

DIVERSITY OF GENUS *SYZYGIUM* Gaertn. (MYRTACEAE Juss.) IN THE NORTH CENTRAL REGION OF VIETNAM

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This paper presents some research results on the diversity of the genus *Syzygium* in the North Central region of Vietnam from January 2022 to December 2023. There are 46 species belonging to *Syzygium* here; among 42 species that were collected and identified, 04 species were inherited from previous studies, and five species are newly recorded for the plant list of Central region of Vietnam. The stem forms of species are trees or shrubs, trees with 37 species and shrubs with nine species. The number of valuable plant species of the *Syzygium* is categorized as follows: 44 species supply essential oil (represented 95.65%), 32 species for timber (69.57%), 18 for edible and medicinal plants (39.13%).

Keywords: Diversity of species; Myrtaceae; *Syzygium*; the North Central; Vietnam.

1. Introduction

The North Central of Vietnam consists of 6 provinces stretching from Thanh Hoa to Thua Thien Hue. This region features a high degree of biodiversity with 14 conservation sections and biosphere reserves, so this place has also received substantial attention from scientists researching biodiversity. Until now, there have been many studies on the flora diversity in this area [1], [2], [3], [4], [5]. However, in-depth studies of the family and genus taxon are still limited.

In the flora, the Myrtaceae family is also a large family of Magnoliophyta, currently known with about 130 genera and 4500-5000 species [6]. *Syzygium* Gaertn. is the species-richest genus in the Myrtaceae family, with more than 1200 species of trees or shrubs currently recognized [6]. It is widely distributed in tropical and subtropic regions of the World, from Africa to South and Southeast Asia, southeastern Australia, New Zealand and the Pacific Islands, with the centre of species richness and highest levels of endemism reported as being in Southeast Asia [6]. In Vietnam, the *Syzygium* genus is also the most significant number of species, with about 54 species [6]. Many species in the *Syzygium* genus have many uses, such as wood, medicine, and essential oils [3], [4], [7], [8], [9]. However, until now, there has been no research on the diversity of the *Syzygium* genus in the North Central region.

This article provides data on the species composition, use value, and stem form of *Syzygium* Gaertn. species in the North Central region based on research results from January 2022 to December 2023 and based on published documents on the genus *Syzygium*.

2. Research subjects and methods

2.1. Subjects and scope research

The subjects of the study are *Syzygium* Gaertn., belonging to Myrtaceae.

Scope of research: National Parks (Ben En, Pu Mat, Vu Quang, Phong Nha - Ke Bang, Bach Ma) and Nature Reserves (Pu Luong, Xuan Lien, Pu Huong, Pu Hoat, Ke Go). In addition, samples are collected in some locations in Ky Son, Quy Chau, and Thanh Chuong districts.

Period time of research: From January 2022 to December 2023.

2.2. Research methods

2.2.1 Data inheritance method

Collectively and selectively inherited documents and scientific works related to the research project to synthesize information, apply it to the analysis and interpret the results.

2.2.2 Field survey method

Conducted more 35 field trips to survey, observe, describe, record data, and sample photographs.

Plant samples were collected and processed by [10]. In each study area, identified the main routes of investigation to study. The vestigation routes passing through different habitats typical of the study area.

2.3. Data analysis

Comparative morphological and expert methods were used to treat and identify plant samples. The documents used include [3], [6], [11], [12]. The scientific name of the plant species was edited and updated by [13], [14]. The plant list was arranged according to the taxonomy of Brummitt [15]. The use value was determined based on the results of consultation with local people and forest rangers and the results of searching documents from previous studies: [1], [2], [3], [4], [5], [6], [7], [8], [9], [11], [13], [16], [18], [19], [20], [21]. The stem form was determined based on field investigation results combined with descriptions in documents [4], [6], [13], [17].

3. Results and discussion

3.1. Diversity in species composition

Over 898 specimens of plants were collected, prepared and dried. These specimens were identified and preserved in the Herbarium of the Center of Practice - Experiment, Vinh University.

