

中国杜仲图志

China Eucommia Pictorial

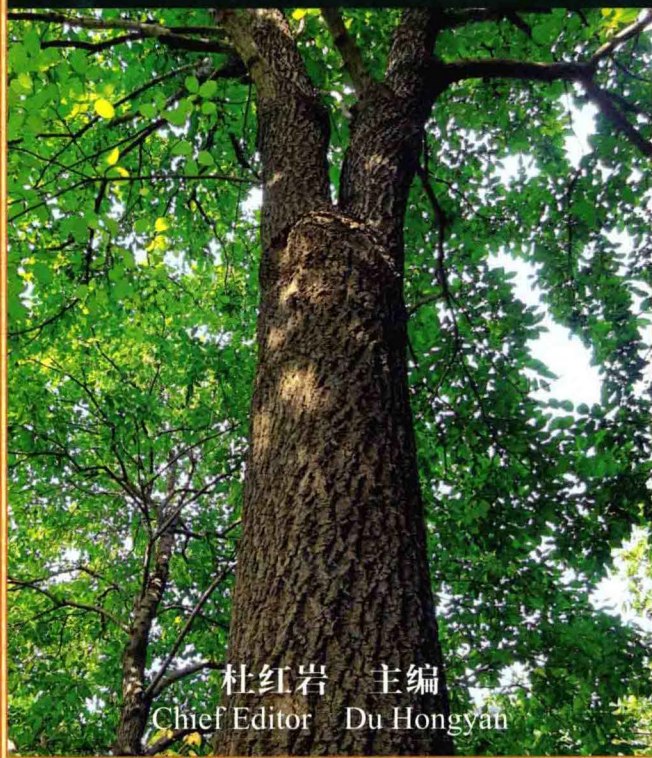
Chief Editor Du Hongyan

杜红岩 主编

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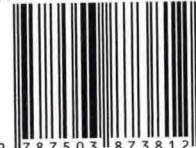
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序

杜仲是我国特有的经济树种，属国家二级重点保护野生植物，自然分布于长江流域和黄河流域。它全身是宝，不仅具有传统的药用价值，而且还具有多功能的利用价值，新开发出杜仲橡胶、食品、饮料等。因此，由于杜仲本身独特和无法替代的性能，它既是世界上极具发展潜力的优质天然橡胶资源，又是名贵药材树种，同时也是改善生态环境、增加碳汇的重要树种，在农、林、医药、化工等方面已经成为一个庞大产业的基础资源和十分重要的国家战略资源。

杜仲橡胶与普通天然橡胶（三叶橡胶）相比，具有独特的橡胶和塑料双重特性，能够被开发出橡胶弹性（高弹性）材料、热塑性材料和热弹性材料。由于杜仲橡胶特殊的物理性质，且具有耐磨、抗撕裂、耐腐蚀、防湿滑、滚动阻力小、节能等优点，杜仲橡胶成为开发高质量防爆轮胎的上佳材料；杜仲橡胶还被誉为“高分子合金”，具有优良的共混性、成膜性、透雷达波性、可黏结性，广泛应用于化工（橡胶）、航空航天、国防、交通运输、通讯、电力、水利、体育、医疗等行业。另外，由于三叶橡胶在中国仅能在海南和云南西双版纳等有限范围内栽培，产量远远满足不了需求，而杜仲是世界上极少数广泛分布于亚热带和温带的优质天然橡胶资源，耐寒、抗旱、耐贫瘠，适生区域广阔，在我国27个省（自治区、直辖市）均有栽培，栽培范围南至广西，北达吉林，东至上海，西抵新疆喀什，因此发展潜力巨大。站在国家安全和发展战略性新兴产业的高度，发展杜仲橡胶产业是切实解决我国天然橡胶资源匮乏的最主要途径，也是加快我国橡胶工业健康发展的根本措施，战略意义重大。

杜仲在中、西医药产业中皆是十分重要的名贵药材，具有强筋骨、补肝肾、降血压、轻身耐老等诸多功效。我国最早的药物学名著之一——《神农本草经》将杜仲列为中药上品；古代医药巨著《本草纲目》对杜仲的药理药效做了更详细和明确的阐述，并称“昔有杜仲服此得道，因以名之”。近年来大量研究证明，杜仲皮、叶、果、雄花内均含有丰富

