%。由此可见,针叶林在绿化环境、改善气候、防风固土、水源涵养及木材供给等方面均具有极其重要的作用。但是,在针叶树开花、结实及种子贮藏过程中,往往遭受多种害虫的危害,致使种子歉收,质量下降,甚至颗粒无收,严重影响天然林更新及绿化造林的进程。

针叶树种实害虫种类多,繁殖快,种群密度高,钻蛀性强,生活隐蔽,危害严重,防治难度颇大。国外林业先进国家十分重视针叶树种实害虫研究,国际林联(IUFRO)专门设有针叶树种实害虫学组,每四年召开一次国际性学术会议,研讨针叶树种实害虫及其防治等有关问题。我国针叶树种实害虫研究工作起步较晚,新中国建立前几乎是个空白,建国后发展较快,特别是70年代末以来,有了迅猛发展。李宽胜研究员等不畏艰苦,知难而进,几十年来一直从事针叶树种实害虫研究,先后承担国家及省级重点科技攻关课题多项,深入林区生产第一线,开展多层次、多方位的调查观察,反复进行各项防治试验,及时总结群众防治经验;还先后赴南斯拉夫、美国、加拿大、日本等国考察,收集了大量研究资料。由于他们的刻苦钻研和不懈努力,取得了显著的研究成果,经国内著名专家评审鉴定,认为有两项成果达国际先进水平,并分获省、部级科技进步二等奖。由李宽胜研究员等编著的《中国针叶树种实害虫》一书,正是在他们几十年来积累的大量第一手宝贵资料基础上,并注意汲取前人研究的最新成果和技术经验编写而成的。该书分总论与各论两大部分。总论包括中国针叶树种实害虫发生与危害概况、中国针叶树种实害虫研究进展、针叶树种实害虫的发生与环境关系、针叶树种实害虫的调查方法、针叶树种实害虫的预测预报、针叶树种实害虫的防治原理与方法。各论包括有6目15科48种主要害虫的名称与分布、发生与危害、形态特征、生物学特性、预测预报(部分害虫)、防治方法。全书共记述中国针叶树种实害虫117种,天敌186种。有彩图8版,黑白插图49幅,内容丰富,结构合理,文字简炼,材料新颖,数据翔实,绘图逼真,措施可行,此乃科学与艺术相结合的珍品,是我国首部针叶树种实害虫研究最全面而系统的专著。该书的出版,不仅填补了国内这方面的空白,而且大大丰富了国际针叶树种实害虫的研究内容。它对于提高我国针叶树种实害虫防治技术水平,提高针叶树种子产量质量,以及提高科研教学质量等方面将起到积极的促进作用。值此书即将付印之际,除祝贺其早日问世外,并乐意为之序。



1997-05-25



## FOREWORD (I)

The coniferous areas and standing volume in China were 50.22% and 56.24% of the total forests in present. Therefore, the coniferous forests hold an extremely important role in the environment greening, climate improving, windbreaks, sand fixation, water resources protection and wood production etc. However, the coniferous tree blooming, seeding and seed storage frequently were suffered from pest damage, which caused the shortage of seeds with lower quality, sometime no seeds at all, and seriously blocked the steps of natural forest regeneration and afforestation.

There are many kinds of coniferous cone and seed pests with fast reproduction, denser population, higher boring ability, hidden habit, and serious damage with difficulty to be controlled. The advanced forestry countries in the world has pay much attention to the coniferous cone and seed pests' study. The special group for the coniferous cone and seed pests was settled under the IUFRO, the international conference was hold every 4 years for the coniferous cone and seed pests and their corresponding control measures. The coniferous cone and seed pests' study in China stepped rather later, there almost is a gap, the study has been developed faster since 1949, the research work has got a great development after the 70's. Professor Li Kuansheng studied the coniferous cone and seed pests for dozens years, undertaken many national and provincial key Sci. & Tech. projects, going into forests for multi-layers and multi-direction investigation with many control experiments and experiences being summarized from the masses. He has been to many counties as Yugoslavia, USA, Canada and Japan etc. and collected a lot of research materials. Since his industrious work, he has obtained remarkable research achievements that were appraised as to the international advanced level through the famous specialist's assessment, and has gotten the second provincial and ministerial awards. The book, "Cone and Seed Insect Pests of China Conifers" compiled by Li kuansheng, is on the basis of his many year's material accumulations and absorbed the new achievements, technique and experiences. The monograph was divided into two parts as general introduction and Taxonomic description. The status of damage and occurrence of cone and seed pests of Chinese conifers, the research status of coniferous cone and seed pests, the relationship between occurrence and damage with environment for cone and seed pests, the investigation method for the coniferous cone and seed pests, prediction and forecast of the coniferous cone and seed pests, the control concept and methods for coniferous cone and seed pests were included in the general introduction. In the Taxonomic description, the names, distribution, occurrence, damage, morphological features, biological characteristics, prediction, forecasting, and control methods for 6 orders, 15 families and 48



