Traditional knowledge on non-medicinal plants used by the tribal people in Nam Dong Commune, Quan Hoa district, Thanh Hoa province, northern Vietnam

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Abstract. The ethnobotanical survey was made among the Thai, Muong, and Kinh tribes in the Nam Dong Commune, Quan Hoa District, Thanh Hoa Province of northern Vietnam. The investigation mainly focused on the plants used for various non-medicinal purposes (like basket and rope making, construction, traditional decorations, the fish poison, food, and forage) through structured questionnaires and consultations with knowledgeable ethnic elders. Totally 62 plant species were identified as economically important plants in the traditional ethnic lifestyle in the area. The present study accentuates the significant role of ethnobotanical researches, which needs to be documented by the extraction of traditional knowledge pertaining to the use of plants by future generations.

1. Introduction

Apart from plants being used counter to some disease by many ethnic communities in traditional medicine, plants are also used as building materials, food, forage, traditional decorations, and other products of economic importance. The non-medicinal plants are known as the main economical supply of rural areas, especially with an ethnic minority in the mountainous countryside of northern Vietnam, where approximately 70% of farmers are landless. It also may be a lifeboat for their survival and existence in the area. Keeping the above points in mind We conducted our research to study the role of non-medicinal plants and villagers’ knowledge on the plants in the area. The study area was situated in Nam Dong Commune between 20°20′44″N – 20°19′16″N and 104°53′26″E – 104°54′47″E including the territory about 283 ha. It is located in the southwestern part of Quan Hoa District of Thanh Hoa Province in northern Vietnam. The territory of Nam Dong District is a hilly area with dominating elevations 600–900 m a.s.l. with a tropical climate, annual precipitation 1600–1700 mm, high annual humidity (86%), cool winter (15–20°C) and warm summer (27–34°C). Diverse natural conditions lead
to the formation of various forest types with very rich species composition. The forest covers over 86% of the area and harbors 1312 documented flowering plant species, which belong to 180 plant families [1-3]. Nam Dong Commune is comprised of about 565 farm families (households) of three ethnic minorities (Thai, Muong, and Kinh) [4]. Ethnic people in Nam Dong use more plants for various non-medicinal purposes such as basket and rope making, construction, and traditional decorations. They also use some plants for food purposes, as well as a fish poison for fishing, fodder, etc. In Nam Dong Commune, almost all villagers understand the characteristics of each plant, including wild plants, which are often grown for a daily use [4-6].

2. Methods and Materials

Seven field trips were undertaken in the Nam Dong Commune during 2016–2019. At each time of visit, the different groups were chosen at different seasons to collect seasonal information. The information was accrued after discussions with several tribal persons, the village head, the elder person, and other local informants. Sixty families (key informants) of different age groups (between the ages of 25–65 years old) were chosen as the sample group for the study. Repeated interviews through questionnaires were made in different groups to authenticate the information. The collected specimens of plants were identified by their names through the available relevant literature reported by Averyanov [7, 8], Nguyen [9, 10], Pham [11], Phung [12], Soejarto [13], Suk [14], Tran [15]. Plants (or their parts) were photographed and used for the preparation of the voucher herbarium specimens following the standard herbarium technique. These specimens were deposited in the herbarium of Vietnam National University of Forestry (VNF) and in the Herbarium of Komarov Botanical Institute of the Russian Academy of Sciences (LE).

3. Results and Discussion

3.1. Economically important plants

The tribal people are mainly dependent on plant resources for the construction of dwellings, making household implements, food supply for tribal groups, and domestic animals (table 1). Of the tribal used non-medicinal plants, 20% are used by Nam Dong people for commercial purposes as Non-Timber Forest Products. Most traditional houses rely on a large supply of suitable wood for basic components such as load-bearing posts, roof supports, walls, doors, etc. Thai, Muong, and Kinh tribals of Nam Dong area use Bauhinia khasiana, Kydia calycina, Pterospermum heterophyllum, and Streblus asper, for rope making. Fodder for domestic animals is of paramount importance in livestock keeping society. The most common plant species used for fodder homesteads are Alocasia macrorrhizos, Axonopus compressus, Colocasia esculenta, Cynodon dactylon, Ipomoea batatas, Musa itinerans, M. acuminata, Pentaphragma sinense, etc. A large number of sedges and grasses were mentioned as preferred fodder plants and a large number of plant species with high water content were explicitly used for forage during the dry season.

