Annals of Traditional Chinese Medicine

Volume 2, Issue 1
Open Access
Review Article

Abstract

In Traditional Chinese Medicine (TCM), *Prunus serrulata* (*P. serrulata*) has a long history of use as a medicinal herb. This review aims to provide an updated overview of the phytochemical constituents and pharmacological attributes *P. serrulata*. A thorough search of scientific databases, such as Web of Science, PubMed, and Scopus, was done in order to find pertinent research up to September 2023. It was discovered that *P. serrulata* contains a wide range of phytochemical elements, with the two most notable bioactive substances being Flavonoids, alkaloids, and terpenoids were also present. Numerous pharmacological activities, such as antioxidant, anti-cancer, and antiviral properties, have been established by these substances. Furthermore, *P. serrulata* has been studied for its ability to treat a variety of illnesses, including cancer, heart problems, and neurological issues. *P. serrulata* highlights the continued need for scientific research and clinical evaluation by offering a compelling path for potential medicinal development.

Keywords: *Prunus serrulate*; Pharmacological activities; Antiviral; Flavonoids; Antioxidant.

Article Details

Received: Dec 23, 2024

Accepted: Jan 13, 2025

Published: Jan 20, 2025

Journal: Annals of Traditional Chinese Medicine

Website: www.anntcm.org

Botanical, phytochemical and pharmacological aspects of *Prunus Serrulata*: A traditional medicinal plant of China

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Introduction

Cherry blossoms, which belong to the genus *Prunus* or the *Prunus subgenus Cerasus*, are also referred to as Japanese cherries or *sakuras*. The Northern Hemisphere is home to the majority of the world's wild cherry tree species [1-6], being common in East Asia, especially in China and Japan. They are generally refer as to ornamental cherry trees, not cherry trees grown for their fruit [7,8]. The cherry blossom is considered the national flower of Japan, This serves as a source of inspiration for the Japanese people. India was added to the Sakura Map as the 28th nation worldwide. Collingwood Ingram gathered and researched Japanese cherry blossoms in Europe during the late 19th and early 20th centuries, creating a variety of attractive varieties. Pretty quickly, ornamental cherry blossom culture started to expand. Ornamental cherry blossoms first appeared in the United States in 1912, when Japan gave them to the country as a friendship gift [9,10]. Cherry trees grown for ornamental reasons in Europe and North America are categorized under the genus *Prunus*, which has over 400 species. However, decorative cherry trees are categorised in the genus *Cerasus* in the mainstream taxonomy used in China, Japan, and Russia. This genus has roughly 100 species that have been split off from the genus *Prunus* [7]. Cherry trees, called yinghua (櫻花) in Chinese, are native to the central and southern regions of the country. Japan diplomatic delegations returned with cherry blossoms from China during the Tang Dynasty.

Watching plum blossoms has long been a traditional pastime in mainland China. Cherry blossoms were seen in numerous wild species, however many of them had little flowers. The range of wild cherry blossom species that produced large enough flowers for hanami was frequently restricted to the areas surrounding densely inhabited areas [11,12]. Manipur scientists have discovered a new species of "cherry blossom," which they have called *Prunus dinabandhuana* in honour of scientist Dr. Dinabandhu Sahoo and in recognition of his remarkable accomplishments [15].

Additionally, there are numerous varieties (a sub classification of species), hybrids between species, and cultivars of cherry trees because they have a wide range of blossoms and characteristics and are particularly prone to mutation.

This has led to confusion in the classification of these plants as many scholars have given different scientific names to the same variety of cherry tree throughout different time periods [13,14]. Cherry blossom have a many pharmacological action, including antioxidants, anti-inflammatory and anti-ageing, and other properties.

Morphology

The literature pertaining to publications containing the knowledge surrounding *P. serrulata* from the year 2000 to September 2023 was searched using Google Scholar, Scopus, PubMed, and Web of Science. Out of the 200 articles that were retrieved, 100 items were taken into consideration. An attempt was made to gather relevant works that focused solely on *P. serrulata*. Such scientific and molecular data has not yet been published in any publications. This review helps with the creation of the plant monograph in accordance with the Japanese Healthcare System and offers up many new avenues for future studies.

