

TEXTUAL RESEARCH FOR LATIN NAMES AND MEDICINAL EFFECTS OF LOW GRADE DRUGS IN SHENNONGBENCAOJING

Shu-Ling Liu*, Chao-Lin Kuo, Yu-Jen Ko, Ming-Tsuen Hsieh

*Department of Chinese Pharmaceutical Sciences and Chinese Medicine Resources,
College of Pharmacy, China Medical University, Taichung, Taiwan*

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The textual research for Latin names and medicinal effects of Shennongbencaojing, after Top Grade and Medium Grade, the Low Grade Drugs was studied. The Low Grade Drugs were divided, in the same way for Top and Medium Grade Drugs, into 6 groups and their drugs number were also shown in the following order: Plant (72 drugs), Mineral (7 drugs), Animal (6 drugs), Fish and Shellfish (2 drugs), Insect (14 drugs) and Other (2 drugs). The number of Low Grade Drugs in Sun's edition was summed up to 103. In this study, many drugs were considered to be toxic such as: *Aconitum carmichaeli* (No. 1), *Pinellia ternata* (No. 4), *Rheum palmatum* (No. 7), *Hyoscyamus niger* (No. 10), *Veratrum nigrum* (No. 13), *Gelsemium elegans* (No. 14), *Dichroa febrifuga* (No. 17), *Euphorbia pekinensis* (No. 24), *Agrimonia pilosa* (No. 29), *Rhododendron molle* (No. 30), *Phytolacca acinosa* (No. 31) etc. They were also listed in the Poisonous Weeds Class of Compendium of Materia Medica. Modern research has confirmed that most of the Low Grade Drugs are toxic as well. For four drugs, Guanjun (No. 22), Yangtao (No. 37), Wujiu (No. 41) and Yaoshigen (No. 64) their botanical names have not yet been defined. Some drugs might have different medicinal names by various used parts but were originated in the same scientific name. For example, Fuzi (Aconiti Lateralis Preparata Radix, No. 1), Wutou (Aconiti Radix, No. 2) and Tianxiong (Radix Aconiti Singularis, No. 3) are originated from *Aconitum carmichaeli*. Hengshan (Radix Dichroae, No. 17) and Shuqi (Cacumen Dichroae Febrifugae, No. 18) are originated from *Dichroa febrifuga*. Fubi (flower, No. 69) and Choxiaodou (bean, in Medium Grade) are originated from *Vigna umbellata*. Moreover, there is one drug that its name does not match with its constituent. It is Fenxi (No. 4, in Minerals). This study was conducted with modern scientific academic skills and still based on Sun's edition of Shennongbencaojing which was examined thoroughly and faithfully. The conclusion conformed to the description of Low Grade Drugs in original Shennongbencaojing: "Drugs mainly used for treating disease, with more toxic, not suitable for long-term used". We hope the completion of this textual research for Top, Medium, and Low Grade Drugs of Shennongbencaojing can help to promote the internationalization of Chinese medicine.

Key words: Shennongbencaojing, low grade drug, scientific name, pharmacological effect, medicinal, textual research

* **Correspondence to:** Shu-Ling Liu, School of Chinese Pharmaceutical Sciences and Chinese Medicine Resources, College of Pharmacy, China Medical University, No. 91 Hsueh-Shih Road, 40402 Taichung, Taiwan, Tel: +886-4-22053366 ext. 5509, Fax: +886-4-22078083, E-mail: slliu@mail.cmu.edu.tw

Introduction

Shennongbencaojing (《神農本草經》) is the first Chinese pharmacy monograph¹. Its original version was lost a long time ago, but several resume publications were submitted by various Chinese medicinal specialists in the past years². Sun Xing-yan (孫星衍), one of the outstanding explanatory specialists, also leded Sun Feng-yi (孫馮翼) to accomplish one edition of Shennongbencaojing. The Sun's edition was written by fully quoting from Jingshizhengleibeijibencao (《經史證類備急本草》) which was recognized to possess the most complete content of Shennongbencaojing. The annotations supplemented by Sun were recognized to present drug status faithfully and completely. Various historical records and classics of Materia Medica were also referred in Sun's edition³. Therefore, it is the most popular and almost faultless in all Shennongbencaojing editions through the ages⁴. The formal drug names in Sun's edition with its Chinese pinyin were chosen to commence. Scientific materials, in the recent time, which never existed in old Chinese books such as biological name, pharmaceutical name, pharmacological effects, and chemical constituents of each drug were offered after proofread. Different drug names defined by various used parts of one plant (or animal) were also mentioned in the serious textual researches of Shennongbencaojing. We are in an effort to marshal and to complete a modern fine work about Shennongbencaojing.

In our previous researches for Top Grade Drugs (Top) and Medium Grade Drugs (Medium), we have shown how to define different medicinal names by various used parts, to correct the misnamed, to confirm scientific names, to gather papers in pharmacological effects and to evaluate utilizing in medicine. Top Grade

Drugs and Medium Grade Drugs were summed up to 142 and 114 drugs respectively in Sun's edition^{5,6}. There are 14 and 8 drugs which are edible as daily food in the Top and Medium respectively^{5,6}, and all the other drugs can be used in medicine. This result is identical to the old definitions that Top grade drugs are the least harmful for human treatment and Medium Grade Drugs are not or only slightly toxic and are effective for treating diseases or deficiency conditions³.

The Low Grade Drugs (Low) of Shennongbencaojing is to be studied further in this study. The same edition of Shennongbencaojing compiled by Sun Xing-yan and Sun Feng-yi was chosen as the foundation to complete this sequent textual research. Improving the ancient Materia Medica internationalization and universalization is always our final goal.

Materials and Methods

I. Materials

We referred following materials for this textual research.

(I) The Original Literatures of Classic of Materia Medica

1. Shennongbencaojing (神農本草經), recom-
piled by Sun Xing-yan and Sun Feng-yi, published
by Wuzhou Pub Co, Taipei, 1985³.

2. Jingshizhengleidaguanbencao (《經史證類大
觀本草》), written by Tang Shen-wei (唐慎微), copied
and issued by Hirokawa Publishing Company, Inc.,
Tokyo, Japan, 1970⁷.

3. Jingshizhengleibeijibencao (《政和經史證
類備急本草》), written by Tang Shen-wei (唐慎微),
published by Southern Materials Center Inc., Taipei,
1976⁸.

4. Bencaogangmu (《本草綱目》), written by Li Shi-zhen (李時珍), published by Da-Taipei Pub Co., Taipei, 1990⁹.

5. Chinese Herbal Medicine (《中華本草》), edited by Editorial Committee of National Administrative Bureau on Chinese Medicine, published by Shanghai Science and Technology Pub Co., Shanghai, 1999¹⁰.

(II) National Pharmacopoeia

1. Zhonghua Chinese Herbal Pharmacopoeia (《中華中藥典》), edited by Editorial Committee of Zhonghua Pharmacopoeia on Chinese Medicine, Published by Department of Health, Executive Yuan, R.O.C., Taipei, 2004¹¹.

