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中国枣品种资源图鉴

THE ILLUSTRATED GERMPLASM RESOURCES OF CHINESE JUJUBE

李登科 牛西午 田建保 主编

EDITED BY DENGKE LI XIWU NIU JIANBAO TIAN



中国农业出版社

CHINA AGRICULTURE PRESS



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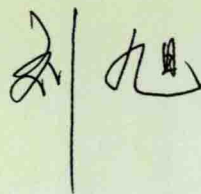
审 稿 刘孟军

序 一

枣是原产我国的特有果树，栽培历史悠久，品种资源丰富。山西省农业科学院果树研究所国家枣种质资源圃是农业部批准建立的国家资源圃之一。建圃30多年来，一直从事枣品种资源的收集保存、鉴定评价和创新利用等工作，积累了大量珍贵的数据资料，取得了丰硕的成果。

《中国枣品种资源图鉴》一书正是该圃几代人长期科研积累的结晶，是我国枣种质资源研究领域的代表性著作之一。

该书以品种资源图说为主线，采用中英文对照形式，重点详述了250个枣地方品种的原产地、栽培分布及主要性状特性，并补充列出了其他具有优异性状或潜在价值的品种资源图像信息。主题突出、层次分明、内容丰富、图片逼真、数据翔实，具有重要的学术研究和生产利用价值，必将对我国枣种质资源的科研、教学、生产和国际交流合作起到重要的参考和促进作用。



中国工程院院士
中国农业科学院研究员
2013年6月30日

Preface 1

Chinese jujube is a native and characteristic fruit to China with a long cultivation history and rather abundant resources. The National Jujube Germplasm Repository established in Pomology Institute, Shanxi Academy of Agricultural Sciences is one of national-level germplasm repository supported by the Ministry of Agriculture. This germplasm repository has been involved in collection, preservation, identification and evaluation of jujube germplasm for over 30 years from its establishment. A lot of valuable data and achievements have been acquired. *The Illustrated Germplasm Resources of Chinese Jujube* is the very fruit of its long-term research work and could be identified as one of representative works about research field in Chinese jujube germplasm.

In this book, it is the main line that jujube varieties are illustrated by Chinese and English and pictures. It is described in detail that the original birthplace, cultivation status and main characteristics of 250 cultivated jujube varieties in China and pictures of varieties with special characters or potential research value have been listed supplementarily. The book has prominent subject, rich content, clear layout, detailed data, fine texts and living pictures. Consequently, it is promising that this book play an important reference and promotion role for scientific research, teaching, production and academic exchange.

Xu Liu

Academician of the Chinese Academy of Engineering

Senior Research Fellow of the Chinese Academy of Agricultural Sciences

Jun.30, 2013

序 二

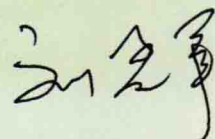
枣是我国原产重要果树和第一大千果经济林树种，栽培历史悠久，品种资源非常丰富。枣品种资源是开展枣树科研和生产的物质基础，对枣产业可持续健康发展具有重要的支撑和保障作用。

农业部国家枣种质资源圃依托山西省农业科学院果树研究所建立，长期致力于枣种质资源的收集保存和鉴定评价研究工作。历经几代人的艰辛努力，收集保存了全国24个省、直辖市、自治区的枣种质资源600多个，并系统鉴定评价了其植物学特征、生物学特性、果实经济性状及适应性、抗逆性等。《中国枣品种资源图鉴》一书，是农业部国家枣种质资源圃科研团队长期科研积累的结晶，是继《中国果树志·枣卷》和《中国枣种质资源》之后我国枣种质资源研究领域的又一代表性著作。

《中国枣品种资源图鉴》一书详述了我国主栽和优良品种资源的原产地、栽培现状和主要性状特性，并概述了具有特异性状或潜在研究价值品种资源的信息。国家枣种质资源圃位于我国枣树栽培的中心地带，该书中的数据是在国家枣种质资源圃多年系统观察和鉴定评价的基础上经过科学分析形成的，可信度高，代表性和可比性强。

该书以品种资源图说为主线，按鲜食、制干、兼用、蜜枣和观赏品种资源等不同用途分类介绍；每类按品种资源的重要性、规模面积等依次排列；每个品种资源从来源分布、植物学特征、物候期、生物学特性、果实经济性状及总体评价等六个方面加以介绍，具有较强的条理性和阅读性，而且还配以树体、开花结果、果实特写和剖面特征等典型彩色图片，直观形象地反映了各品种资源的特性。