pest species were recorded on the book. The 117 pests and 186 natural enemies for Chinese conifers are described. There are 8 pages color pictures, and 49 black & white pictures, with 400000 characters. The book was fulfilling content, reasonable arrangement, briefly narration, new materials, detail and truthful data, active pictures, practicable measures, and is a precious gift of science and art combination, and also is first monograph systematically dealing with the coniferous cone and seed pests in China. The publication of the book will fill the domestic blank for the field, and will fully upgraded the contents of international cone and seed pests' study for conifers. The book will play an important role in prompting coniferous cone and seed pests' control level, enhancing the coniferous seed production and quality, increasing the teaching and research quality etc. On the occasion of the book publication, I am very glad to write a few words for the congratulation.

Chou Io  
May 25 1997

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## 序 二

森林是自然界的重要组成部分。它不但能够调节气候、保持水土、防风固沙、维持生态平衡、促进农业高产稳产,而且还能够直接提供大量木材和多种林副产品,是国家经济建设的支柱,也是人类赖以生产、生活所必需的。针叶树是森林资源的主力军。要使针叶树能够健康、迅速成长,必须具备品质优良、数量充足的种实。然而多年来种实上的害虫日益严重,使大量种子减产,至少是品质下降。

由李宽胜研究员主编的《中国针叶树种实害虫》一书,为林业工作者带来了福音。李宽胜研究员等在过去几十年时间里曾经承担着多项国家及省级重点课题,专门从事针叶树种实害虫的研究。长期深入林区生产第一线,进行害虫种类调查和发生规律的研究及其防治的探讨。因而积累了大量数据和丰富经验,取得了明显的效果。

这本书分总论与各论两大部分,共12章。前6章总论部分介绍中国针叶树种实害虫的发生与危害概况、研究进展、发生与环境关系、调查方法、预测预报和防治原理与方法。后6章介绍同翅、半翅、鞘翅、双翅、鳞翅、膜翅6个目的针叶树种实害虫种类共15科48种的详细名称、分布、发生与危害、形态特征、生物学特性、预测预报和防治方法。全书共40万字,文字精炼、流畅,论点正确,科学性、思想性、系统性以及逻辑性都很强。有彩图8版,黑白插图49幅。文后附有详细的中国针叶树种实害虫名录117种和天敌186种;有参考文献640篇及全部昆虫中名索引和学名索引;这些都为查阅提供极大的方便。

总之,这本书的问世,势必将对我国防治种实害虫,提高林业生产水平以及培养新生技术骨干力量方面产生长远的影响。所以,我们可以总结出一句话:这本书是我国当前最全面、最系统、最好的一本针叶树种实害虫专著。

刘友樵

1997-12-31

## FOREWORD ( II )

Forest, a important component of nature, could moderate the climate, conserve soil and water, prevent from wind damage, fix sand, boost the agriculture production with high and stable yield, provide woods and many kinds of by-products. The forestry, a prop for national economics, is an instant demand of production and life by human being. The coniferous forest holds an extremely important position in forest resources. The enough seeds with high quality are needed in the development of coniferous. However, the coniferous tree blooming, seeding and seed storage frequently were suffered from pest damage, which caused the shortage of seeds with lower quality, sometime no seeds at all.

The book — “Cone and Seed Insect Pests of China Conifers” complied by professor Li Kuansheng- provided advantages and good news to save Chinese coniferous seeds. Professor Li Kuansheng studied the coniferous cone and seed pests for dozens years, undertaken many national and provincial key Sci. & Tech. projects, going into forests for multi-layers and multi-direction investigation on the pests’ classification, occurrence and control experiments. He has accumulated lots of data and abundant experience and achieved the obvious results.