Taxonomical classification

Kingdom: Plantae

Clade: Tracheophytes

Clade: Angiosperms

Clade: Eudicots

Clade: Rosids

Order: Rosales

Family: Rosaceae

Genus: Prunus

Subgenus: *Prunus subg. Cerasus*

Section: *P. sect. Cerasus*

Species: *P. serrulata*

Figure 1: *P. serrulate.*

Common name: Japanese flowering cherry or oriental cherry

Synonyms: Paperbark cherry, Tibetan cherry

Habitat: western Asia and Eastern Europe from the Caspian Sea to the Balkans.

Agriculture

There is a vast array of cherry blossoms (sakura) in Japan. There are more than 200 varieties. Based on one classification scheme, about 600 varieties are believed to exist in Japan. According to the Tokyo Shimbun, there are eight hundred different kinds of cherry blossoms in Japan [16-19]. The Forestry and Forest Products Research Institute in Japan conducted a DNA analysis of 215 cultivars in 2014, and the results showed that many of the cherry tree cultivars that are now widely distributed are interspecific hybrids created by crossing different wild species with Oshima cherry and *Prunusu jamasakura* (Yamazakura) with various species [26].

Sakura cultivars include the following species, hybrids, and varieties [20-24]:

- *Prunus apetala*
- *Prunus campanulata*
- *Prunus × furuseana (P. incisa × P. jamasakura* [25]*)*
- *Prunus × incam (P. incisa × P. campanulata)*
- *Prunus × sieboldii*
- *Prunus speciosa*
- *Prunus × subhirtella (P. incisa × P. itosakura* [25]*)*
- *Prunus × syodoi*
- *Prunus × tajimensis*
- *Prunus × takenakae*
- *Prunus × yedoensis (P. itosakura × P. speciosa* [25]*)*
- *Prunus incisa var. kinkiensis*
- *Prunus × introrsa*
- *Prunus itosakura (Prunus subhirtella, Prunus pendula)*
- *Prunus jamasakura [ja]*
- *Prunus × kanzakura (P. campanulata × P. jamasakura and P. campanulata × P. speciosa* [25]*)*
- *Prunus leveilleana (Prunus verecunda)*
- *Prunus × miyoshii*
- *Prunus nipponica*
- *Prunus padus*
- *Prunus × parvifolia (P. incisa × P. speciosa* [25]*)*
- *Prunus pseudocerasus*
- *Prunus × sacra (P. itosakura × P. jamasakura* [25]*)*
- *Prunus sargentii*
- *Prunus serrulata var. lannesiana, Prunus lannesiana (Prunus Sato-zakura group. Complex interspecific hybrids based on Prunus speciosa.* [26]*)*
- *Prunus × sieboldii*

Traditional uses

They have a many uses like: This tree's edible fruits are used as an emmenagogue and in traditional medicine to treat mastitis, dropsy, and heart failure.

Phytochemical compounds

In this context, the profile of the phytochemical elements in the *Prunus* genus is particularly interesting. Numerous second-

ary metabolites, including carotenoids, gibberellins, phenolic acids, terpenes, steroids, phenylpropanoid esters, and flavonoids, are abundant in *Prunus* species [27-29]. *P. serrulata* have demonstrated several biological activities, such as anticancer, antioxidant and antiviral activities and used in the skin diseases also [30,31].

Pharmacognostic standardization of *P. serrulata*

The pharmacognostic features of *P. serrulata* are shown in Table 1 in which complete observation of flower, leaf and fruit are given.

Table 1: Pharmacological features of *P. serrulate*.

S.no.	Parameter	Flower observation	Leave Observation
1.	Shape and Structure	cup-shaped	simple, ovate-lanceolate
2.	Odour	Refreshing scent	Sweet Scent
3.	Color	light pink, Dark pink	Dark green
4.	Touch	Smooth	Smooth
5.	Size	5 cm	15-30 ft. tall, 15-30 ft. wide
6.	Taste	slightly sweet hint of bitterness	sweet-salty-sour