2. China Pharmacopoeia (《中國藥典》), Volume 1, edited by the Pharmacopoeia Commission of the Ministry of Health, P.R.C., published by China Medical Science Press, Beijing, 2010.¹²

(III) Folk Publication

Encyclopedia of Medicinal Plants 1–4, chief editors are Zhao ZZ, and Xiao PG, Shanghai World Pub Co., Shanghai, 2009¹³.

(IV) Popular Medicine Websites

Yibian.hopto.org, Pharmnet.com.cn, Health.chinatimes.com, Zhong-yao, Hudong.com, Baike.baidu.com, and Wikipedia-the free encyclopedia.

II. Methods

The Medium Grade Drugs in Shennongbencaojing compiled by Sun Xing-yan and Sun Feng-yi were first chosen to use in the study for the original formal Chinese drug names. Then, the literatures documented in classics of ancient Materia Medica such as Bencao-

jingjizhu (《本草經集注》)¹⁴, Xinxiubencao (《新修本草》)¹⁵, Jingshizhengleidaguanbencao (《經史證類大觀本草》)⁷, revised Zhenghe Jingshizhengleibei-jibencao (重修《政和經史證類備急本草》)⁸, and Bencaogangmu (《本草綱目》)⁹ were studied to indentify the exact original formal Chinese drug names. Drug origins by its scientific names were identified through national pharmacopoeias such as Zhonghua Chinese Herbal Pharmacopoeia (《中華中藥典》)¹¹, China Pharmacopoeia (《中國藥典》)¹², and Chinese Herbal Medicine (《中華本草》)¹⁰. With each scientific name, the pharmacological effects of the drug were searched via Academic Search Premier or Medline in EBSCO-host data base. As regard to the drug utilizing, the original Chinese herbal name was used as the key word for searching on the internet via Google into some popular websites such as Health.chinatimes.com, Zhong-yao, Yibian.hopto.org, Pharmnet.com, Hudong.com, Baike.baidu.com, and Wikipedia-the free encyclopedia. At the last, the Latin dictionary- Babylon.com was used for translating Latin into English.

Besides, the literatures documented in classics of Materia Medica or publications in academic circles were also referred to and some combinations and comparisons were also involved to complete this study.

Results

Low Grade Drugs in Shennongbencaojing were still divided into six groups, (I) Plant, (II) Mineral, (III) Animal, (IV) Fish and Shellfish, (V) Insect, and (VI) Other. Then the serial number, formal Chinese name, and pinyin were arranged as title of the drugs. In addition to the title, scientific name, family name, common name, medicinal parts, and corresponding pharmacological effects, or chemical constituents

were presented. Another official botanical or zoological names would be shown if they existed. Lastly for the plant group, the utilizing levels (i.e. from one of the most commonly used to almost not used) were pointed out in the study.

I. Plants (72 drugs)

1. 附子 Fuzi

Aconitum carmichaeli Debx. (Ranunculaceae)⁷, also known as Chinese Aconite, Carmichael's Monkshood, and Chinese Wolfsbane. Its lateral root, *Aconiti Lateralis Preparata Radix*, prepared with thermal hydrolysis to lower down its toxicity, has cardiac stimulation, anti-myocardial, arrhythmogenic, anti-arrhythmic, exhibited both blood pressure-raising and blood pressure-lowering activities, anti-stress, immunosuppressant, analgesic, anti-inflammatory, and anti-tumor effects^{10,13,16}. It is commonly used in TCM.

2. 烏頭 Wutou

The botanical origin of this drug was same as the above drug 附子 Fuzi, *Aconitum carmichaeli* Debx. Its tuberous mother root is *Aconiti Radix*¹¹. This is a very toxic herb, especially in raw form for its aconitine-type alkaloids¹⁷. It has anti-inflammatory, analgesic, cardiactonic, and local anesthetic effects^{10,13}. It is seldom used in TCM.

3. 天雄 Tianxiong

The botanical origin of this drug was same as the above drug 附子 Fuzi, *Aconitum carmichaeli* Debx. Its long and singular root, *Aconiti Singularis Radix*. Its medicinal effects were similar to 附子 (Fuzi)¹⁸. It is seldom used in TCM.

4. 半夏 Banxia

Pinellia ternata (Thunb.) Breit¹¹. (Araceae), also known as crow dipper. Its dried stem tuber, *Pinelliae Rhizoma*¹¹, has anti-tussive, anti-emetic, expectorant, and anti-tumor effects^{13,19}. It is commonly used in TCM.

5. 虎掌 Huzhang

Pinellia pedatisecta Schott (Araceae)¹⁰, also known as 天南星 Tiannanxing. Its dried tuber, *Pinelliae Pedatisectae Rhizoma*¹⁰ has expectorant, anti-convulsion, and anti-tumor effects^{13,20}. *Arisaema heterophyllum* Bl., *A. erubescens* (Wall.) Schott or *A. amurense* Maxim. of this family were also recorded as others official botanical origin of *Huzhang*⁹. They are commonly used in TCM.

6. 鳶尾 Yuanwei

Iris tectorum Maxim. (Iridaceae)¹⁰, commonly called roof iris. Its leaves or whole herb, *Iris Tectorum Folium seu Herba* can treat parasitic toxin, pathogen, and various toxins¹⁰, and induce apoptosis of HepG2 cells.²¹ It is seldom used in TCM.

7. 大黃 Dahuang

Rheum palmatum L. (Polygonaceae)¹¹, commonly called Turkey rhubarb, Chinese rhubarb, Indian rhubarb, Russian rhubarb or rhubarb root Tea. Its rhizome and root, *Rhei Palmat Rhizoma et Radix*¹⁰, has purgative, anti-bacterial, anti-neoplastic²², liver fibrosis-inhibiting, and anti-thrombotic effects^{13,23}. *R. palmatum* L. var. *tanguticum* Maxim. ex Regel. or *R. officinale* Baill. of this family were also recorded as others official botanical origin of *Dahuang*⁹. They are most commonly used in TCM.

8. 亭歷 Tingli

Lepidium apetalum Willd. (Brassicaceae)¹² also known as 葶藶子 Tinglizi or pepperweed. Its dried seed, *Lepidii Semen*,¹² has expectorant and cardiotoxic effects¹³. *L. virginicum* L. and *Descurainia sophia* (L.) Webb ex Prantl of this family were also recorded as other official botanical origin of Tinglizi¹⁰. They are commonly used in TCM.

9. 桔梗 Jiegeng

Platycodon grandiflorus (Jacq.) A. DC. (Campanulaceae)¹¹ also known as Platycodon or Chinese bellflower. Its root, *Platycodi Radix*¹¹, is used extensively as an anti-inflammatory in the treatment of coughs and colds, and has anti-angiogenesis²⁴ and antioxidant²⁵ effects. It is commonly used in TCM.