The monograph was divided into two parts as general introduction and Taxonomic description with total 12 chapters. The general introduction, the prior 6 chapters, described the status of damage and occurrence of cone and seed pests of Chinese conifers, the research development, the relationship between occurrence and damage with environment, the investigation method, prediction and forecast and the control concept and methods. The Taxonomic description, the rear 6 chapters, introduced the Homoptera, Hemiptera, Coleoptera, Diptera, Lepidoptera and Hymenoptera etc. 6 orders, 15 families and 48 species’ names, distribution, occurrence, damage, morphological features, biological characteristics, prediction, forecasting and control methods. The book with 400000 characters was briefly and fluently narration, correct arguments with scientific, thoughtful, systematic and logistic ideas. There are many active pictures with 49 black and white illustrations. The detail name citation for 117 insect pests and 186 natural enemies were appended. The 640 literatures, Chinese name citation of insects and scientific name citation of insects were listed in the book and provided a convenience for further study.

Generally speaking, the book publication will play an important and longer-term influence on Chinese cone and seed pests’ study, enhance the coniferous seed production with high quality and foster the new technicians. Therefore, the book is a first and best monograph systematically dealing with the coniferous cone and seed pests in China.

Liu Youqiao  
Dec. 31 1997

## 前 言

针叶树是我国重要的森林资源，主要有马尾松、油松、华山松、樟子松、赤松、云南松、黄山松、落叶松、云杉、冷杉、杉木等，约占全国森林总面积的 50.22%。随着林业建设事业的飞速发展，对针叶树种子的需求量亦大为增加，但在其开花、结实和种子贮藏过程中，往往遭受多种害虫危害，导致林木种子大幅度减产，质量变劣，种源奇缺，加之这类害虫个体小，钻蛀性强，生活隐蔽，不少种还有滞育习性，因而防治难度颇大，严重影响绿化造林和迹地更新的步伐，已成为当前林业生产发展的主要障碍。

针叶树种实害虫防治研究这门学科，在我国起步较晚，新中国建立前几乎是个空白，建国后发展较快，有众多学者从事这方面研究，积累了大量资料，取得了许多丰硕成果。为了系统总结这方面的研究成果，提高针叶树种实害虫防治和研究水平，促进林木良种生产发展，加强国内外学术交流，作者结合多年来的研究工作，系统收集了国内外有关的文献和研究成果，积累了大量第一手资料和防治实践经验，特编著成《中国针叶树种实害虫》一书。全书分总论和各论两部分。总论包括中国针叶树种实害虫发生与危害概况、针叶树种实害虫研究进展、针叶树种实害虫的发生危害与环境关系、针叶树种实害虫的调查方法、针叶树种实害虫的预测预报、针叶树种实害虫的防治原理与方法；各论包括同翅目、半翅目、鞘翅目、双翅目、鳞翅目、膜翅目等 6 目 15 科 48 种，每种害虫分别记述名称与分布、发生与危害、形态特征、生物学特性、防治方法。全书有彩图 8 版，黑白插图 49 幅。最后有 2 个附录，附录 I 为中国针叶树种实害虫名录，按分类系统排列，共计 7 目 28 科 117 种，每种分别记述学名、中名、异名（部分）、分布、寄主；附录 II 为中国针叶树种实害虫天敌名录，其中包括脊椎动物门鸟纲 2 目 4 科 5 种，无脊椎动物节肢动物门昆虫纲 8 目 26 科 173 种，蛛形纲 1 目 2 科 4 种，真菌门丝孢纲 1 目 1 科 3 种，真细菌纲 1 目 1 科 1 种，共计 5 纲 13 目 34 科 186 种，每种分别记述学名、中名、异名（部分）、分布、寄主。就针叶树种实害虫来说，本书所涉及的广度和深度，在国内尚属首次，这是与此项目有关的广大科技工作者集体智慧的结晶和共同劳动的成果。

本书在编写过程中，承蒙业师西北农业大学周尧教授、中国科学院动物研究所刘友樵教授审阅书稿，并为本书写序，还得到下列单位和个人的帮助和支持，他（她）们是：中华人民共和国林业部科技委副主任吴博博士，林业部种苗站霍信璟副站长，阙秀如、游应天高级工程师，中国科学院动物研究所蔡邦华、侯陶谦、黄复生、宋士美等教授，北京林业大学张执中、黄競芳、李镇宇教授，东北林业大学方三阳、岳书奎、苗建才教授，中南林学院王淑芬教授，中国林业科学研究院萧刚柔、孙锡麟、严静君教授，中国林业科学研究院亚热带林业研究所赵锦年教授，贵州省林业科学研究院徐春贵高级工程师，贵州农学院龚才教授，西北林学院周嘉熹、刘铭汤、屈邦选教授，河北林学院阎浚杰教授，河南农业大学杨有乾教授，宁夏农学院王希蒙教授，沈阳农学院刘振陆、王洪魁教授，浙江林学院袁荣兰教授，浙江农业大学何俊华、徐志宏教授，四川大学吴次彬教授，四川林业科学研究院田泽君高级工程师，