该书主题突出、内容丰富、层次分明、数据翔实、图文并茂，理论与实践兼顾，对枣品种资源的生产利用具有很强的指导意义，对于深入开展品种资源和育种研究亦具有重要的参考价值，同时有助于开展相关的国际交流与合作。该书的出版必将对推动枣品种资源的深入研究和创新利用产生广泛而深远的影响。



国际园艺学会枣属植物工作组主席

中国园艺学会干果分会理事长

河北农业大学教授

2013年6月30日

Preface 2

Jujube is an important fruit tree species and the largest species of economic dry fruits forest in China. It is native to China with a long cultivation history and rather abundant resources. Jujube variety resources are the fundamental materials for scientific research and production of jujube trees and fruits, and play an important supporting and security role for healthy and sustainable development of jujube industry.

The National Jujube Germplasm Repository of the Ministry of Agriculture is established in Pomology Institute, Shanxi Academy of Agricultural Sciences. The research personnel of the Repository have been involved in collection, preservation, identification and evaluation of jujube germplasm for a long time. Under hard work of several generations, more than 600 jujube germplasms from 24 provinces of China have been collected and preserved here, whose botanical and biological characteristics, economic traits of jujube fruit, adaptability and stress tolerance have been systematically identified and evaluated. *The Illustrated Germplasm Resources of Chinese Jujube* is the fruit of long-term hard work of the research team at the National Jujube Germplasm Repository.

The book describes in detail the original birthplace, cultivation status and main characteristics of the mainly-cultivated, elite and rare jujube varieties in China. Varieties with special characters or potential research value are also briefly introduced. The National Jujube Germplasm Repository is located in the central area of jujube cultivation in China. The data in this book are formed as a result of scientific analysis based on long-term systematic observation, identification and evaluation made in the Repository, so they are highly reliable with strong representativeness and comparability.

In this book, it is the main line that jujube varieties are illustrated by words and pictures. The varieties are divided into different categories according to different uses of the fruits, such as table varieties, drying varieties, multipurpose varieties, candied varieties and ornamental varieties. Varieties in each category are ordered in accordance with the importance and cultivation scale, and each variety is introduced in terms of origin, distribution, botanical characters, biological characteristics, economic traits of fruit and general evaluation. Matched by typical color pictures of tree body, flowering and bearing, close-up of jujube fruit and features of fruit section, the characteristics of each variety are reflected visually and vividly.

The book has prominent subject, rich content, clear layout, detailed data, fine texts and pictures, and gives attention to both theory and practice, which makes it a useful guide for production and utilization of jujube variety resources and a valuable reference for further research on germplasm and breeding. It is also helpful for developing related international communication and cooperation. In a word, the publication of this book will surely have a deep and wide effect on promotion of further research and creative utilization of jujube variety resources.

Mengjun Liu
Chair of the ISHS Jujube Working Group
President of Dry-Fruit Branch, CSHS
Professor of Hebei Agricultural University
Jun. 30, 2013

前 言

枣 (*Ziziphus jujuba* Mill.) 为鼠李科 (Rhamnaceae) 枣属 (*Ziziphus* Mill.) 植物, 是最具中国特色的优势果树。据大量出土文物考证、古文献记载和现存的古枣树群落分布表明, 我国是枣树的栽培起源中心。山东临朐解河村出土的枣树叶片化石距今已2 400万年, 河南密县荥沟北岗新石器时代遗址发掘出的炭化枣核和干枣有7 240多年的历史; 文字记载最早的是见于约3 000年前的《诗经》中, 其后的《尔雅》、《史记》、《神农本草经》、《齐民要术》和《本草纲目》等古文献对枣的品种、栽培、加工和药用价值等都作了记载和说明; 另外, 地处黄河流域的山西、陕西、河北、河南和山东等地发现有几百年到上千年的古老枣树林。

枣品种资源是枣树科研和生产的物质基础, 对新品种选育和生产利用具有基础性和关键性的支撑作用。我国枣品种资源收集保存和利用研究已有7 000多年的历史, 在漫长的自然演化和人为选择过程中形成了极为丰富的品种资源。仅古文献记载的枣品种总数就达500个左右, 以《广群芳谱》和《植物名实图考》中记载的品种最多, 达到87个。尤其是新中国成立后, 我国的枣树科技工作者在全国范围内多次开展了品种资源调查和鉴定评价等研究工作, 并于1993年编辑出版了《中国果树志·枣卷》。该书主要以文字描述的形式详细记载介绍了枣品种资源700个, 成为全国枣树科研、教学、生产和经营者必备的工具书。