的活性成分，在降血脂、降血压，治疗心脑血管疾病，促胰岛素分泌、延长降糖效果，抑制癌症的发生和转移等方面都具有特殊的治疗和保健效果。大力发展杜仲产业，将在促进民生和民族工业发展的同时，为提升国民的身体素质和健康水平做出贡献。

为了有效开发利用杜仲资源，用科技支撑挖掘杜仲产业发展的潜力，我国著名杜仲专家、中国林业科学研究院经济林研究开发中心博士生导师杜红岩研究员等学者，长期开展杜仲橡胶良种选育、高效栽培和综合利用技术研究，特别是在杜仲长期育种工程和果园化高效栽培、杜仲雄花茶及其系列酒产品开发、杜仲 α -亚麻酸油利用及其产业化研发、杜仲养生功能食品及功能型食用菌技术创新、杜仲功能饲料研制等方面都取得了重要突破。他们将近30年科研成果汇集，编撰了《中国杜仲图志》，首次以图文并茂的形式全面系统地展示了杜仲根、茎、叶、花、果实的形态特征，生长发育规律，种质资源遗传多样性，良种选育与繁育技术，杜仲栽培模式和技术创新，杜仲剥皮再生技术，病虫害防治，杜仲综合利用与产品开发等。此专著紧密结合我国杜仲产业化开发的需要，内容全面、系统，以文解图，以图释文，通俗易懂，可谓是一本杜仲科研成果的荟萃，更是一本成果推广转化教材，也是一本完善的杜仲百科全书。

本专著为我国杜仲种植及产业化开发做了一项十分有益的工作。相信本专著的出版，对促进以杜仲橡胶为龙头的杜仲产业快速发展将起到有力的推动作用。同时希望本专著能成为从事杜仲种植与产业化开发的有关科研、生产、教学、企业界朋友的良师益友，特此推荐。

中国工程院农业学部主任

中国工程院院士

2013年6月26日于北京



PREFACE

E*ucommia ulmoides* Oliver (EU) is a specific economic tree species endemic to China. It belongs to the II-class national key protected wild plants, which is naturally distributed in the Yangtze River Basin and the Yellow River Basin. EU is one of the few woody plants producing trans-1,4-polyisoprene (TPI), or “Eucommia rubber (EU rubber)”, which has some unique and irreplaceable characteristics. EU is a valuable herbal tree with medicinal uses, as well as being an important tree species for improving ecological environment and increasing carbon sequestrations. These traits make EU become the fundamental and an important strategic resource for China to have the potential for use at large-scale industrial enterprise in agriculture, forestry, medicine and chemical industries.

Compared with natural rubber (*Hevea* rubber), EU rubber, also called “Gutta-percha” or “Palata”, has characteristic of rubber-plastic duality that can be processed and manufactured into thermoplastics, thermoelastomer, and high elastomer. EU rubber has properties such as abrasion resistance, tear resistance, corrosion resistance, slipperiness prevention, low rolling resistance, and energy saving, *etc.* It is one of the best materials for developing high quality blowout-proof tyre. Being the natural large molecule material, the properties of blending, filmforming and radar wave transmissibility make EU rubber be processed for a wide range of applications in chemical lines, aerospace sectors, national defense materials, transportations, communications, electric power, water conservancy, sport and medical treatment, *etc.*

It is now widely planted in 27 provinces (autonomous regions or municipalities directly under the central government) from Guangxi Zhuang Autonomous Region in the south to Jilin Province in the north, from Shanghai Municipality in the east to Kashi City of Xinjiang Uygur Autonomous Region in the west. It is hardy and drought-resistant, and well- adapted to poor soil conditions. Therefore there is large potential to expand EU cultivation in China. Developing EU-rubber industry is an alternative approach to solve the shortage of natural rubber produced by *Hevea* rubber tree in China.