10. 莨蕩(若)子 Langdangzi

Hyoscyamus niger L. (Solanaceae)¹², also known as 天仙子 *Tianxianzi*, Black henbane or stinking nightshade. Its ripe seed, *Hyoscyami Semen*¹², is narcotic and poisonous to human. It also has anti-inflammatory²⁶, antiparkinsonian²⁷, sedative and anti-spasmodic effects¹³. *H. bohemicus* F.W. Schmidt of this family was also recorded as another official botanical origin of Langdangzi. They are seldom used in TCM.

11. 艸蒿 Caohao

Artemisia annua L. (Asteraceae)¹¹, also best known as 青蒿 *Qinghao*, Sweet Wormwood, Sweet Annie, Sweet Sagewort or Annual Wormwood. The dried aerial part, *Artemisiae Annuae Herba*¹¹, has anti-pyretic, anti-inflammatory, analgesic, anti-malarial, anti-schistosomal, immunoregulatory, anti-tumor, anti-bacterial, and anti-viral effects^{13,28,29}. It is commonly used in TCM.

12. 旋覆花 Xuanfuhua

Inula japonica Thunb. (Asteraceae)¹¹, also known as elecampane flower. Its inflorescence, *Inulae Japonicae Flos*¹⁰, has anti-tussive, expectorant, antidiabetic polysaccharide³⁰, and anti-inflammatory effects¹³. *I. britannica* L. of this family was also recorded as another official botanical origin of Xuanfuhua. They are commonly used in TCM.

13. 藜蘆 Lilu

Veratrum nigrum L. (Liliaceae)¹⁰, commonly known as Black False Hellebore. Its dried root and rhizome, *Veratri Nigri Radix et Rhizoma*¹⁰, induce vomiting to treat wind-phlegm, and kills parasites¹³. *V. schindleri* Loes. f., *V. maackii* Regel., *V. dahuricum* (Turcz.) Loes. f. or *V. grandiflorum* (Maxim.) Loes. f. of this family were also recorded as other official botanical origin of Lilu¹⁰. They are commonly used in TCM.

14. 鉤吻 Gouwen

Gelsemium elegans (Gardn. et Champ.) Benth. (Loganiaceae)¹⁰ also known as 斷腸草 *Duanchangcao*, 野葛 *Yege*, 大茶藤 *Dachateng*, poison hemlock, graceful jessamine. The dried whole plant, *Gelsemii Elegantis Herba*¹⁰ has anti-tumor, sedative, analgesic, and immunoregulatory effects¹³. It is seldom used in TCM.

15. 射干 Shegan

Belamcanda chinensis (L.) DC (Iridaceae)¹¹, also known as blackberry lily. Its rhizome, *Belamcandae Rhizoma*¹¹, has anti-bacterial, anti-inflammatory, and anti-viral effects¹³. It is commonly used in TCM.

16. 蛇合 Shehe

Potentilla kleiniana Wight et Arn. (Rosaceae)¹⁰

also known as 蛇含委陵菜 Shehanweilingcai or 蛇銜 Shexian. This whole herb with roots, *Potentillae Kleianiae Herba*¹⁰, can treat bacterial dysentery, swelling of unknown origin, sore throat, and snakebite¹⁰. It is seldom used in TCM.

17. 恆山 Hengshan

Dichroa febrifuga Lour. (Hydrangeaceae)¹² also known as 常山 Changshan. Its dried root, *Dichroae Radix*¹², has anti-malarial, emetic, anti-inflammatory, and anti-tumor effects¹³. It is seldom used in TCM.

18. 蜀漆 Shuqi

The drug was the same official botanical origin of above drug, *Dichroa febrifuga* Lour¹⁰. Its another used parts, verdant branches and leaves, *Dichroae Febrifugae Cacumen*¹⁰, can be used as expectorant or deadline malaria drug¹⁰. It is seldom used in TCM.

19. 甘遂 Gansui

Euphorbia kansui T. N. Liou ex T. P. Wang (Euphorbiaceae)¹¹, its dried root tuber, *Euphorbiae Kansui Radix*¹⁰, has purgative, anti-fertility, immunosuppressant, anti-viral, and anti-inflammatory effects¹³. It is seldom used in TCM.

20. 白蘘 Bailingian

Ampelopsis japonica (Thunb.) Makino (Vitaceae)¹², also known as Japanese Pepper Vine. Its dried tuberous root, *Ampelopsis Radix*¹², has anti-bacterial and anti-tumor effects¹³. It is seldom used in TCM.

21. 青葙子 Qingxiangzi

Celosia argentea L. (Amaranthaceae)¹², commonly known as plumed cockscomb. Its dried ripe seed, *Celosiae Semen*¹², lowers intraocular pres-

sure, and has hypotensive and anti-bacterial effects¹³. It is commonly used in TCM.

22. 瞿菌 Guanjun

The drug is still not defined for unclear source plant recorded.

23. 白及(葎) Baiji

Bletilla striata (Thunb.) Reichb. f. (Orchidaceae)¹¹. Its dried tuber, *Bletillae Rhizoma*¹¹, has hemostatic, anti-bacterial, anti-oxidative, and anti-tumor effects, and protects the mucous membrane¹³. It is commonly used in TCM.

24. 大戟 Daji

Euphorbia pekinensis Rupr. (Euphorbiaceae)¹², its dried root, *Euphorbiae Pekinensis Radix*¹² regulates smooth muscles, induces diuresis, dilates blood vessels, and irritates the skin¹³. It is seldom used in TCM.

25. 澤漆 Zeqi

Euphorbia helioscopia L. (Euphorbiaceae)¹⁰, its whole herb, *Euphorbiae Helioscopiae Herba*¹⁰, has antitussive, expectorant, and antitumor effects. It is seldom used in TCM.

26. 茵芋 Yinyu

Skimmia reeuesiana Fort. (Rutaceae)¹⁰, its stem and leaves, *Herba Skimmiae Reeuesianae*, have hypertensive, uterus contactory, and blood vessels dilatory effects. *S. arborescens* T. Anders. of this family was also recorded as another official botanical origin of Yinyu¹⁰. They are seldom used in TCM.

27. 貫眾 Guanzhong

Dryopteris crassirhizoma Nakai (Dryopteri-

daceae)¹², its rhizome, *Dryopteridis Crassirhizomae Rhizoma*¹², has insect repellent, uterus contactor, estrogen-like, anti-tumor, and anti-viral effects¹⁰. It is commonly used in TCM.

28. 蕘華 Yaohua

Wikstroemia canescens (Wall.) Meissn. (Thymelaeaceae)¹⁰ also known as 蕘花 (with the same pinyin). Its flower bud, *Wikstroemiae Canescentis Flos*¹⁰, was used in edema, cough, and asthma. It is seldom used in TCM.

29. 牙子 Yazi

Agrimonia pilosa Ledeb. (Rosaceae)⁷ also known as 鶴草芽 Hecaoya, Hairyvein, Agrimonia or Cocklebur. Its bud and rhizome, *Agrimoniae Rhizoma*¹⁰, also known as 狼牙 Langya, can be used for teniasis. It is commonly used folk medicinal herbs in Taiwan³¹.