山西省农业科学院果树研究所建所之初即开展了枣品种资源调查工作, 并于1963年开始建立山西省枣品种资源圃, 至1965年收集保存品种资源56个(份)。1979年, 承担了农业部国家枣种质资源圃的建设任务, 从此在全国范围内开始了大规模的品种资源考察和收集保存工作, 之后对圃内保存的品种资源进行了植物学性状、生物学特性、果实经济性状及适应性、抗逆性等基本农艺性状的系统观察和鉴定评价。2000年起又承担了农业部农作物种质资源保护项目、国家科技基础条件平台、国家科技基础性工作专项等科研任务, 进一步开展了枣品种资源的收集保存和原产地追溯、主要农艺性状和功能性成分的系统调查、鉴定评价技术规范研究、DNA遗传多样性标记等工作, 积累了大量的数据资料, 取得了丰硕的科研成果。截至2012年底, 该圃占地总面积已达11hm², 收集保存全国24个省、直辖市、自治区的枣品种资源630个(份), 是我国目前规模面积最大、种质数量最多、遗传多样性最丰富、基础设施完备、仪器设备齐全、研究手段先进、管理技术一流的现代化国家枣种质资源圃。现已成为基础科学研究和野外观测基地, 科技合作和学术交流基地、试验示范和成果展示基地、人才培养和科普教育基地。

为了系统总结国家枣种质资源圃多年的研究成果和最新研究进展, 充分展示我国枣品种资

源的性状特性和现状概况,满足广大枣树科研、教学和生产者的迫切需求,最大限度地实现枣品种资源的有效共享和进一步提高枣品种资源、育种研究及利用水平,山西省农业科学院果树研究所国家枣种质资源圃科研团队编撰了《中国枣品种资源图鉴》一书。

本书以枣品种资源图说为主线,采用中英文对照的方式,以枣果的不同用途为结构单元,将每个品种资源列为一个板块的编排格式,详实介绍了250个品种资源的来源分布、植物学特征、物候期、生物学特性、果实性状及总体评价等,并配以树体、开花结果、果实特写和剖面特征等彩色图片共1 400余幅。本书对枣品种资源中普遍存在的同名异物和同物异名的问题,尽量做到命名规范化,即在原品种名称前冠以原产地名,但对分布范围广泛、原产地难以确定和习惯公认的品种资源则保留其原名称不变。对难以用文字完整描述的114个品种资源,以果实特写图片的形式来反映。为方便查阅使用,书末还列出了以品种资源汉语拼音排序的检索表。

本书的编写,力求结构层次分明、内容系统丰富、数据翔实可信、图片清晰美观、编排规范新颖,集先进性、科学性、全面性、新颖性、实用性和鉴赏性于一体。旨在为进一步开展枣品种资源研究和新品种选育提供有价值的借鉴和参考,为国内外从事枣树科研、教学、生产和经营管理等工作的单位和人员提供有益的帮助和指导,为枣产业的健康和可持续发展提供可靠的支撑和保障。

本书是在国家农作物种质资源保护项目(NB05-070401-2, NB2012-2130135-02)、国家科技基础条件平台(2005DKA10300, 2012-051)、国家科技基础性工作专项(2011FY110200, 2012FY110100, 2013FY111700)、国家林业公益性行业科研专项(201004041)、国家科技支撑计划(2008BAD92B03-13, 2013BAD14B03)等国家和省部级项目专项经费资助下,在山西省农业科学院果树研究所国家枣种质资源圃几代科研和管理人员的辛勤努力下以及全国各地枣产区相关人员的鼎力帮助下,以国家枣种质资源圃多年的自主研究成果积累为主体,参考国内外相关文献资料编写而成的,在此向他们表示最诚挚的谢意。但由于时间和水平所限,本书的不足和疏漏之处在所难免,敬请各位专家、同仁和读者批评指正。