EU itself is one of the most valuable herbs being used in pharmaceutical industry both in China and western countries. Chinese claims that EU can “revitalize the internal organs, increase prowess, strengthen the bones, muscles, and tendons... and delay aging when taken regularly.” Pharmacological function of EU was described in both ancient medical books *Shen Nong's Herbal Classic* and *Compendium of Materia Medica*. EU contains active components in its leaf, bark, fruit and male flower. These components include lignanoids, phenylpropanoids, iridoids,

flavonoid, α -linolenic acid, *etc.*, which was confirmed to have effect of nourishing the liver and kidney, preventing miscarriage, lowering blood pressure, improving sleep with little side-effects. Developing EU commercialization can effectively enhance citizen's health and fitness.

In order to efficiently develop potentials and utilize EU resources, the famous EU expertise Prof. Du Hongyan and his team have been conducting researches on EU new cultivar propagation, silviculture and integrated utilizations. A great breakthrough has been achieved in EU propagation, orchard-like system cultivation, and development of new functional products, such as EU male flower tea and series wines and alcohols, α -linolenic acid capsules, edible mushroom culture and functional fodder, *etc.* They compiled *China Eucommia Pictorial* collecting results from 30 year's scientific researches. This book displays, in the form of pictures and captions for the first time, morphological characteristics, growth and development of EU roots, stems, leaves, flowers, and fruits; genetic biodiversity of germplasm resources; new cultivar selection and propagation; innovated silviculture technologies and models; pest control; and integrated utilization and development of new products. This monograph closely combines with the need of EU industrialization development in China. The contents are comprehensive and systematic with explanatory pictures and captions explanation, and are easy to understand. This book is a collection of achievements in EU scientific research, a teaching material of achievement transformation and popularization as well as a perfect encyclopedia of EU.

Publication of this monograph meets the demands for EU planting and industrialization. It is believed that this book will promote the rapid development of EU industrialization headed by EU rubber industry. Therefore, I strongly recommend this book to those who engage themselves in scientific research, producing, teaching and enterprises involved in EU planting and commercialization. It will be your good teachers and friends.

Yin Weilun

Academician of Chinese Academy of Engineering

June 26, 2013 in Beijing

前言

杜仲 (*Eucommia ulmoides* Oliver) 是我国特有的、除三叶橡胶 (*Hevea brasiliensis* Muell.-Arg.) 外世界上具有巨大开发前景的优质天然橡胶树种。杜仲果、叶、皮均含有丰富的天然橡胶——杜仲橡胶，其果皮中杜仲橡胶含量高达17%以上。杜仲橡胶具有独特的结构与性能，可被开发出橡胶弹性（高弹性）材料、热塑性材料和热弹性材料等三大类不同用途的材料。用杜仲橡胶改性的橡胶组合物具有耐磨、抗撕裂、耐腐蚀、防湿滑、滚动阻力小、节能等优点，不但能够替代普通天然橡胶，还是开发高质量防爆轮胎的良好材料。杜仲橡胶被誉为“高分子合金”，具有优良的共混性、成膜性、黏结性及雷达波可透性。我国是世界上最大的橡胶消费国，橡胶消耗量连续11年居世界第一。然而，由于三叶橡胶适生区狭窄，仅能在我国的海南和云南西双版纳等地栽培，产能已达极限。我国天然橡胶对国外依存度高达80%，这将严重制约我国橡胶工业及相关产业的健康发展。而杜仲在我国适生范围广，发展潜力巨大。从国家安全和发展战略性新兴产业的角度出发，发展杜仲橡胶产业是切实解决我国天然橡胶资源匮乏的根本途径。

杜仲还是我国名贵药用经济树种。杜仲皮为中药上品，中国第一部药书《神农本草经》和明代医圣李时珍所著《本草纲目》都详尽记载了杜仲皮的药用与保健功能，称其具有强筋骨、补肝肾、降血压、久服轻身耐老等作用。现代研究表明，杜仲叶富含绿原酸、京尼平苷酸等活性成分，是生产中药和保健品的上佳原料，也是生产功能饲料和功能型食用菌的优质原料，已被列入2005版《中国药典》。杜仲种仁油内 α -亚麻酸含量高达67.6%，为橄榄油、核桃油、茶油中 α -亚麻酸含量的8~60倍；并且，杜仲种仁中桃叶珊瑚苷含量高达11.3%，是桃叶珊瑚苷含量最高的植物之一。杜仲花粉是我国极其珍贵的药用花粉资源，富含大量活性成分和营养物质，其中含杜仲黄酮（槲皮素）3.5%，氨基酸含量达21.88%，为松花粉内氨基酸含量的2倍以上。在不断的研究和探索中，杜仲已经显示出巨大的开发潜力。