山东省林业科学研究所范迪、方德齐高级工程师，湖南省林业科学研究所韩明德高级工程师，陕西省林业厅钟高适厅长，何发理副厅长，陕西省林业科学研究所符毓秦所长，唐德瑞副所长，胡忠朗、罗伟祥、党心德研究员和毛远同志，国际林联（IUFRO）针叶树种实害虫学组第三届主席 Harry O. Yates III（美国）、第四届主席 Alain Roques（法国）、本届主席 Gary L. Debarr（美国），美国农业部林务局，芬兰黑尔辛基大学 Pekka Nuorteva 教授，日本农林水产省林野厅试验场场长山口博昭博士、日本九州大学、京都日中科技交流协会等，在此表示衷心感谢。

由于作者业务水平有限，加之编写时间仓促，错误与不当之处在所难免，恳请广大读者提出批评指正。

李宽胜

1998 年 5 月，陕西杨陵



## PREFACE

The coniferous forests, an important wood resources for China, are mainly composed with *Pinus Massoniana*, *Pinus tabulaeformis*, *Pinus armandi*, *Pinus sylvestris* var *mongolica*, *Pinus densiflora*, *Pinus yunnanensis*, *Pinus taiwanensis*, *Larix gmelini*, *Picea asperata*, *Abies fabri* and *Cunninghamia lanceolata* etc., which is about 50.22% of total forested area in China. With the accelerated development of forestry, the demand for coniferous seeds was expanded greatly. However, there are a lots of pests' affliction during the tree blooming, seeding and seed storage, which resulted in a lower seed production with unfavorable quality and lacking seed resources, the pest with little body, stronger boring ability, hidden habit and later reproduction is difficult to be controlled. All those seriously affected the afforestation and natural regeneration, which is already developed as a major barrier for the forestry now.

The control and prevention of coniferous cone and seed pests in China was developed rather later, which is almost a blank before the 1949, a lots of scholars involved in the field, accumulated plentiful materials and obtained a dozens of achievements since then. On the basis of many years' study, systematical literature and achievements from domestic and abroad, a lots of first-hand materials and practicable experience, the authors specially compiled the "Cone and Seed Insect Pests of China Conifers" to systematically summarize the research achievements, promote the control and research level on the coniferous cone and seeds pests, enhance the development of the superior trees and intensify the domestic and international scientific transfer. The book was divided into two parts as general introduction and Taxonomic description. The general introduction included the damage and occurrence of coniferous cone and seed pests in China, the research status of coniferous cone and seed pests, the relationship between damage and environment for coniferous cone and seed pests, the investigation method for coniferous cone and seed pests, prediction and forecast of coniferous cone and seed pests, the control concept and methods for coniferous cone and seed pests. The Homoptera, Hemiptera, Coleoptera, Diptera, Lepidoptera and Hymenoptera etc. 6 orders, 15 families and 48 species were included in the Taxonomic description. The name, distribution, occurrence, damage, morphological features, biological characteristics and control methods for every species are described on the book. There are 8 color pictures, 49 black & white pictures with 400 000 characters in the book with 2 appendixes. The appendix 1 is the name list of coniferous cone and seed pests in China being arranged according to the taxonomy system with 7 orders, 28 families and 117 species. The scientific name, Chinese name, different name, distribution and hosts are described on the book for every species.

The appendix 2 is a name list of natural enemies for coniferous cone and seed pests in China. The list included chordata, aves, 2 orders, 4 families and 5 species; Invertebrata arthropoda, insecta, 8 orders, 26 families and 173 species; Arachnoidea, 1 order, 2 families and 4 species; Eumcota, Hyphomycetes, 1 order, 1 family and 3 species; Eubacteriae, 1 order, 1 family and 1 species; totally there are 5 classes, 13 orders, 34 families and 186 species. The scientific name, Chinese name, different names (in partial), distribution and hosts were described in the book for every species. On the coniferous cone and seed pests, the book firstly covered almost all the fields in domestic, all those are the integrated result and industrious achievements by all the scientific technicians related to the field.

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Since the limitation of the author's professional career, the errors and mistakes may be occurred in the book, I cordially help the reader give yours correction and suggestion.

Li Kuansheng

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