Cherry blossom by country and region

China: Cherry trees, called yinghua (櫻花) in Chinese, are native to the central and southern regions of the country. Japan diplomatic delegations returned with cherry blossoms from China during the Tang Dynasty. Qinglong Temple in Xi'an is a prominent example of how some of the most well-known cherry blossom parks in China are a reflection of Japan's donation from Japan either before or after its brief rule of parts of China in the first half of the 20th century. In honour of his time spent studying at the temple, the Japanese monk Kukai donated cherry blossom plantations as a gift in 806 CE. When relations between China and Japan improved in 1972, roughly 800 cherry blossom trees were given to Wuhan University. In 2020, when cherry blossom viewing became impossible due to the spread of COVID-19, the state of cherry blossoms at Wuhan University was released on the Web and viewed a total of 750 million times [32-34]. China and Japan both utilise cherry blossoms to symbolise their friendship. As a sign of friendship, Japan sent cherry trees to China in 1973, the year after the joint communiqué was signed. The trees were placed at Beijing's Yuyuantan Park [35,36].

Some notable cherry blossom sites in China include [37-39]:

- Longwangtang Cherry Blossom Park in Lushun, Dalian, Liaoning
- East Lake Cherry Blossom Park near Wuhan University, in Donghu District, Wuhan, Hubei
- Wuhan University, in Donghu District, Wuhan, Hubei
- Nanshan Botanical Garden in Nan'an District, Chongqing
- Pingba Cherry Blossom Park in Guizhou
- Yuantouzhu in Wuxi

France: Two cherry orchards, one for white cherry blossoms (*Prunus avium*) and the other for pink cherry blossoms (*Prunus serrulata*), can be found in the Paris suburb of *Parc de Sceaux*. The pink cherry blossoms (*Prunus serrulata*), which have about 150 trees, draw a lot of tourists when they bloom in early April.

Indonesia: In West Java's Cibodas Botanical Garden, cherry blossoms are in bloom. *Prunus cerasoides* cherry blossoms are grown in Cibodas Botanical Garden. The climate in Cibodas Botanical Gardens is tropical rainforest; flowers here start to bloom in January, reach full bloom in February, and begin to fall in March. The second flowering season begins in June, peaks in August, and ends in October with the flowers falling [40,41].

Thailand: Northern Thailand is where you may find cherry blossoms [42].

Taiwan: Cherry blossoms, which are mostly located in hilly regions, are a well-liked tourist destination in Taiwan, with several particularly designed viewing trips available. The two most well-liked places to see them are Wuling Farm in Taichung and Yangmingshan in Taipei since they are among the easiest to get to [43].

India: In the Himalayan states of Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Sikkim, and the northern districts of West Bengal, including Jalpaiguri and Darjeeling, Nagaland, Manipur, as well as the tropical highlands of Garo Hills and Khasi Hills in Meghalaya, where *Prunus cerasoides* is native, cherry blossoms are also a popular sight in India [44-55].

Korea: In Korea, cherry trees have long been used. Woodblocks and bows have both been made with it (Palman Daejanggyeong). Monks reportedly used wood from white birches, cherry trees, and silver magnolias from the peninsula's southern coast. A survey conducted in 2022 revealed that the majority of the cherry trees planted in the National Assembly area and Yeouido, two of the most well-known locations in the capital to see cherry blossoms, were Japanese Yoshino cherry trees. Of these, 90.4% were in the National Assembly area and 96.4% were in Yeouido. Notably, none of the cherry trees were Korean King Cherry trees. The King Cherry Project 2050, an incorporated association, intends to gradually replace Yoshino cherry trees with King cherry trees by roughly 2050, based on the survey's results [56-66].

There are many other countries where cherry blossom trees are found which people use in various works. Cherry blossom is a good medicinal source. Cherry blossom is an important plant for china and japan. Potential bioactive primary and secondary metabolites present in figure 2.