但是，以杜仲橡胶为龙头的杜仲产业还没有真正起步。由于杜仲长期取皮入药的利用特点，2000多年来，我国一直沿用实生苗造林和传统药用经营模式。资源良莠不齐，栽培模式落后，用途单一和经济效益差已经严重影响到杜仲产区林农的收入和杜仲产业的发展。

针对我国杜仲生产和产业发展存在的突出问题，中国林业科学研究院经济林研究开发中心杜仲研究团队对杜仲育种、高效栽培与综合利用技术进行了长期的系统研究，取得了一系列重要研究成果。①建立了我国第一个也是目前世界上最大的杜仲基因库，保存杜仲种质资源859份。选育出不同用途的杜仲良种20余个，其中国家审定杜仲良种10个。②首创杜仲果园化、园艺化栽培模式和技术，取得了我国杜仲研究历史性的重大突破，使果实产胶量提高40倍，开辟了天然橡胶新资源，填补了国内外的研究空白，居国际领

先地位。研究成果引起国家有关部门和专家的极大关注。③国家发明专利“杜仲雄花茶及其加工方法”为国际首创,开创了杜仲综合利用的新局面,杜仲雄花茶已逐步成为国内功能食品的知名产品。经过20多年的系统研究,杜仲雄花茶加工工艺日臻完善,先后获得杜仲雄花茶国家发明专利3项。杜仲雄花酒、杜仲雄花干红酒、杜仲种子酒和杜仲养生挂面的研发均取得重要突破,分别申报了国家发明专利。④提出了用杜仲果实提取杜仲橡胶、杜仲油综合利用新思路,其中专利技术“一种提高杜仲产果量和产胶量的培育方法”形成了杜仲果园化栽培的技术规范,为我国杜仲天然橡胶产业化发展奠定了技术基础,为杜仲 α -亚麻酸油利用及其功能食品的产业化开发提供了技术支撑。⑤研发出杜仲香菇、杜仲木耳、杜仲功能鸡(蛋)、杜仲猪肉等专利产品,拓宽了杜仲综合利用新途径。⑥对活性成分分离提纯技术进行了全面研究,获得了高纯度的绿原酸、桃叶珊瑚苷等,为进一步研制绿色杜仲中药产品奠定了良好基础。经过国家5个“五年计划”的系统研究,已形成了以中国林业科学研究院经济林研究开发中心为核心,覆盖林业、医药和化工(橡胶)等行业专家组成的全国杜仲研究和创新团队。已取得杜仲研究成果18项,荣获国家和省部级科技奖励10项;发表杜仲学术论文200篇以上,出版杜仲专著6部;获得杜仲国家发明专利21项。这些研究成果有力地推动了我国杜仲产业的健康发展。

多年来,作者在应邀到各产区指导杜仲生产和产业发展的过程中,了解和感受到各产区政府部门、林农和企业要求杜仲产业化的呼声十分迫切。近10年来,我国政府部门和有关专家学者、企业家等,通过多种途径促进杜仲战略性新兴产业的快速发展。通过全国人大、政协多次提案,从不同角度呼吁国家从各个层面支持发展杜仲产业;国家发展和改革委员会、财政部、科技部、国家林业局等部门分别立项,从科技支撑角度解决杜仲产业发展的关键技术问题,组织民间力量推动杜仲产业快速发展。

特别是近年来,国务院、国家林业局和有关部委十分重视杜仲产业的发展。2010年,国务院对加快杜仲产业发展做出重要批示。按照国务院的统一部署,国家发展和改革委员会、财政部、科技部等有关部委均将杜仲产业的发展列入重要议事日程,积极谋划支持杜仲产业发展的措施。杜仲作为战略性新兴产业被列入国家“十二五”发展规划。国家发展和改革委员会在《2011年新的产业结构调整目录》中,将“天然橡胶及杜仲种植生产”作为单独一项列入鼓励类农林产业,我国杜仲产业从此迎来了前所未有的发展机遇。以杜仲橡胶为龙头的杜仲产业快速发展,不仅能够提升我国天然橡胶工业的国际地位和话语权,还将形成以中国杜仲橡胶新兴产业为龙头的国际天然橡胶市场新格局。