山西省农业科学院果树研究所
《中国枣品种资源图鉴》编委会

2013年6月30日

Introduction

Chinese Jujube (*Ziziphus jujuba* Mill.) is a member of *Ziziphus* Mill. in Rhamnaceae. According to a large number of unearthed cultural relics, record of historical documents and existing ancient jujube-tree community, it is found that China is the origin of jujube cultivation. Leaf fossils unearthed at Xiehe Village of Shandong Province are believed to be 24 million years old, and carbonized jujube stone and dried jujube fruits found at Neolithic sites of Mixian County in Henan Province have a history of more than 7 240 years. The earliest written records on jujube cultivation can be found in the Book of Songs of 3 000 years ago. Besides, hundreds-to-thousand-year-old jujube forests also exist in provinces of Shanxi, Shaanxi, Hebei, Henan and Shandong located in Yellow River Basin.

Jujube variety resources are the fundamental materials for scientific research and production of jujube. Especially for breeding of new cultivars and utilization on production, the varieties play a fundamental and critical supporting role. Collection, preservation, utilization and research for jujube germplasm in China were started more than 7 000 years ago, and rich variety resources were produced in the long process of natural evolution and artificial selection. After 1949, survey and evaluation on jujube variety resources have been carried out for many times by scientific and technological workers on jujube research across the country. The book of *Fruits of China (Vol. Jujube)* was published in 1993, which was used as a reference tool by people engaged in scientific research, teaching, producing and marketing of jujube.

From the time of its foundation on, survey on jujube varieties was started by Pomology Institute, Shanxi Academy of Agricultural Sciences. Jujube Variety Resource Center of Shanxi Province was established in the Institute in 1963, and 56 varieties had been collected and preserved by 1965. In 1979, the Institute undertook building task of the National Jujube Germplasm Repository from the Ministry of Agriculture. From then on, large-scale investigation, collection and preservation of jujube variety resources were carried out across the country. And systematic observation, identification and evaluation were conducted on botanical and biological characteristics, economic traits of jujube fruit, adaptability and stress tolerance of preserved varieties in the Repository. Up to the end of 2012, the Repository has occupied a land area of 11 hectares, in which 630 germplasms from 24 provinces have been preserved. It is a modernized national repository with the largest scale and land area, the largest number of germplasms, the richest genetic diversities, complete infrastructure and equipments, advanced research techniques and first-rate management technology. The Repository has become a base for basic scientific research, field inspection, scientific and technological cooperation, academic exchange, experiment and demonstration, achievement exhibition, personnel training and science education.

In order to make a systematic summary on achievements and latest developments of the repository, fully display characteristics and current status of jujube varieties in China, meet the urgent requirements of people engaged in scientific research, teaching and producing of jujube, maximize effective sharing of jujube varieties and further improve research and utilizing level of jujube germplasm, *The Illustrated*

Germplasm Resources of Chinese Jujube is edited and published by scientific research team of the National Jujube Germplasm Repository in Pomology Institute, Shanxi Academy of Agricultural Sciences.

In this book, illustrated explanation of jujube varieties is the main line. The varieties are divided into different categories according to different uses of the fruits, and each variety occupies one page, introduced in both Chinese and English. The origin, distribution, botanical characters, biological characteristics, fruit traits and general evaluation of 250 varieties are introduced in detail, matched by more than 1 400 color pictures of tree body, flowering and bearing, close-up and section features of fruit. For the common problems of homonym and heteronym in jujube varieties, the book tries to give standardized names, i.e., adding name of origin before name of variety. Yet for those widely-distributed varieties with hardly identified origin, the original names remain unchanged. There are also 114 varieties which cannot be described completely in words, so they are introduced by close-up pictures of their fruits. For convenience of reference, a retrieval table for all the varieties is listed in Chinese Pinyin order at the end of the book.

The book has been tried best to be with a well-organized structure, rich and systematic content, detailed and credible data, clear and nice pictures, standard and original layout, meanwhile integrating advancement, scientificity, comprehensiveness, novelty, practicability and appreciation. It aims at offering valuable reference for further research on jujube germplasm and on breeding of new cultivars, affording helpful assistance and guide for units and persons involved in scientific research, teaching, producing and marketing of jujube, and providing reliable support and ensurance for healthy and sustainable development of jujube industry.