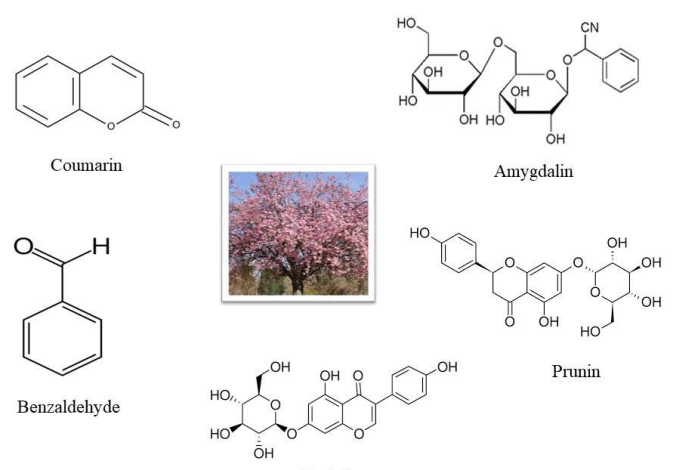

Figure 2: Structural of potential bioactive primary and secondary metabolites in *P. serrulata.* These metabolites are useful to cure various diseases and disorders.

Therapeutic use & pharmacological activity of *P. serrulata*

Oriental medicine has a long history dating back more than two millennia, having originated in China. Large trees of the *Prunus serrulata* var. *spontanea* L. (*Rosaceae*) family are extensively found in Japan and Korea. This tree's edible fruits are used as an emmenagogue and in traditional medicine to treat mastitis, dropsy, and heart failure. Pruni cortex, a combination of *P. serrulata*, *P. yedoensis*, and *P. sargentii*, has been used in traditional Korean medicine as an antitussive, for relaxing, and for cleansing [67,68].

Antioxidative and antiviral activity

Numerous fruits' phenolic components are well-known to be effective antioxidants that protect cells. The antiviral and antioxidant characteristics of four flowering cherry cultivars in Korea—Prunus yedoensis, Prunus sargentii, Prunus lannesiana, and Prunus cerasus—were examined in this study. Specific activities such as the hydroxy radical scavenging activity of 2,2-diphenyl-1-picrylhydrazyl (DPPH), the ability to reduce power, and the activity similar to Superoxide Dismutase (SOD) were measured for the antioxidant property. Furthermore, antiviral activity was assessed using inhibition tests conducted on the Pig Epidemic Diarrhoea Virus (PEDV) infection cycle. The antiviral activity was quantified as the lowest dose of cherry extracts that prevented 50% of the PEDV Cytopathic Effect (CPE). According to our findings, all four cherry types have significantly higher levels of antioxidants and antiviral properties. P. cerasus in particular has stronger antiviral and antioxidant properties [69].

Antioxidative and anticancer activity

Cherry (Prunus serrulata var. spontanea) flowers were extracted using organic solvents (methanol, ethanol, and acetone) and water, and the extracts' antioxidant properties were assessed. The maximum total phenol concentration (104.30 microM), radical scavenging activity (34.2%), and reducing power (0.391) were observed in methanolic CBE (100 microg/ml). The Comet test was used to assess the impact of CBE on DNA damage caused by H(2)O(2) in human leukocytes. DNA damage generated by 200 microM of H(2)O(2) was potently inhibited by all forms of CBE, with methanolic CBE exhibiting the most inhibitory activity. This effect was dose dependant [70].

Culinary use

In China and Japan, cherry blossoms and leaves are utilised as culinary ingredients since they are edible:

Sakurayu, or salt-pickled blossoms in hot water, are served instead of green tea during celebratory occasions like weddings.

Sakura mochi is made from pickled leaves, which are mainly from the Ōshima cherry because to their softness, in salted water.

The blooms are used to extract flavour from wagashi, a traditional Japanese dessert, or anpan, a Japanese sweet bun that is typically filled with red bean paste. The blossoms are pickled in salt and umezu (ume vinegar).

The fruit, known as *sakuranbo* (桜桜坊), is tiny and primarily consists of a seed. Sakuranbo should not be consumed fresh or whole due to their bitter flavour; instead, the seed within should be removed and the fruit processed into preserves. Japanese Roku gin uses cherry blossoms as a botanical flavouring.

Conclusion

Alternative treatment options that are less expensive, safer, and more effective have been required due to public concerns about the efficacy and safety of currently available contemporary medicine. *P. serrulata* is used in Chinese traditional medicine, and it is believed that the plant's potential therapeutic benefits against a variety of illnesses stem from the presence of many bioactive compounds. The most recent advancements in the use of *P. serrulata* and its secondary metabolites to treat a range of acute and chronic illnesses are discussed in this study. Like the majority of other medicinal plants, *P. serrulata* has a wide range of chemical components, including polysaccharides, alkaloids, steroids, flavonoids, and diterpenoids. Thus, herbal remedies—among which *P. serrulata* is one—are thought of as multi-target agents that carry out their therapeutic role more thoroughly. The many metabolites found in plants are very valuable in the future and have not yet been the subject of any kind of study. This analysis of plants serves as a foundation for numerous future studies and is significant to the Chinese medical system in addition to other global medical systems. Although there are many significant medicinal herbs in the Chinese system, *P. serrulata* is the most helpful and advantageous plant; however, more study is required.