2013年9月18日,中国社会科学院、中国林业科学研究院、中国社科文献出版社联合发布《杜仲产业绿皮书:中国杜仲橡胶资源与产业发展报告(2013)》,中央电视台、新华社、人民日报、光明日报、中国网等30家新闻媒体参加了新闻发布会。中国网进行了

网络直播, 国务院新闻办网站等300多家政府和新闻媒体、网站进行了报道或转载。这标志着我国杜仲产业全面启动。

为适应我国杜仲产业的快速发展和市场的迫切需求, 作者及其杜仲团队编著了《中国杜仲图志》。这是作者及其团队全体研究人员近30年系统研究的结晶, 也是近30年辛勤耕耘、坚持不懈、不断创新的重要成果。本专著首次以图片的形式, 全面系统地介绍了杜仲的根、茎、叶、花、果实的形态特征, 生长发育规律, 我国杜仲种质资源, 杜仲遗传多样性, 优良种质资源及其良种选育, 杜仲良种繁育技术, 杜仲主要栽培模式(包括传统栽培模式、果园化栽培模式、雄花园栽培模式、叶用林栽培模式、材药兼用栽培模式、立体经营模式等)和技术创新成果, 杜仲剥皮再生技术, 杜仲主要病虫害, 杜仲综合利用与产品开发(园林绿化、杜仲橡胶、杜仲雄花茶及花粉系列产品、杜仲 α -亚麻酸及其功能产品、杜仲功能饮品、杜仲现代中药、杜仲功能饲料及其功能禽畜产品、杜仲香菇等杜仲功能型食用菌)等。本专著共收录杜仲图片1100余幅, 均是作者及其团队在进行科学研究过程中长期拍摄积累的, 每张图片背后都凝结了杜仲团队长期辛勤工作付出的心血与汗水。希望《中国杜仲图志》的出版, 能够为我国杜仲科研、教学、生产企业和林农提供系统而直观的杜仲育种、高效栽培和综合利用知识, 从而指导杜仲产业发展, 将杜仲高效生产和产业化开发引向一个持续健康发展的道路。这就是作者编著本书的目的和愿望。

本专著得到国家林业公益性行业科研专项(201004029)和上海华仲檀成杜仲种植科技开发有限公司的资助。在专著编著出版的过程中, 国家林业局科学技术司、中国林业科学研究院、中国社会科学院、中国林业出版社、中国林业科学研究院经济林研究开发中心以及各杜仲产区均给予了大力支持, 在此一并表示感谢!

在本专著出版之际, 我国著名林学家、中国工程院农业学部主任、中国工程院院士尹伟伦先生欣然作序。这不仅是对我们杜仲团队的莫大鼓励和鞭策, 更是对我国杜仲产业给予的高度评价, 对我国特有战略资源的发展寄予的厚望。在此向尹伟伦院士表示衷心的感谢!

杜红岩

2013年10月22日于郑州

FOREWORD

*E**ucommia ulmoides* Oliver (EU), endemic to China, is one of the tree species with great prospects for production of high-quality natural rubber in the world, in addition to *Hevea brasiliensis* Muell.-Arg. EU tree is rich of trans-1,4-polyisoprene (TPI), distinguished as EU rubber, in fruits, leaves and bark. The EU TPI content in fruit coatings even reaches 17%. EU rubber has a unique structure and properties, and it can be developed for production of rubber elastic materials, thermoplastic materials and thermoelastic materials. The rubber compositions modified with EU rubber have the advantages of wear-resistance, tear-resistance, corrosion-resistance, anti-slipperiness, less rolling resistance, energy-saving, *etc.* They can not only replace ordinary natural rubber, but also be developed for high-quality run-flat tires. EU rubber is known as “polymer alloy”, for its excellent properties of blending, film forming, bonding and radar wave transmissibility. China is the world’s largest rubber consumer, with its rubber consumption ranking the first in the world for 11 consecutive years. However, due to the narrow suitable area for growth of *Hevea brasiliensis* in China, which can only be cultivated in Hainan and Xishuangbanna, the production capacity of natural rubber has reached the limit. China imports 80% of its consumption of natural rubber, and this is severely restricting the healthy development of its rubber industry and related industries; while EU trees have a wide range of suitable areas and tremendous potential for development. From perspectives of national security and the development of strategic emerging industries, EU rubber is the basic solution to China’s scarce of nature rubber resources.