30. 羊躑(躑)躑 Yangzhizhu

Rhododendron molle (Bl.) G. Don (Ericaceae.)¹², its flower, *Rhododendri Mollis Flos*¹², has analgesic, anti-arrhythmic, anti-hypertensive, and anti-bacterial effects¹³. It is seldom used in TCM.

31. 商陸 Shanglu

Phytolacca acinosa Roxb. (Phytolaccaceae)¹², its dried sliced root, *Phytolaccae Radix*¹², has immunity-boosting, anti-inflammatory, anti-viral, anti-tumor, expectorant, anti-tussive, anti-asthmatic, and diuretic effects¹³. *P. americana* L. of this family was also recorded as another official botanical origin of Shanglu¹⁰. They are seldom used in TCM.

32. 羊蹄 Yangti

Rumex japonicus Houtt. (Polygonaceae)¹⁰, its

fresh or dried sliced root, *Rumicis Japonici Radix*¹⁰ has anti-bacterial and anti-fungi effects. *R. nepalensis* Spreng. of this family was also recorded as another official botanical origin of Yangti¹⁰. They are seldom used in TCM.

33. 篇蓄 Bianxu

Polygonum aviculare L. (Polygonaceae)¹², also known as common knotgrass, birdweed, pigweed, and lowgrass. This fresh or dried whole herb, *Polygoni Avicularis Herba*¹², has diuretic, hypotensive, and anti-bacterial effects¹⁰. It is commonly used in TCM.

34. 狼毒 Langdu

Stellera chamaejasme L. (Thymeleaceae)¹⁰, this fresh or dried sliced root, *Stellerae Chamaejasmis Radix*¹⁰, has analgesic, anti-tumor, anti-bacterial, and enhances intestinal motility effects¹⁰. It is seldom used in TCM.

35. 白頭翁 Baitouweng

Pulsatilla chinensis (Bunge) Regel (Ranunculaceae)¹² was nicknamed White Haired Old Man. Its dried root, *Pulsatillae Radix*¹², has anti-amebic, anti-bacterial, and anti-cancer effects^{18,32}. *P. turczaninowii* Kryl. et Serg., *P. ambigua* Turcz. ex Pritz., *P. dahurica* (Fisch. ex DC.) Spreng., *P. cernua* (Thunb.) Bercht. et Opiz. or *P. campanella* Fisch. ex Regel of this family were also recorded as other official botanical origin of Baitouweng¹⁰. They are commonly used in TCM.

36. 鬼臼 Guijiu

Dysosma versipellis (Hance) M. Cheng ex Ying (Berberidaceae)¹⁰, also known as 八角蓮 Bajiaolian, East-Chinese Many-flowered or May-apple. Its dried rhizome and root, *Dysosmae Versipellis Rhizoma et*

Radix¹⁰ has certain effects in anti-virus, anti-parasites, and preventing cardiovascular diseases¹³. *D. pleiantha* (Hance) Woods. and *D. veitchii* (Hemsl. et Wis.) Fu ex Ying of this family were also recorded as other official botanical origin of Bajiaolian¹⁰. They are seldom used in TCM.

37. 羊桃 Yangtao

The relative official scientific name of this drug is still not defined.

38. 女青 Nüqing

Cynanchum thesioides (Freyn) K. Schum. (Asclepiadaceae)¹², its dried herb, Cynanchi Thesiodis Herba¹⁰, has antiviral effect in vivo and in vitro. It is seldom used in TCM.

39. 連翹 Lianqiao

Forsythia suspensa (Thunb.) Vahl. (Oleaceae)¹¹, its dried ripe fruit, Forsythiae Fructus¹¹, has anti-microbial, anti-inflammatory, antipyretic, anti-emetic, diuretic, cardiotonic, and anti-tumor effects¹³. It is commonly used in TCM.

40. 蘭茹 Lanru

Euphorbia pallasii Turcz. (Euphorbiaceae)¹⁰, also known as 閩茹 Lüru. Its dried sliced root, Euphorbiae Pallasii Radix¹⁰, has anti-tumor and kill larvae effects. It is seldom used in TCM.

41. 烏韭 Wujiu

The relative official scientific name of this drug is still not defined.

42. 鹿藿 Luhuo

Rhynchosia volubilis Lour. (Fabaceae)¹⁰, its

stem and leaves, Rhynchosiae Volubilidis Herba, can increase urination, eliminate swelling, activate blood, and detoxify in TCM¹⁰. It is seldom used in TCM.

43. 蚤休 Zaoxiu

Paris polyphylla Smith var. *chinensis* (France.) Hara (Liliaceae)¹², also known as 重樓 Chonglou. Its dried rhizome, Paridis Rhizoma¹², has hemostatic, analgesic, sedative, anti-microbial, gastric mucous membrane injure inhibitory and anti-tumor effects^{13,33}. *P. polyphylla* Smith var. *yunnanensis* (Franch.) Hand.-Mazz.) or *P. polyphylla* Smith of this family were also recorded as othes official botanical origin of Zaoxiu⁹. They are commonly used in TCM.

44. 石長生 Shichangsheng

Adiantum monochlamys Eaton (Adiantaceae)¹⁰, its whole herb, Adianti Monochlamysis Herba, can clean heat, reduce phlegm, and has detoxifying action in TCM¹⁰. It is seldom used in TCM.

45. 陸英 Luying

Sambucus chinensis Lindl. (Caprifoliaceae)¹⁰, its steam and leaves, Sambuci Chinensis Caulis et Folium¹⁰, has against hepatitis effect³⁴. It is seldom used in TCM.

46. 藎艸 Jincao

Arthraxon hispidus (Thunb.) Makino (Poaceae)¹⁰, the whole herb¹⁰, Arthraxi Hispidus Herba can used for scabies, carbuncle and furuncle, and itchy skin. It is seldom used in TCM.

47. 牛扁 Niubian

Aconitum barbatum Pers. var. *puberulum* Ledeb. (Ranunculaceae)¹⁰, its dried root, Aconiti Puberuli

Radix¹⁰, can dispel wind and dampness, mainly for relieving rheumatism and related conditions in TCM¹⁰. It is seldom used in TCM.

48. 夏枯艸 Xiakucao

Prunella vulgaris L. (Lamiaceae)¹¹ is known by many names such as All Heal, Heal all, Self Heal, Woundwort, and many others. Its fresh or dried flower spike, *Prunellae Spica*¹¹, has anti-hypertensive, anti-viral, anti-inflammatory, analgesic, and hyperglycemic effects^{13,36}. *P. asiatica* Nakai of this family was also recorded as another official botanical origin of Xiakucao¹⁰. They are commonly used in TCM.

49. 芫華 Yuanhua

Daphne genkwa Sieb. et Zucc. (Thymelaeaceae)¹², also known as 芫花 (with the same pinyin). Its dried flower bud, *Genkwa Flos*¹², has purgative, diuretic, anti-inflammatory, and antiviral effects^{10, 37}. It is seldom used in TCM.

50. 巴豆 Badou

Croton tiglium L. (Euphorbiaceae)¹¹, also known as Purging Croton. Its dried fruit, *Crotonis Fructus*¹¹, has purgative, anti-microbial, and anti-tumor effects^{13,38}. It is seldom used TCM.