Future prospects

P. serrulata is a plant that contains several primary and secondary metabolites that are used to treat both acute and chronic conditions; as a result, many pharmacological activities of the plant are yet unknown. For the greatest plant investigation, those tasks might be easy for new researchers to understand. *P. serrulata* contains a wide range of phytochemicals that have been discovered; these compounds may one day be used to cure illnesses and open up new research avenues.

Declarations

Rishabh Gaur: Writing – review & editing, Writing – original draft, Conceptualization, Formal analysis.

Competing interests: Author has no competing interests to declare regarding the publication of this paper.

Funding support: None.

References

1. "Origins of Japanese flowering cherry (*Prunus subgenus Cerasus*) cultivars revealed using nuclear SSR markers". Shuri Kato, Asako Matsumoto, Kensuke Yoshimura, Toshio Katsuki etc. 2023.
2. "Origins of Japanese flowering cherry (*Prunus subgenus Cerasus*) cultivars revealed using nuclear SSR markers". Forestry and Forest Products Research Institute. 16 June 2014. Archived from the original on 9 March 2019. 2023.
3. Toshio K. Sakura no Kagaku (Science of Cherry Blossoms). 2018: 40–42.
4. "Are cherry trees native to countries other than Japan?". The Flower Association of Japan. Archived from the original. 2014.
5. "Basic knowledge of cherry blossoms". China Cherry Blossom Association.
6. Studies on the History of the Flowering Cherry.《Journal of Nanjing Forestry University》1982年02期". en.cnki.com.cn. 2023.
7. Toshio K Sakura. Iwanami Shoten. 2015: 14-18.

8. The history and cultural symbolism of both the seven wild species and the hundreds of forms known for centuries as satozakura, or garden cherries and information about growing and propagating is found in Kuitert, Wybe (6 March 2015). "Japanese Flowering Cherries". Timber Press.

9. Honoca. "The beauty and history of sakura, Japan's national flower". Tsunagu Japa. 2023.

10. Macé F. Shintō, the disenchanter. Cipango-French Journal of Japanese Studies. English Selection. 2021: 16.

11. Kubo, Yutaka. "Feeling the friction: Reworking Japanese film studies/criticism from a queer lens." *Beyond Diversity.* 165.

12. De Pieri, Veronica. "Genbaku Legacy in Post-3.11 Japan. Ōta Yōko and Yoshida Chia." *Art and Activism in the Nuclear Age. Exploring the Legacy of Hiroshima and Nagasaki*. Routledge. 2023: 198-215.

13. Tsunoda, Takuya. The Dawn of cinematic modernism: Iwanami Productions and postwar Japanese cinema. Yale University. 2015.

14. Guo, Nanyan.; Jing-Bao Nie. "Primary sources and secondary liaturature in Japanese, Chinese, and English." *Japan's Wartime Medical Atrocities: Comparative Inquiries in Science, History, and Ethics.* 2010: 205.

15. https://www.deccanherald.com/science/new-plant-species-of-cherry-blossom-found-in-manipur-1099814.html. Retrieved 09 November 2023.

16. Samuels, Gayle Brandow. *Enduring Roots: Encounters with Trees, History, and the American Landscape*. Rutgers University Press. 2005.

17. Webb, R. New translations of the Dhammapada: Phra Khantipalo (tr.) The Path of Truth, Harischandra Kaviratna (ed. and tr.) Wisdom of the Buddha and Sathienpong Wannapok (ed. and tr.) The Buddha's Words. *Buddhist Studies Review*. 1981; 6: 119-122.

18. Beardsley, RK.; Nakano, T.; Morioka, K.; Okada, Y. Japanese sociology and social anthropology: a guide to Japanese reference and research materials (No. 10). University of Michigan Press. 1970.