EU is also a valuable economic medicinal tree species in China. The EU bark is a top-grade traditional Chinese medicine. *Shen Nong’s Herbal Classic*, China’s first medicine book, and *Compendium of Materia Medica* composed by Li Shizhen, the medical saint in the Ming Dynasty, both well documented the medical and healthcare functions of EU bark, saying it can strengthen bones and muscles, tonify the liver and kidney, lower the blood pressure, and keeping use of it will slow down the natural aging and make people feel light on the feet. Modern analysis shows that EU leaf is rich in chlorogenic acid, geniposidic acid and other active ingredients. It is a good raw material for the production of traditional Chinese medicine and health products, as well as quality raw material for the production of functional feed and functional edible fungus. The EU leaf has been included in the 2005 *Chinese Pharmacopoeia*. The α -linolenic acid content in EU seed oil reaches 67.6%, being 8–60 times of that in olive oil, walnut oil and tea seed oil. In addition, the aucubin content in EU seeds is as high as 11.3%, making EU one of the plants

with the highest aucubin content. EU pollen is an extremely valuable medicinal pollen resource in China, rich in a large number of active ingredients and nutrients, of which the EU flavonoids (quercetin) content is 3.5%, and the amino acid content is up to 21.88%, being more than 2 times of that in pine pollen. In the continuous research and exploration, EU has shown a great potential for development.

However, the EU industry led by the EU rubber has not really started. As a result of long-term utilization of EU bark as medicine, the seedling planting and conventional medicinal cultivating models have been kept for over 2000 years in China. The varying quality, backward cultivating pattern, limited utilization and low economic efficiency have seriously dragged the development of EU industry and the income increase of farmers in EU production area.

In view of the outstanding problems in EU production and industry, the EU research team of Non-timber Forest Research and Development Center, Chinese Academy of Forestry (CAF), conducted long-term systematic research on EU breeding, intensive cultivating and comprehensive utilization, and a series of important results have been achieved. ①The first EU gene bank has been established in China, also the largest one around the world, preserving 859 EU germplasms; 20 improved varieties of EU have been bred, of which 10 are certified by the state. ②The orchard-like, silvicultural cultivating model and related techniques have been originated, which is a historic breakthrough in the EU research of China, so that the rubber yield of EU samaras is increased by 40 times; new resources of natural rubber have been opened up to fill the gaps in research at home and abroad; the research results have drawn great interests of related authorities and experts at national level. ③The national patent for invention “*Eucommia ulmoides* male flower tea and its processing method” is international initiative. It opened up a new phase for comprehensive utilization of EU, and the “EU male flower tea” has gradually become a domestic well-known functional food product. After 20 years of systematic research, the processing technology of EU male flower tea is improving daily, and 3 national patents have been issued for *Eucommia ulmoides* male flower tea. Meanwhile, breakthroughs have been made in the research and development of EU male flower wine, EU male flower dry red wine, EU seed wine and EU health noodles, and these products have been declared national patents for invention. ④The new ideas of extracting EU rubber and EU oil from EU samaras have been proposed. The patent “a novel silvicultural model for increasing biopolymer production from *Eucommia ulmoides* Oliver trees” turned into technical specifications for EU orchard-like cultivating model, laid the technical foundation for EU natural rubber industry in China, provided technical support for the utilization of EU seed oil rich in α -linolenic acid, and its industrial production for functional food products. ⑤Patented products such as EU mushroom, EU fungus, EU-leaf-fed chicken (eggs), EU pigs have been developed, which have broadened the way for EU comprehensive utilization. ⑥They conducted comprehensive study on the separation and purification of the active

ingredients, obtained chlorogenic acid and aucubin of high purity, and laid a good foundation for further development of green traditional Chinese medicines. Through the systematic research of 5 “Five-year Development Plans”, a nationwide EU research and innovation team has been formed, with the Non-timber Forest Research and Development Center, CAF as the core, and covering experts from multiple industries such as forestry, pharmaceutical and chemical (rubber) businesses. The EU research team has acquired 18 EU-related research results, won 10 national (provincial, ministerial) awards of science and technology, published over 200 papers, as well as 6 monographs, and obtained 21 of national invention patents. These results are a powerful drive for the healthy development of EU industry in China.