Based on research results from specimens obtained from field investigations, combined with data from previous studies [1], [2], [3], [4], [5], [6], [18], [19], [20], [21], it has been determined that in the study area, there are 46 species of the genus *Syzygium* as detailed in Table 1.

Table 1: List of species of the genus *Syzygium* in the North Central region

No.	Scientific name	Verneular name (Vietnamese)	Stem-form	Valuable uses
1	<i>Syzygium abortivum</i> (Gagnep.) Merr. & L.M.Perry	Trâm lạc thai	Mi	EO
2	<i>Syzygium acuminatissimum</i> (Blume) DC.	Thoa	Mg	Wo., ED, EO
3	<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry**	Đinh hương	Mi	Wo., M, ED, EO
4	<i>Syzygium attopeuense</i> (Gagnep.) Merr. & L.M.Perry	Trâm attopeu	Mi	EO, ED, M
5	<i>Syzygium balsameum</i> (Wight) Wall. ex Walp.	Trâm dầu	Mi	Wo., EO
6	<i>Syzygium boisianum</i> (Gagnep.) Merr. & L.M.Perry	Trâm bois	Mi	EO, M, Wo., ED
7	<i>Syzygium bullockii</i> (Hance) Merr. & L.M.Perry	Trâm bullock	Shr.	EO, M, ED
8	<i>Syzygium buxifolium</i> Hook. & Arn.	Trâm lá cà na	Mi	Wo., EO, M
9	<i>Syzygium chantaranothaianum</i> W. K. Soh & J. Parn.	Trâm	Me	EO
10	<i>Syzygium claviflorum</i> (Roxb.) Wall. ex Steud.	Trâm hoa mảnh	Mi	EO, Wo., ED
11	<i>Syzygium chloranthum</i> (Duthie) Merr. & Perry	Trâm hoa xanh	Mi	EO
12	<i>Syzygium coarctate</i> (Blume) Byng, N.Snow & Peter G.Wilson*	Trâm lớn	Mg	EO, Wo.
13	<i>Syzygium corticosum</i> (Lour.) Merr. & L.M.Perry	Trâm bội	Mi	EO, Wo.
14	<i>Syzygium cumini</i> (L.) Skeels	Vối rừng	Mg	Wo., EO, ED, M
15	<i>Syzygium fluviatile</i> (Hemsl.) Mer. & L. M. Perry*	Trâm suối lá nhỏ	Shr.	EO
16	<i>Syzygium formosum</i> (Wall.) Mason	Trâm lá chụm ba	Me	M, Wo., EO, ED
17	<i>Syzygium grande</i> (Wight) Walp	Trâm đại	Me	Wo., EO, M
18	<i>Syzygium hancei</i> Merr. & L.M.Perry	Trâm hance	Shr.	EO
19	<i>Syzygium hemisphericum</i> (Wight) Alston	Trâm trắng	Mg	Wo., ED
20	<i>Syzygium imitans</i> Merr. & Perry	Trâm sao	Mi	Wo., EO