51. 蜀茺(椒) Shujiao

Zanthoxylum bungeanum Maxim. (Rutaceae)¹¹, also known as 花椒 Huajiao. Its dried pericarp, *Zanthoxyli Pericarpium*¹¹, has anti-experimental gastric ulcer, anti-thrombotic, anti-diarrheal, hepatoprotective, analgesic, anti-inflammatory, and local anesthetic effects¹³. *Z. schinifolium* Sieb. et Zucc. of this family was also recorded as another official botanical origin of Shujiao¹⁰. They are commonly edible as condiment.

52. 皂莢 Zaojia

Gleditsia sinensis Lam. (Fabaceae)¹¹, also known as 皂莢 (with the same pinyin) or Chinese honeylocust. Its normal fruit - *Gleditsiae Fructus* or sterile fruit – *Gleditsiae Abnormalis Fructus*¹¹, has expectorant, anti-bacterial, anti-tumor, anti-allergy, sedative, and hypotensive effects¹³. It is commonly used in TCM.

53. 柳華 Liuhua

Salix babylonica L. (Salicaceae)¹⁰, also known as 柳花 (with the same pinyin) or Weeping Willow. Its inflorescence, *Salicis babylonicae Flos* can sweep wind and drain dampness, and has haemostatic and stasis-resolving effects¹⁰. The drug is seldom used in TCM.

54. 棟實 Lianshi

Melia toosendan Sieb. et Zucc. (Meliaceae)¹¹, also known as 川棟子 Chuanlianzi or Szechwan chinaberry. Its dried ripe fruit, *Toosendan Fructus*¹¹, has anti-parasitic, and anti-bacterial effects, and blocks the transfer between neuromuscular junctions^{13,39}. It is commonly used in TCM.

55. 郁李仁 Yüliren

Cerasus japonica (Thunb.) Lois. (Rosaceae)¹⁰, also known as Korean cherry, Flowering almond or Oriental bush cherry. Its kernel, *Cerasi Japonicae Semen*¹⁰, has deobstruent, aperient, aperient, carminative, diuretic, laxative, hypotensive, ophthalmic, and lenitive action¹⁰. *C. humilis* (Bge.) Sok., *Amygdalus triloba* (Lindl.) Ricker or *A. pedunculata* Pall. of this family were also recorded as other official botanical origin of Yüliren¹⁰. They are commonly used in TCM.

56. 莽艸 Mangcao

Illicium lanceolatum A. C. Smith. (Illiciaceae)¹²,

its fresh or dried leaves, *Illicii Lanceolati Folium*¹⁰, can induce convulsion like picrotoxin. It is seldom used in TCM.

57. 雷丸 **Leiwan**

Polyporus mylittae Cooke et Mass. (Polyporaceae)¹⁰, a genus of fungi in the Tricholomataceae family, *Omphalia*¹⁰, can kill tapeworm, trichomona, roundworm, and hookworm, increase immunization and has anti-tumor effects. It is seldom used in TCM.

58. 桐葉 **Tongye**

Paulownia fortunei (Seem.) Hemsl. (Scrophulariaceae)¹⁰, also known as Foxglove Tree. Its dried or fresh leaves, *Paulowniae Fortunei Folium* have heat-clearing, detoxify, stop bleeding, and disperse swelling action. *P. tomentosa* (Thunb.) Steud. of this family was also recorded as another official botanical origin of Tongye¹⁰. They are seldom used in TCM.

59. 梓白皮 **Zibaipi**

Catalpa ovata G. Don (Bignoniaceae)¹⁰, also known as yellow catalpa or Chinese catalpa. Its outer layer of bark (cortex), *Catalpae Ovatae Cortex*¹⁰, has heat-clearing, dampness-draining, counterflow down-bearing, kill worms, and relieve itching effects¹⁰. It is commonly used in TCM.

60. 石南 **Shinan**

Photinia serrulata Lindl. (Rosaceae)¹¹, also known as Chinese photinia. Its dried leaves or dried twig with leaves; *Photinae Serrulatae Folium et Cacumen*¹⁰, has cardiac excitatory and vasoconstriction effects, and can kill *Schistosoma japonicum*¹⁰. It is seldom used in TCM.

61. 黃環 **Huanghuan**

Wisteria sinensis Sweet (Fabaceae)¹⁰, also known as 紫藤 *Ziteng* or Chinese Wisteria. Its dried root, *Wisteriae Sinensis Radix*, was used to remove toxicities caused by venomous insects in Chinese folk¹⁰.

62. 溲疏 **Soushu**

Deutzia scabra Thunb. (Hydrangeaceae)¹⁰ also known as fuzzy deutzia. Its dried fruit, *Deutziae Scabrae Fructus*¹⁰, has heat-clearing and diuretic actions. It is seldom used as folk medicine.

63. 鼠李 **Shuli**

Rhamnus utilis Decne. (Rhamnaceae)¹⁰ also known as Chinese buckthorn. Its fruit, *Rhamni Utilis Fructus*, was used to remove toxicities hid in body. It also can be used as an edible fruit. has laxative and diuretic action¹⁰.

64. 藥實根 **Yaoshigen**

The official botanical origin of Yaoshigen has not been defined yet.

65. 欒華 **Luanhua**

Koelreuteria paniculata Laxm. (Sapindaceae)¹⁰, also known as 欒花 (with the same pinyin) or Golden-rain tree. Its dried flowers, *Koelreuteriae Paniculatae Flos*, can clear liver and improve vision^{10,40}. It is seldom used in TCM.

66. 蔓荊(椒) **Manjiao**

Zanthoxylum nitidum (Roxb.) DC. (Rutaceae)¹², also known as 蔓椒 (same pinyin), 兩面針 *Liangmian-zhen*, 鳥不踏 *Niaobuta*, or Shiny-leaved Prickly Ash. Its root or twig with leaves, *Zanthoxyli Nitidi Radix seu Ramulus et Folium*¹⁰, has analgesic, anti-bacterial,

anti-spasmodic, and anticancer effects^{13,41}. It is one of commonly used folk medicinal herbs in Taiwan⁴².

67. 桃(核)仁 Tao(he)ren

Amygdalus persica L. (Rosaceae)¹⁰, also known as Peach Tree. Its dried seed, *Amygdalus Persicae Semen*¹⁰, has cardiovascular circulation modifying, anticoagulant, antithrombotic, anti-inflammatory, and anti-allergic effects¹⁰. *A. davidiana* (Carr.) C. de Vos ex Henry of this family was also recorded as another official botanical origin of Tao(he)ren¹⁰. They are commonly used in TCM.

68. 杏(核)仁 Xing(he)ren

Armeniaca vulgaris Lam. (Rosaceae)¹⁰, also known as Apricot. Its dried seed, *Armeniaca Vulgaris Semen*¹⁰, has anti-cough, anti-asthmatic, laxative, anti-tumor, anti-inflammatory, and analgesic effects¹⁰. *A. vulgaris* Lam. var. *ansu* (Maxim.) Yü et Lu, *A. sibirica* (L.) Lam. or *A. mandshurica* (Maxim.) Skv. of this family were also recorded as another official botanical origin of Xing(he)ren⁹. They are commonly used in TCM.