Over the years, the author has been invited to various EU production areas for the guidance of EU production and industrial development, understood and felt the urge of EU commercialization by the government, farmers and enterprises there. In the past 10 year, the government agencies, the related experts, scholars and entrepreneurs, *etc.*, have been promoting the rapid development the strategic emerging EU industry through a variety of ways. They have been calling for supports from all levels through NPC and CPPCC proposals for several times. The National Development and Reform Commission, the Ministry of Finance, the Ministry of Science and Technology and the State Forestry Administration have all initiated projects to support the development of EU industry on key technical issues. The non-governmental forces are also contributing for its development.

Especially in recent years, the State Council, the State Forestry Administration attached a great importance to the EU industry. In 2010, The State Council made important instructions to accelerate the industrial development of EU. In accordance with the unified arrangements of the State Council, the National Development and Reform Commission, the Ministry of Finance and the Ministry of Science and Technology have all included the EU industry development in their agenda, and actively planned to support its development. As a strategic emerging industry, EU was included in the national “Twelfth Five-year Development Plan”. In the *2011 New Industrial Restructuring Directory*, the National Development and Reform Commission included the “natural rubber and *Eucommia* planting & production” into the encouraged agriculture and forestry industries as a separate category. Therefore, the EU industry has been embracing an unprecedented opportunities for development. Rapid development of EU industry led by the EU rubber, will not only enhance China’s international status and its voice in natural rubber industry, but also help Chinese EU rubber industry cut a share in the international natural rubber market.

In September 18, 2013, Chinese Academy of Social Sciences, Chinese Academy of Forestry, Sciences and Social Sciences Academic Press (CHINA) jointly issued the *Green Book of Eucommia Industry: Report on Development of China’s Eucommia Rubber Resources and Industry (2013)*. 30 news media attended the press conference such as CCTV, Xinhua News Agency, *People’s Daily*, *Guangming Daily*, China Network and so on. China Network had a live broadcast on the web, and more than 300 news media and websites including the website of the State Council Information Office have reported or reproduced it. That is a sign of China’s EU industry was in full swing.

The author and his EU research team compiled this *China Eucommia Pictorial*, to meet the urgent needs of EU industry's rapid development and the market. It is the quintessence of nearly 30 years systematic research by the author and his team, and the important achievement of their hard work, perseverance and innovation. This monograph uses pictures plus captionss for the first time and gives a comprehensive and systematic introduction to EU trees, including morphological features of their roots, stems, leaves, flowers and samaras; principles of their growth and development; EU germplasms in China; genetic diversity of EU trees; improved varieties and their breeding; EU propagation technologies; main cultivation models (such as conventional cultivation, orchard-like cultivation, orchard-like male flower intensive cultivation; orchard-like cultivation for leaves, cultivation for both wood and leaves, three-dimensional cultivation) and technological innovations; EU bark girdling and regeneration; major damages by insects; comprehensive utilization and product development (such as landscaping, EU rubber, EU male flower tea and pollen products, EU α -linolenic acid and its functional products, EU functional beverages, EU modern medicine, EU functional feed and livestock products, EU mushrooms and other functional fungus). This monograph contains a total of more than 1,100 images of EU, all being collected by the author and his team during the course of scientific research, converging the long and hard work of the whole team. By publishing this *China Eucommia Pictorial*, we are hoping to deliver the EU researching units, colleges, enterprises and farmers with systematic and intuitive information for EU breeding, intensive cultivation and comprehensive utilization, to help them get a better understanding of the development and potential of EU industry, and offer a guide for sustainable and healthy EU industrial development and efficient production. This is the purpose and aspiration for why the author writes the book.

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In addition, Yin Weilun, who is the famous forest scientist, member of the Chinese Academy of Engineering (CAE) and head of the Division of Agriculture, CAE, wrote the preface for this book. He spoke highly of the EU industry in China, and placed high hope on this unique strategic resource. It is a great encouragement and motivation for our EU research team. The gratitude is hereby expressed!

Du Hongyan

October 22, 2013 in Zhengzhou