No.	Scientific name	Verneular name (Vietnamese)	Stem-form	Valuable uses
21	<i>Syzygium irregulare</i> (Craib) Merr. & L.M.Perry*	Trâm không đều	Mi	EO
22	<i>Syzygium jambos</i> (L.) Alston	Roi	Mi	Wo., M, ED, EO
23	<i>Syzygium levinei</i> (Merr.) Merr.	Trâm núi	Me	Wo., EO
24	<i>Syzygium lineatum</i> (DC.) Merr. & L.M.Perry	Trâm hoa dài	Mi	ED, EO Wo.,M
25	<i>Syzygium malaccense</i> (L.) Merr. & L.M.Perry	Roi	Mi	Wo., M, EO, ED
26	<i>Syzygium myrtifolium</i> Walp.	Trâm mùi	Shr.	Wo., EO
27	<i>Syzygium nervosum</i> DC.	Trâm vôi	Me	M, Wo., ED, EO
28	<i>Szygium ngheanense</i> N.S.Lý, N.Đ.Đỗ & T.H.Lê	Trâm Nghệ An	Mi	EO
29	<i>Syzygium nigrans</i> (Gagnep.) Craven & Biffin**	Trâm vôi lá đen	Me	Wo., EO
30	<i>Syzygium oblatum</i> (Roxb.) Wall. ex A.M.Cowan & Cowan*	Trâm rộng	Mi	EO Wo., ED
31	<i>Syzygium odoratum</i> (Lour.) DC.	Trâm thơm	Me	Wo., EO
32	<i>Syzygium pachysarcum</i> (Gagnep.) Merr. & L.M.Perry	Trâm nạc dày	Shr.	Wo., EO, ED
33	<i>Syzygium petelotii</i> Merr. & L.M. Perry	Trâm petelot	Mi	EO, M
34	<i>Syzygium pierrei</i> (Gagnep.) Merr. & L.M.Perry	Trâm pierre	Mi	Wo., EO
35	<i>Syzygium ripicola</i> (Craib) Merr. & L.M.Perry**	Trâm suối	Mi	Wo.
36	<i>Syzygium rubicundum</i> Wight & Arn.**	Trâm đỏ thắm	Shr.	Wo., EO
37	<i>Syzygium samarangense</i> (Blume) Merr. & L.M.Perry	Roi	Mi	Wo., ED, M,EO
38	<i>Syzygium sterrophyllum</i> Merr. & L.M.Perry	Trâm lá cứng	Shr.	EO, M, Wo.
39	<i>Syzygium syzygioides</i> (Miq.) Merr. & L.M.Perry	Trâm kiên kiên	Mg	ED, Wo., EO
40	<i>Syzygium tephrodes</i> (Hance) Merr. & L.M.Perry	Trâm tro	Shr.	EO

No.	Scientific name	Verneular name (Vietnamese)	Stem-form	Valuable uses
41	<i>Syzygium thumra</i> (Roxb.) Mason*	Trâm hoa tròn	Me	EO, Wo.
42	<i>Syzygium tonkinense</i> (Gagnep.) Merr. & L.M.Perry	Trâm bắc	Me	EO
43	<i>Syzygium tsoongii</i> (Merr.) Merr. & L.M.Perry	Trâm quả trắng	Shr.	EO, Wo.
44	<i>Syzygium vestitum</i> Merr. & L.M.Perry	Trâm phủ	Mi	EO
45	<i>Syzygium zeylanicum</i> (L.) DC.	Trâm tích lan	Me	M, Wo., EO, ED
46	<i>Syzygium zimmermannii</i> (Warb. ex Craib) Merr. & L.M.Perry	Trâm zimmermann	Me	EO, M

Notes: *Additional species distributed in the North Central region; **Species inherited from documents recorded in the North Central region; M: Medicinal plants, EO: essential oil plants, ED: Edible plants, Wo: Wood; Mi: small tree, Me: medium tree, Mg: big tree.

Of the 46 recorded species of the *Syzygium* genus in the North Central region, we identified 42 species, of which four species were inherited from previous research results, including *S. aromaticum* [4], [21]; *S. ripicola* [4], [21]; *S. nigrans* [4] and *S. rubicundum* [21].

Compared with previous publications on species of *Syzygium* genus in Vietnam [1], [2], [3], [4], [5], [6], [12], [13], [18], [19], [20], [21], we added five species for the North Central of Vietnam: *S. fluviatile*, *S. irregular*, *S. Coarctatum*, *S. oblatum*, *S. thumra*.

3.2. Diversity of stem forms

Plants of the *Syzygium* genus were of 2 types: Trees and Shrubs, detailed in Table 2.

Table 2: Diversity of stem forms of species in the genus *Syzygium*

No.	Life form		No. of species	%
1	Trees	Mg	5	10.87
2		Me	11	23.91
3		Mi	21	45.65
4	Shrubs	Shr.	9	19.57
Total			46	100

Table 2 shows that the species of *Syzygium* genus are distributed in the North Central region in 2 stem types: trees with 37 species, accounting for 80.43% of the total number of species, and shrubs with nine species (19.57%). Among them, trees are divided into three groups: Big trees (Mg) with five species (10.87%), medium trees (Me) with 11 species (23.91%) and small trees (Mi) with 21 species (45.65%).