69. 腐婢 Fubi

Vigna umbellata (Thunb.) Ohwi et Ohashi (Fabaceae)¹⁰, also known as 赤小豆 Choxiaodou, ricebean or rice bean. Its fresh or dried flowers, *Vignae Umbellatae Flos*¹⁰, has detoxify, alleviates edema, move qi and diuresis actions¹⁰. *V. angularis* (Willd.) Ohwi et Ohashi of this family was also recorded as another official botanical origin of Fubi¹⁰. The drug is seldom used in TCM.

70. 苦瓠 Kuhu

Lagenaria siceraria (Molina) Standl. var. *micro-*

carpa (Naud.) Hara (Cucurbitaceae)¹⁰, also known as Bitter Bottle Gourd. Its ripe peeled fruit, *Lagenariae Sicerariae Fructus*, can treat edema, jaundice, wasting-thirst, difficult urination, abscess, and lichen by Chinese physician¹⁰. It is seldom used in TCM.

71. 水蘩 Shuiqin

Oenanthe javanica (Bl.) DC. (Apiaceae)¹⁰, also known as 水芹, Japanese parsley or Chinese celery. Its aerial part, *Oenanthis Javanicae Herba*¹⁰, has hepatoprotective, anti-arrhythmia, hypolipidemic, and anti-allergic effects¹⁰. The plant is sometimes cultivated as a vegetable, and is seldom used in TCM.

72. 彼子 Bizi

Torreya grandis Fort. (Cephalotaxaceae)¹², also known as 榧子 Feizi or Chinese Nutmeg Tree. Its dried seed, *Torreya Semen*¹², has anthelmintic, antitussive, laxative, and peptic effects¹³. It is seldom used in TCM.

II. Minerals (seven drugs)

1. 石灰 Shihui

Calx¹⁰, also known as Limestone, Lime or Portlandite. After a long time stored, the limestone (CaCO₃) was derived from burnt lime (CaO) and hydrated lime [Ca(OH)₂]. It can treat dry dampness, sore, ulcer, wound bleeding, scald, and diarrhea in TCM.

2. 礬石 Yushi

Arsenopyrite¹⁰ also known as Arsenopyritum. It is an iron arsenic sulfide (FeAsS). It can treat wind, cold, dampness and impediment, sore, and ulcer in TCM.

3. 鉛丹 Qiandan

Plumbum Rubrum¹⁰ also known as red lead. The

lead oxide drug, Pb_3O_4 , was made from pure lead. It was used for eczema, tinea, and epidermal.

4. 粉錫 Fenxi / 錫鏡鼻 Xijingbi

Hydrocerussitum¹⁰ also known as 鉛粉 Qianfen, Ceruse or white lead. The drug is a white powder which mainly contains basic lead carbonate $2PbCO_3 \cdot Pb(OH)_2$. It was used for treating worm, diarrhea, scabies, carbuncle, and sore¹⁰.

5. 代赭石 Daizheshi

Haematite¹⁰ is one of several iron oxides. This iron ore mainly contains Fe_2O_3 , Haematitum, can pacify the liver to subdue yang, cool blood and stop bleeding, and treat manic psychosis in TCM¹⁰. It is commonly used in TCM.

6. 戎鹽 Rongyan

With various names, the drug was sorted as below,

(1) 大青鹽 Daqingyan

Halite¹⁰, commonly known as 胡鹽 Huyan, or rock salt. It mainly contains sodium chloride ($NaCl$)¹⁰. The mineral medicine, Halitum, can discharge heat, cool blood, improve vision, and moisten dryness in TCM¹⁰.

(2) 鹵鹽 Luyan

Bischofitum¹⁰ also known as 鹵鹹 Luxian. It mainly contains magnesium chloride ($MgCl_2$)¹⁰. The mineral medicine can discharge heat, fire-draining, resolve phlegm, soften hardness, and improve vision in TCM¹⁰.

7. 白堊 Baie

This drug has two origins:

(1) 高嶺土 Gaolingtū

Kaolin¹⁰ is a clay mineral, with the chemical

composition $Al_2Si_2O_5(OH)_4$. Its material, Kaolinitum, was used for nausea, diarrhea, itching, and hematemesis¹⁰.

(2) 甘土 Gantu

Montmorillonite¹⁰ is a grayish white odorless powder, with the chemical composition $(Al, Si)_4 O_{10}(OH)_2 \cdot nH_2O$. The material, Bentonitum, was used as an antidote to adsorb toxins produced by infected food and bacteria¹⁰.

III. Animals (six drugs)

1. 豚卵 Tunluan

Sus scrofa domestica Brisson (Suidae)¹⁰, also known as domestic pig. Its testis can synthesize testosterone and was used to warm kidney, dissipate cold, calm frightened, and stabilize epilepsy in TCM¹⁰.

2. 麋脂 Mizhi

Elaphurus davidianus Milne-Edwards (Cervidae)¹⁰, also known as the 麋鹿 Milu or elaphure. Its fat, Elaphuri Davidianus Adeps can moisten skin, dispel cold and treat acne⁹.

3. 鼯鼠 Leishu

Petaurista petaurista Pallas (Sciuridae)¹⁰, also known as Red Giant Flying Squirrel. Its meat and bone can hasten parturition, and treat sore waist, joint pains, and headache caused by pathogenic wind¹⁰. It is seldom used in TCM.

4. 六畜毛蹄甲 Liuxumaotijia

These drugs were assembled by the hair, crust, or hoof of 6 animals such as horse, cattle, sheep, pig, dog, and chicken. They were almost not used in medicine nowadays.

5. 蝦蟆 Hama

Rana limnocharia Boie (Ranidae)⁹, also known as 蛤蟆 Gema, or Cricket Frog. Its whole body can clean heat, treat swollen sore, scrofula, boil, furuncle, and dysentery⁹.

6. 蛇蛻 Shetui

Elaphe carinata (Guenther) (Colubridae)¹⁰, also known as King Ratsnake or Keeled Ratsnake. Its outer layer of skin, *Serpentis Periostracum*¹⁰, can treat fright epilepsy, corneal opacity, vision obstruction, ringworm, scabies, boil, and scrofula. *E. rufodorsata* Cantor, *E. taeniurus* Cope or its close relative family also recorded as other official zoological origin of Shetui¹⁰. It is commonly used in TCM.

IV. Fish and Shellfish (two drugs)

1. 馬刀 Madao

Cuneopsis capitata Heude (Unionodae)¹⁰ is one of distinctive animals of China. Its shell¹⁰ was used for dizziness, palpitations, psychosis, hematemesis, and nosebleed¹⁰. *Lanceolaria grayana* (Lea) and other close relative species were also recorded as same official zoological origin of Madao¹⁰. These shells are seldom used in TCM.