19. 白の輝き 新種のしだれ桜 茨城の「博士」が上野で発見 (in Japanese). Tokyo Shimbun. 29 March 2022. Archived from the original on 28 March 2022. 2023.

20. Kato S, Matsumoto A, Yoshimura K, Katsuki T, Iwamoto, K.; Kawahara, T.; Mukai, Y.; Tsuda, Y.; Ishio, S.; Nakamura, K.; Moriwaki, K.; Shiroishi, T.; Gojobori, T.; Yoshimaru, Hiroshi. "Origins of Japanese flowering cherry (*Prunus subgenus Cerasus*) cultivars revealed using nuclear SSR markers". *Tree Genet Genomes.* 2014; 10: 477–487.

21. Kato S, Matsumoto A, Yoshimura K, Katsuki T, Iwamoto K, Tsuda Y, et al. "Clone identification in Japanese flowering cherry (*Prunus subgenus Cerasus*) cultivars using nuclear SSR markers". *Breed Sci.* 2012; 62: 248–255.

22. サクラ栽培品種の分類体系の再編とデータベース化 (in Japanese).

23. 桜の新しい系統保全 ―形質・遺伝子・病害研究に基づく取組 (in Japanese). Forestry and Forest Products Research Institute Tama Forest Science Garden.

24. "The observation of flowering dates in the Cherry Preservation Forest at the Tama Forest Science Garden over a 30-year period" (PDF). *Bulletin of FFPRI* (in Japanese). 2011; 10: 7–48.

25. T Katsuki. Classification and morphological identification of cherry trees (サクラの分類と形態による同定). 2017: 96-97.

26. T Katsuki. Sakura pp. Iwanami Shoten. 2015; 137: 86-95.

27. The Wealth of India, Raw Materials, "A Dictionary of Indian Raw Materialsand Industrial Products" Publications and Importance Directorate-CSIR,New Delhi (India), 1969, VIII, 264 and JC Willis, A dictionary of flowering plants and ferns, revised by HK Airyshaw. 1966.

28. Chopra RN, Nayar SL, Chopra IC. Glossary of Indian Medicinal Plants (CSIR, New Delhi). 1956: 205.

29. Makarov VA. *Chem Abst.* 1972; 76: 138196.

30. Yook HS, Kim KH, Park JE, Shin HJ. Antioxidative and antiviral properties of flowering cherry fruits (*Prunus serrulata* L. var. spontanea). *Am J Chin Med.* 2010; 38: 937-48.

31. Lee BB, Cha MR, Kim SY, Park E, Park HR, Lee SC. Antioxidative and anticancer activity of extracts of cherry (*Prunus serrulata* var. spontanea) blossoms. *Plant Foods Hum Nutr.* 2007; 62: 79-84.

32. "10 Best Places to Enjoy Cherry Blossoms in China". www.careerchina.com. 2023.

33. Nobuhiko, T. Why do Chinese people come to view cherry blossoms? Chinese people rediscovered cherry blossoms through Japan. NEC 2021.

34. Why Japanese-style cherry blossom viewing and cherry blossom viewing spots are on the rise in China. Diamond online. 2021

35. Wuhan City delegation to learns about cherry blossom management in Hirosaki Park. The Mutsu Shimpo. 2018.

36. China Now (24). Nishinippon Shimbun. 2017.

37. China's East Lake Cherry Blossom Gaeden sweat and tears of the unsung hero from Aomori. From Aomori in Japan-Local News & Article Site. 2019.

38. Cherry Blossom Spots. 19.

39. Wuxi International Cherry Blossoms Week. Cherry blossoms promote friendship between China and Japan. Agence France-Presse. 2019

40. Kurniawan V. "Phenology and morphological flower of *Prunus cerasoides* Buch.-Ham. Ex D. Don". IOP Conference Series: Earth Environ Sci. 2021; 948: 8.

41. Cherry blossom lures visitors to Cibodas Botanical Garden". thejakartapost.com. 2023.

42. "Northern Thailand's Own Sakura Cherry Blossoms". Siam and Beyond. 2014.

43. Sui C. "Ultimate Taiwan Cherry Blossom Guide — a cheaper and less touristy alternative to catch the flowers in bloom". The Travel Intern. 2023.