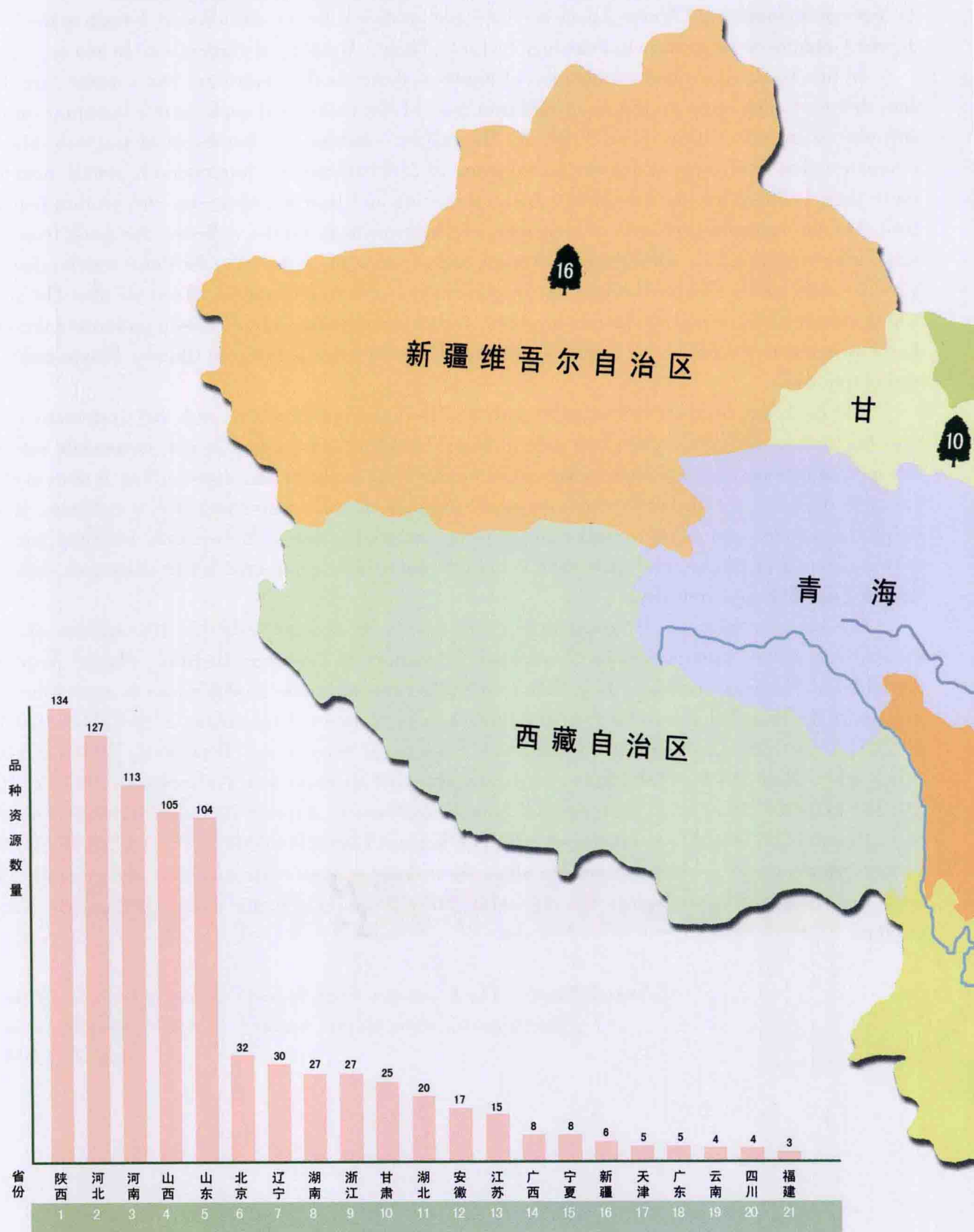
The book is successfully completed under the hard work of scientific researchers of several generations at the National Jujube Germplasm Repository in Pomology Institute, Shanxi Academy of Agricultural Sciences, with kind help from relevant persons of jujube producing areas across the nation, and under the financial aids of the National Project on Protection of Crop Germplasms (NB05-070401-2, NB2012-2130135-02), National Infrastructure Platform of Science and Technology (2005DKA10300, 2012-051), National Special Project on Groundwork of Science and Technology (2011FY110200, 2012FY110100, 2013FY111700), Special Scientific Research Project on Public Welfare Industry of State Forestry (201004041) and National Sci-Tech Support Plan (2008BAD92B03-13, 2013BAD14B03). Sincere appreciation is extended here to all of them. Yet because of limited time and compiling level, some omissions and shortcomings are inevitable. So criticism is welcome from experts, colleagues and readers.