2. 貝子 Baizi

Monetaria moneta Linnaeus (Cypraeidae)¹⁰, also known as the money cowry. Its shell, *Monetariae Concha*¹⁰, can treat strangury, edema, corneal opacity, vision obstruction, pus, and blood sinusitis¹⁰. *M. annulus* (Linnaeus) of this family is also recorded as another official zoological origin of Baizi¹⁰. They are seldom used in TCM.

V. Insects (14 drugs)

1. 邱蚓 Qiuyin

Pheretima aspergillum (E. Perrier) (Megascolecidae)¹², also known as 蚯蚓 (with the same pinyin) or Earthworm. Its dried body can treat high fever with impaired consciousness, numbness of the limbs, cough, and asthma due to heat in the lung, convulsions, arthralgia, hemiplegia, edema, and hypertension. *P. guillelmi* (Michaelsen), *P. vulgaris* Chen or *P. pectinifera* Michaelsen of this family were also recorded as other official zoological origin of Qiuyin¹⁰. They are commonly used in TCM.

2. 蠟螞 Yiweng

Eumenes pomiformis Fabricius (Eumenidea)¹⁰ its dried whole body can treat cough, downbear counter-flow, and nasal congestion¹⁰. It is seldom used in TCM.

3 吳蚣 Wugong

Scolopendra subspinipes mutilans L. Koch (Scolopendridae)¹² also known as 蜈蚣 (with the same pinyin) or Chinese red-headed centipede, its whole body, *Scolopendra*¹², can extinguish wind to arrest convulsions, dispel wind to free the collateral vessels and relieve pain. *S. subspinipes mutidens* (Newport) of this family is also recorded as another official zoological origin of Wugong¹⁰. They are commonly used in TCM.

4. 水蛭 Shuizhi

Hirudo nipponica (Whitman) (Hirudinidae)¹² is a species of leeches. Its whole dried body, *Hirudo*¹², has anticoagulant effect. *Whitmania pigra* (Whitman) of this family is also recorded as another official zoological origin of Shuizhi¹⁰. They are commonly used in TCM.

5. 班苗 Banmiao

Mylabris phalerata Pallas (Meloidae)¹², also known as 班蝥 (with the pinyin Banmao¹²), Chinese blister beetle or Chinese blistering fly. Its whole body, Mylabris¹² has anti-tumor, white blood cells increasing, immune-enhancing, anti-inflammatory, anti-viral, anti-bacterial, estrogen-like facilitating, and epidermal stimulation effects¹⁰. *M. cichorii* L. of this family is also recorded as another official zoological origin of Banmao¹⁰. They are commonly used in TCM.

6. 石蠶 Chican

Phryganea (Colpomera) japonica McLachlan (Phryganeidae), also known as 石蛾 Shie. Its larva and pupa can induce diuresis and relieve fever, and treat difficult urination and stone strangury³. It is seldom used in TCM.

7. 雀甕 Queweng

Cnidocampa flavescens Walker (Limacodidae)¹², this dried steamed larva with its cocoon, Cnidocampae Flavescentis Turfur et Larva¹², has anti-anoxic, anti-convulsive, hypnotic, analgesic, and anti-inflammatory effect¹². It is seldom used in TCM.

8. 蜣螂 Qianglang

Catharsius molossus (Linnaeus) (Scarabaeidae)¹², this dried whole body, Catharsius Molossus¹², can anti-blood coagulator and relax the bowels, and has sedative and paralytic effects¹⁰.

9. 蠼蛄 Lougu

Gryllotalpa africana Palisot et Beauvois (Gryllotalpidae)¹⁰, also known as African Mole Cricket. The dried whole body, Gryllotalpa¹⁰, can treat inhibited

urination, edema, and stone strangury. *G. unispina* Saussure of this family is also recorded as others official zoological origin of Lougu¹⁰. They are seldom used in TCM.

10. 馬陸 Malu

Kronopolites svenhedini (Verhoeff) (Strongylosomidae)¹⁰ is a species of Millepede. Its whole dried body, Kronopolites Svenhedini¹⁰, can treat gastric ulcer, duodenal ulcer, and chronic gastritis¹⁰. It is seldom used in TCM.

11. 地膽 Didan

Meloe coarctatus Motschulsky (Meloidae)¹⁰, its dried whole body, Meloe Corvinus⁹, can be used for accumulation, scabies, ringworm, and oxhide lichen. *M. violceus* L. of this family is also recorded as another official zoological origin of Didan¹⁰. They are seldom used in TCM.

12. 螢火 Yinghuo

Luciola vitticollis Kies. (Lampyridae)¹⁰, is a species of firefly beetles (螢火蟲 with pinyin “Yinghuochong”). Its dried whole body can treat bluish blindness, dim vision, and premature graying of the hair¹⁰. It is seldom used in TCM.

13. 衣魚 Yiyu

Lepisma saccharina L. (Lepismatidae)¹⁰, also known as silverfish or fishmoth. Its dried whole body can treat strangury disease, inhibited urination, fright epilepsy, furuncle, and corneal nebula in tradition. *Ctenolepisma villosa* Fabricius of this family is also as another official zoological origin of Yiyu¹⁰. They are seldom used in TCM.

14. 鼠婦 Shufu

Armadillidium vulgare Latreille (Armadillidiidae)¹², also known as 平甲蟲 pingjiachong, pill-bug or pill woodlouse. Its dried whole body can treat accumulation, amenorrhea, inhibited urination, and various sore. *Porcellio scaber* Latreille of this family also as another official zoological origin of Shufu¹⁰. They are seldom used in TCM.

VI. Other (two drugs)

1. 青琅玕 Qinglanggan

Acropora pulchra Brook (Acroporidae)¹⁰ is one of coral polyp species. Its colony, formed by skeleton and tissue, contains calcium carbonate and has anti-hypertensive, vasodilator, and anti-myocardial ischemia effects. All *Acropora* species are also recorded as official zoological origin of Qinglanggan¹⁰. They are seldom used in TCM.

2. 冬灰 Donghui

The drug is the ashes remained after firewood is burned in the kitchen range at winter. It was used to resolve verruca and polyp, and treat pruritus induced by abscess.

Discussion

In our previous and current studies for Shennongbencaojing (《神農本草經》), there were 142 drugs in Top Grade Drugs, 114 drugs in Medium Grade Drugs, and 103 drugs in Low Grade Drugs respectively^{5,6}. It was different from a common impression that there were 120 drugs in Top, 120 drugs in Medium, and 125 drugs in Low Grade Drugs, respectively. The above results indicated that there were many different Shennongbencaojing editions ever used in ancient

time.² Without conducting more detailed research and checking, many people blindly believed that there were just 365 drugs in Shennongbencaojing. Actually there were more than 365 drugs listed in Shennongbencaojing. Tao Hong-jing (陶弘景) chose 365 drugs from the many and completed his work, Bencaojingjizhu (《本草經集注》)¹⁴. This information was proved to be true again in this study.