44. Pāgé, Navendu. "Cerasus cerasoids – Wild Himalayan Cherry". Flowers of India. 2014.

45. "efloraofindia species rosaceae *prunus*". efloraofindia.

46. *Prunus cerasoides* by Divya C. 2019 https://thepapyrus.in/index.php/sakura-magic-in-the-nilgiris-wild-cherry-blossom-pollachi-papyrus/

47. "Cherry Blossoms in Shillong". mapsofindia.com.

48. *"Prunus cerasoides"*. Germplasm Resources Information Network. Agricultural Research Service, United States Department of Agriculture. 2014.

49. Trees In Indian Art Mythology and Folklore, Bansi Lal Malla. 2000: 56.

50. Joseph N. "*Prunus cerasoides* D. Don: A Review on Its Ethnomedicinal Uses, Phytochemistry and Pharmacology". researchgate. Int J Pharm Sci Rev Res. 2023.

51. Verma S. "Celebrating Shivratri the Pahari style". himvani.com. 2023.

52. Jishtu V. "*Padmakh* (Pajja) – An Amazing Native Autumn Flowering Tree from Shimla Hills". Hillpost in. 2023.

53. Banerjee A. "Cherry blossom festival". Livemint. 2023.

54. Kamei Precious. "Shillong Cherry Blossom Festival". outlookindia. 2023.

55. Shahani S. "Cherry blossom festival takes place this month". cntraveller. 2023.

56. "A History of Tripitaka Koreana, the World's Greatest Collection of Buddhist Scriptures". 2017.

57. 팔만대장경을 만들어 낸 우리나무, 벚나무 [cherry tree which made the Palman Daejanggyeong] (in Korean).

58. 가슴과 어깨에 벚꽃을 꽂고 희생 다짐하는 18세 조종사 (in Korean). Joongang. 2023.

59. Ohnuki-Tierney, Emiko. Kamikaze, Cherry Blossoms, and Nationalisms. 2002: 122-3.

60. Sung-Un C. "Biting the cherry: Cherry blossoms and their attendant festivals herald the spring in Korea despite associations with a dark chapter with the country's history". IK-Journal. 2023.

61. "포트맥 강변의 왕벚나무도 제주도산" [King cherry around Potmac river derived from Jeju]. Chosun.com. 두 나라에서 발견된 왕벚나무는 유전적으로 동일합니다[Cherry trees found in both countries are genetically identical]. 2017

62. 국회•여의도 벚나무 90% 일본산 '소메이요시노 벚나무' (in Korean). New1 Korea. 2023.

63. ^ 국회•여의도 벚나무는 일본산… 토종 왕벚나무가 하나도 없다 (in Korean). Seoul Shinmun. 6 April 2022. Archived from the original on 7 April 2022. 2023.

64. 2050년 거리엔 '한국 벚꽃' 날리자…"벚꽃 해방" 나선 사람들 (in Korean). JoongAng I. Archived from the original on 11 April 2022. 2023.

65. 진해 군항제 벚나무는 일본 벚나무 일색」(in Korean). 내일신문. Archived from the original on 26 March 2023. 2023.

66. "Cherry Blossom". naver dictionary.

67. Kim MJ, Choi YA, Lee S, Choi JK, Kim YY, Kim EN, et al. *Prunus serrulata* var. spontanea inhibits mast cell activation and mast cell-mediated anaphylaxis. *J Ethnopharmacol.* 2019: 112484.

68. Jung HA, Chung HY, Jung JH, Choi JS. A new pentacyclic triterpenoidglucoside from *Prunus serrulata* var. spontanea. *Chem. Pharm. Bull.* (Tokyo). 2004; 52: 157-159.

69. Yook HS, Kim KH, Park JE, Shin HJ. Antioxidative and antiviral properties of flowering cherry fruits (*Prunus serrulata* L. var. spontanea). *Am J Chin Me*. 2010; 38: 937-48.

70. Lee BB, Cha MR, Kim SY, Park E, Park HR, Lee SC. Antioxidative and anticancer activity of extracts of cherry (*Prunus serrulata* var. spontanea) blossoms. *Plant Foods Hum Nutr.* 2007; 62: 79-84.