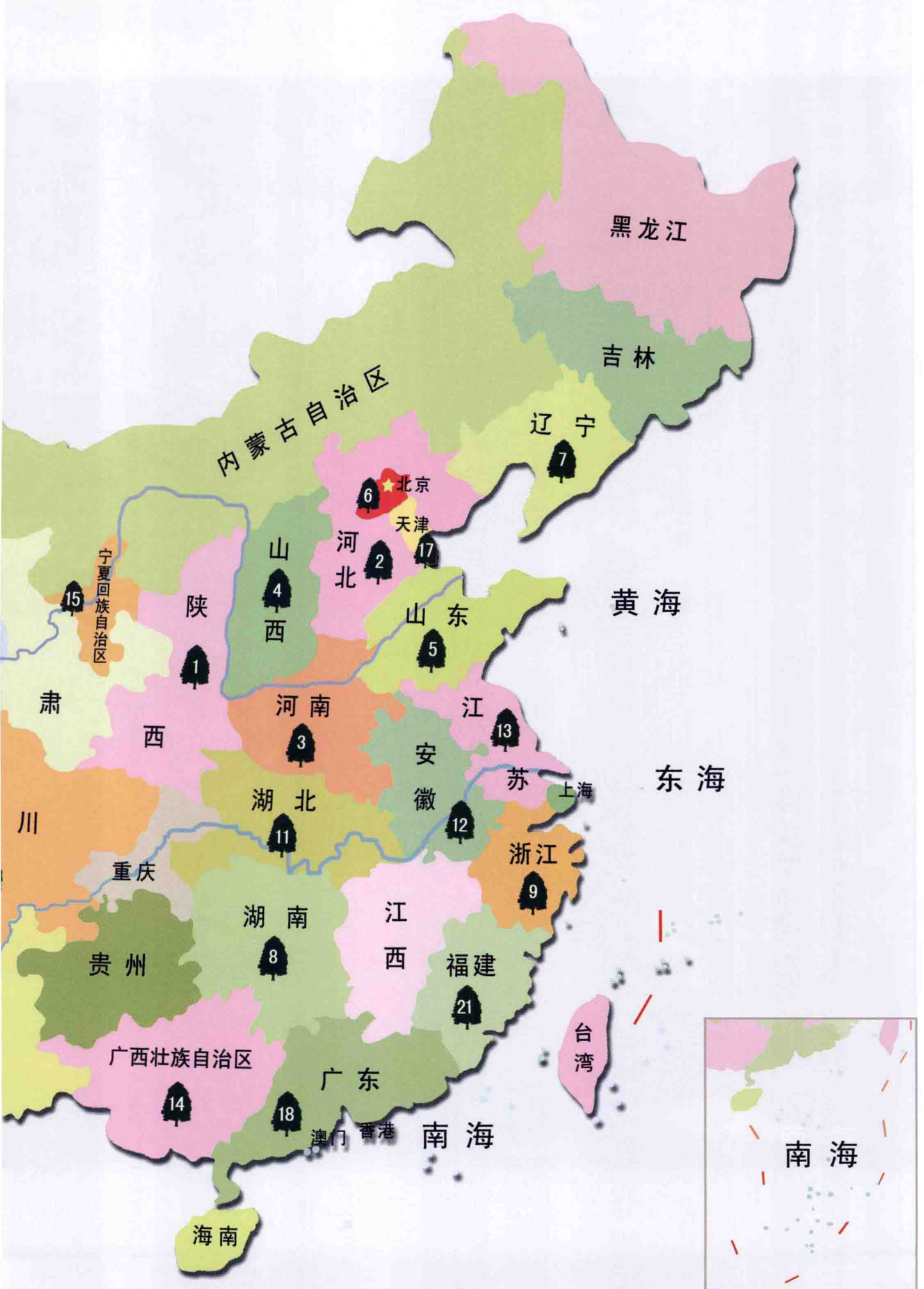
Editorial Board of *The Illustrated Germplasm Resources of Chinese Jujube*
Pomology Institute, Shanxi Academy of Agricultural Sciences

Jun. 30, 2013

中国枣品种资源分布图

Distribution Graph of Chinese Jujube Germplasm Resources









黄河沿岸老枣树（陕西 佳县）
Old Jujube Trees Along the Yellow River (Jiaxian, Shaanxi)