3.3. Diversity of helpful plant species

All 46 species recorded have valuable uses and are divided into four groups: essential oils, wood, medicinal plants, and edible. Among them, the essential oil group has the highest number of species (44 species, 95.65%), followed by wood (32 species, 69.57%). The medicinal and edible groups have 18 species (39.13%) (Figure 1).

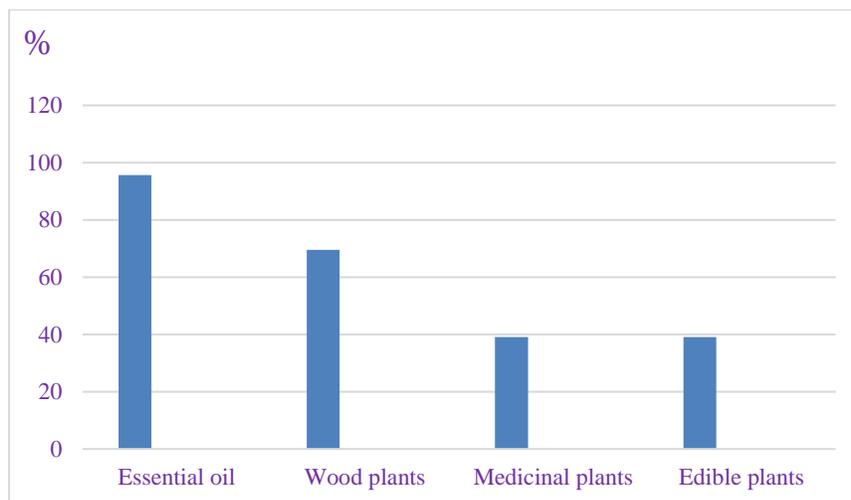


Figure 1: *Helpful plant species*

- *Essential oil plants*: Based on the document [1], [2], [3], [4], [5], [6], [7], [8], [9], [11], [13], [16], [18], [19], [20], [21] and our research results, there are 44 species of essential oils. Most parts of species (roots, stems, bark, leaves, twigs, flowers, fruits) contain essential oils. However, the content and ingredients are different depending on the part and species.

- *Wood plants*: Among the 46 identified species, 32 species are used for wood. However, the wood quality of the identified species is not very good. The wood of these species is often used to make household items or boats; very few species are used in house construction [4].

- *Medicinal plants*: Among the 46 species, 18 species can be used to make medicine. The parts used include leaves, bark, flowers, fruits, branches or roots. Different parts in different species can be used to treat many different diseases [4], [7], [8], [9], [13], [16], [18], [19], [20], [21]. These are the species used to treat diseases such as treat rheumatism, bone pain, and digestive:

+ *S. aromaticum*: Use flower bud as the digestive stimulant to treat flatulence, abdominal pain, and hiccups. Used externally to massage, straighten broken bones, and treat rheumatism, bone pain, fatigue, cold hands and feet, and rheumatism.

+ *S. attopeuense*: After soaking, the roots are used as an external medicine to massage and treat rheumatism, bone pain, aches and pains, cold hands and feet, and rheumatism.

+ *S. boisianum*: Use young leaves to treat stomachache.

+ *S. bullockii*: Leaves treat tuberculosis, cough, toothache, hepatitis, and diarrhoea. Roots treat rheumatism.

+ *S. buxifolium*: Roots and bark were pounded, powdered, and sprinkled to treat breast swelling, wheezing in children, falls, and fire burns. Leaves were used to treat ulcers.

+ *S. cumini*: Fruits and seeds have diuretic effects, help ease digestion, and treat diarrhoea. Seeds reduce blood sugar and urinary sugar for people with diabetes. Bark with high tannin (13 - 19%) treats mouth ulcers, washes wounds, tans leather, makes brown dye, and preserves fish. Roots are sometimes used to treat epilepsy.

+ *S. formosum*: Leaves treat swelling, inflammation, itching, urticaria, and scabies. Leaves are also used to treat sore throats and cystitis.