In this Low Grade Drugs study, there was nearly no drug edible as daily food in plants. Furthermore, there were many drugs in Low with certain degree of toxicity on human body which were classified as the toxicants such as Fuzi, Wutou, Tianxiong (附子、烏頭、天雄, No. 1-3), Banxia (半夏, No. 4), Huzhang (虎掌, No. 5), Yuanwei (鳶尾, No. 6), Dahuang (大黃, No. 7), Langdangzi (葇荇子, No. 10), Lilu (藜蘆, No. 13), Gouwen (鉤吻, No. 14), Shegan (射干, No. 15), Shuqi (蜀漆, No. 18), Gansui (甘遂, No. 19), Daji (大戟, No. 24), Zeqi (澤漆, No. 25), Yinyu (茵芋, No. 26), Yaohua (堯花, No. 28), Yazi (牙子, No. 29), Yangzhizhu (羊躑躅, No. 30), Shanglu (商陸, No. 31), Langdu (狼毒, No. 34), Guijiu (鬼臼, No. 36), Lanru (蘭茹, No. 40), Zaoxiu (蚤休, No. 43), Yuanhua (堯花, No. 49), and Mangcao (莽艸, No. 56). They were ever included in the Poisonous Weeds Class of Bencaogangmu (本草綱目)⁴⁴. Also many studies have reported these poisonous herbs about their effects, toxicities, actions, indications, doses, and safety. These were already well known in academia. Comparing with our previous studies, the number for the drugs that were edible as daily food was 14 in the Top Grade Drug⁵. It was eight in the Medium Grade Drug⁶. However, in the Low Grade Drug, no drug was mentioned to be edible as daily food. It suggested that although the Low could be used to treat illnesses but they were with some degree of toxicity, and should

not be taken for a long period of time after the disease was cured, and further medication should be avoided. The results of our textual research were proved again to comply with the implication of Shennongbencaojing which was properly divided into Top, Medium, and Low Grade Drug.

Drug Fuzi (附子, No. 1), Wutou (烏頭, No. 2), and Tianxiong (天雄, No. 3) were originated from same plant, *Aconitum carmichaeli* Debx. (Ranunculaceae). Different names were given basis on its part grown and external entity on root. Wutou means tuberous mother root or root tuber. Fuzi means lateral root. Tianxiong means singular and long root. All three radical parts were used but had different given drug names^{44,45}.

Dysosma versipellis (Hance) M. Cheng ex Ying (Berberidaceae) with numerous mortared connected roots was previously named Guijiu (鬼臼, No. 36) in Chinese medicine. Its popular name nowadays is called Bajiaolian (八角蓮) for palmed leaves with 4-9 deep cleft or lobed as an endemic species in China.

As the drug Shujiao (蜀椒, No. 51. of Plant of Low) had strong scent and poisonous so it was listed in Low Grade Drugs; and although the drug Qinjiao (秦椒, No. 57. of Plant of Medium) was very similar to Shujiao but it was less poisonous, less hot, so it was listed in Medium Grade Drugs of the Classic Materia Medica such as Shennongbencaojing (《神農本草經》), Xinxiubencao (《新修本草》)^{46,47}, and Jingshizhengleibeijibencao (《經史證類備急本草》)^{48,49}... etc. But Shujiao was transcribed by Li Shi-zhen (李時珍) as Medium Grade Drug into his Bencaogangmu 《本草綱目》⁵⁰. In Bencaogangmu, Shujiao, and Qinjiao were also listed as different drugs and Huajiao (花椒) was listed under the Qinjiao as its alias⁵¹. At present, in China Pharmacopoeia (《中國藥典》), Huajiao is the official drug name and its

scientific names were already been defined. In Chinese Herbal Medicine (《中華本草》), Shujiao and Qinjiao were listed as ones of Huajiao's subordinates having the same origins as Huajiao. Therefore these two drugs, Shujiao and Qinjiao, have no their own different scientific names and just share the same scientific names with Huajiao.

The annual vine legume of *Vigna umbellata* (Thunb.) Ohwi et Ohashi (Fabaceae), with its red beans called Choxiaodou (赤小豆) was included in Top, and with its emitting foul odor flowers called Fubi (腐婢, No. 69) was included in Low.

According to the knowledge of phonology and norm of developed Chinese feature, the word 榧 (Fei) was sub-differentiated from 彼 (Bi). Feizi (榧子) was Bizi (彼子) and annotated as same drug first on Xinxiubencao (《新修本草》)⁵² and also recognized by Li Shi-zhen⁵³. They were the same plant and had been debated by others classic materia medica. The unidentified evolutionary relationships of the two Chinese words was affected by Tao Hong-jing (陶弘景).

Lead and tin often mixed named and there were no differences before Qin and Han Dynasty. The lead is always taken as tin, such as drug Fenxi (粉錫, No. 4 of Mineral) is practically a white powdered lead with basic lead carbonate $2\text{PbCO}_3 \cdot \text{Pb}(\text{OH})_2$, although its Chinese name means powdered tin.

Notwithstanding our efforts to verify, the official scientific name of plant Guanjun (藿菌, No. 22), Yangtao (羊桃, No. 37), Wujiu (烏韭, No. 41), and Yaoshigen (藥實根, No. 64) were still not defined yet for their undetermined document source.

Drug used experience in Shennongbencaojing by ancients is our predecessor valuable wisdom. Combining modern scientific research results, we give a new interpretation for the old classic of

Materia Medica. The series of research results will facilitate the Chinese medicine modernization and internationalization.

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《神農本草經》下品藥拉丁名與藥效之本草考證

劉淑鈴*、郭昭麟、柯裕仁、謝明村

中國醫藥大學藥學院中國藥學暨中藥資源學系，台中，台灣

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《神農本草經》的考證研究，已完成「上品藥」、「中品藥」，本次繼續進行「下品藥」之研究。首先仍將藥物分類為：植物(72種)、礦石(7種)、動物(6種)、魚貝(2種)、昆蟲(14種)、其他(2種)等六大類，共計「下品藥」有103種，其中許多藥物皆具有毒性，如烏頭、半夏、大黃、菝葜子、藜蘆、鉤吻、恆山、大戟、狼牙、羊躑躅、商陸等，也曾被列於《本草綱目》草部毒草類。《本經》「下品藥」據現代研究也證實，大多有毒，尚未被定義出基原者有4種：藟菌、羊桃、烏韭、藥實根；藥物「一物數名」具有相同基原者，如：烏頭-附子-天雄-恆山-蜀漆-腐婢-赤小豆；另「有名無實」1種，粉錫。本考察「下品藥」類藥物，大部分為「多毒，主治病，不可久服」。《神農本草經》上、中、下三品皆以考證詳實的孫氏版為依據，並運用當今的學術文獻，完成《神農本草經》現代的藥物的考證，有助於中醫藥國際化。

關鍵字：神農本草經、下品藥、學名、藥效、藥用、本草考證

*聯絡人：劉淑鈴，中國醫藥大學藥學院中國藥學暨中藥資源學系，40402 台中市北區學士路 91 號，電話：04-22053366 分機 5509，傳真：04-22078083，電子郵件信箱：slliu@mail.cmu.edu.tw