+ *S. grande*: Bark, roots, leaves, and fruit treat dysentery, diarrhoea, bleeding wounds, and diabetes-related diseases.

+ *S. jambos*: All parts can be used as medicine. The leaves treat infections, sore eyes, smallpox, rheumatism, and detoxification. The seeds and fruits treat diarrhoea, dysentery, and diabetes. The Roots treat epilepsy. The bark is used as medicine to treat skin fungus.

+ *S. lineatum*: Treats cancer.

+ *S. malaccense*: Bark is used to treat mouth ulcers, and leaves are used to treat menstrual disorders. Leaves and fruits can be used to treat fever. Roots can be used as a diuretic.

+ *S. nervosum*: Leaves heal wounds, relieve pain, disinfect wounds, and reduce necrosis. Bark treats digestive diseases such as diarrhoea, dysentery, diabetes, hypertension, gastritis and skin diseases.

+ *S. petilotii*: Used to treat dysentery, diarrhoea, and roundworms.

+ *S. samarangense*: Used to make antibacterial medicine, treat diarrhoea and fever.

+ *S. sterrophyllum*: The plant is used to treat measles and smallpox.

+ *S. zeylanicum*: Bark is used to treat dysentery, rheumatism, and syphilis and as a medicine for diabetes. Leaves and roots are used as an anthelmintic medicine.

+ *S. zimmermannii*: Flowers can be used to reduce fever.

- *Edible plants*: 18 *Syzygium* species are edible. The part used is the fruit or young leaves.

4. Conclusion

Research results on plant diversity of species in the genus *Syzygium* in the North Central region have identified:

1. Diversity of species composition: we have recorded 46 species. Four species were recorded from previous studies, and 42 species were identified from field investigations, and five species are newly recorded for the plant list of Central region of Vietnam.

2. Diversity of stem form: The stem form of species was determined: trees with 37 species accounted for 80.43% of the total number of species, and shrubs with nine species accounted for 19.57%.

3. Diversity of the use value of species: the use value of species was divided into four groups: Essential oil (44 species, 95.65%), wood (32 species, 69.57%), medicine and edible (18 species, 39.13%).

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TÓM TẮT

ĐA DẠNG CHI TRÂM (*Syzygium* Gaertn.) THUỘC HỌ SIM (MYRTACEAE Juss.) Ở KHU VỰC BẮC TRUNG BỘ

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Ngày nhận bài 17/10/2024, ngày nhận đăng 09/01/2025

Nghiên cứu về đa dạng chi Trâm (*Syzygium* Gaertn.) ở khu vực Bắc Trung Bộ được tiến hành từ tháng 01 năm 2022 đến tháng 12 năm 2023 nhằm đánh giá tính đa dạng về thành phần loài, giá trị sử dụng và dạng thân của các loài trong chi Trâm tại đây. Kết quả nghiên cứu đã xác định được 46 loài, trong đó đã bổ sung thêm vùng phân bố cho 05 loài ở khu vực Bắc Trung Bộ, bao gồm: Trâm lớn (*S. coarctatum*), Trâm suối lá nhỏ (*S. fluviatile*), Trâm không đều (*S. irregulare*), Trâm rộng (*S. oblatum*), Trâm hoa tròn (*S. thumra*). Tuy nhiên cũng có 4 loài đã ghi nhận trong các nghiên cứu trước, nhưng không gặp lại trong nghiên cứu này như: Đinh hương (*S. aromaticum*), Trâm suối (*S. ripicola*), Trâm vôi lá đen (*S. nigrans*) và Trâm đỏ thắm (*S. rubicundum*). Dạng thân của các loài trong chi Trâm ở đây thuộc 2 dạng là cây gỗ với 37 loài và cây thân bụi với 9 loài. Giá trị sử dụng của các loài được chia thành 4 nhóm chính: Cho tinh dầu với 44 loài, lấy gỗ có 32 loài, làm thuốc và ăn được cùng có 18 loài.

Từ khóa: Đa dạng thành phần loài; họ Sim; chi Trâm; Bắc Trung Bộ; Việt Nam.