Table 1. Plants used by three tribal groups in Nam Dong Commune.

| Scientific name (family) | Local name | Uses                      |
|--------------------------|------------|---------------------------|
| Aphanamixis polystachya (Wall.) R. Parker (Meliaceae) | Gội gác | Timber for construction |
| Alocasia macrorrhizos (L.) G. Don (Araceae) | Ráy | Whole plant for fodder |
| Amentotaxus yunnanensis H.L. Li (Taxaceae) | Dẻ tùng Vân Nam | Timber for construction |
| Amesiodendron chinense (Merr.) Hu (Sapindaceae) | Trương mật | Timber for construction |
| Arenga pinnata (Wurmb) Merr. (Arecaceae) | Đoác | Leaf for decorative purposes |
| Axonopus compressus (L.) Pers (Poaceae) | Cò lá gừng | Whole plant for fodder |
| Baccaraea ramiﬂora Lour. (Phyllanthaceae) | Dâu da dát | Ripe fruit for food |
Bauhinia khasiana Baker (Fabaceae)  
Quạch mấu  
Stem bark to make ropes

Burretiodendron hsienmu W.Y.Chun & F.C.How (Malvaceae)  
Nghiến  
Timber for construction

Calamus nambariensis Becc. (Areaceae)  
Song mật  
Stem in basket making

C. tetradactylus Hance (Areaceae)  
Mây tát  
Stem in basket making

C. flagellum Mart. (Areaceae)  
Song  
Stem in basket making

Calanthe triplicata (Willemet) Ames (Orchidaceae)  
Lan đất hoa trắng  
Ornamental plant

Canarium tramdenum Dai. & Yakovl. (Burseraceae)  
Trám đen  
Timber for construction

Castanopsis indica A. DC (Fagaceae)  
Cà ổi Ấn độ  
Timber for construction

Caryota arenis L. (Areaceae)  
Mộc  
Leaf for decorative purposes

Centella asiatica (L.) Urb. (Apiaceae)  
Rau má  
Whole plant for food

Citrus maxima (Burm.) Merr. (Rutaceae)  
Bưởi  
Fruit for decorative purposes

C. medica L. subsp. bajoura Bonavia (Rutaceae)  
Thanh yên  
Fruit for decorative purposes

C. reticulata Blanco (Rutaceae)  
Quít  
Fruit for decorative purposes

Choerospondias axillaris (Roxb.) B.L.Burtt &A.W.Hill (Anacardiaceae)  
Dâu da xoan  
Ripe fruit for food

Clerodendrum cyrtophyllum Turcz. (Verbenaceae)  
Đắng cẩy  
Young leaf for food

Colocasia esculenta (L.) Schott (Araceae)  
Khoai nước  
Whole plant for fodder

Cynodon dactylon (L.) Pers (Poaceae)  
Cỏ gà  
Whole plant for fodder

Dendrocalamus patellaris Gamble (Poaceae)  
Giang  
Stem for basket making

Derris elliptica Benth. (Fabaceae)  
Dây mật  
Whole plant for fish

Dendrocalamus patellaris Gamble (Poaceae)  
Giang  
Stem for basket making

Dillenia indica L. (Dilleniaceae)  
Sô  
Ripe fruit for food

Dioscorea glabra Roxb. (Dioscoreaceae)  
Cú tử  
Root tuber for food

D. persimilis Prain et Burkill (Dioscoreaceae)  
Cú mài  
Root tuber for food

Diospyros cingulata (Burm.f) Underw. (Theaceae)  
Huỳnh dương  
Timber for construction

Embelia undulata Mez (Primulaceae)  
Chua ngọt  
Leaf for food

Erythropalum scandens Blume (Olacaceae)  
Bò khai  
Young leaf for food

Ficus auriculata Lour. (Moraceae)  
Vá  
Ripe fruit for food

Heritiera macrophylla Wall. ex Kurz (Malvaceae)  
Cui lá to  
Timber for construction

Houttuynia cordata Thumb. (Saururaceae)  
Điêu cá  
Whole plant for food

Ipomoea batatas (L.) Lam (Convolvulaceae)  
Khoai lang  
Whole plant for fodder

Kydia calycina Roxb.(Malvaceae)  
Bò kê  
Stem bark to make ropes

Madhuca pasquieri H.J.Lam (Sapotaceae)  
Sến mật  
Timber for construction

Maesa montana A. DC. (Primulaceae)  
Đơn nem  
Young leaf for food

Manglietia fordiana Oliv. (Magnoliaceae)  
Vàng tâm  
Timber for construction

Manghania stipulata (Wall.) Seem. (Bignoniaceae)  
Dinh  
Timber for construction
Melia azedarach L. (Meliaceae)  Xoan  Timber for construction
Meliantha suavis Pierre (Opiliaceae)  Rau sông  Young leaf and fruit for food
Millettia ichthyochtona Drake (Fabaceae)  Thàn mát  Fruit for fishing
Muntingia calabura L. (Muntingiaceae)  Trừng cá  Ripe fruit for food
Musa itinerans Chessman (Musaceae)  Chuỗi mọc tán  Whole plant for fodder
M. acuminata Colla (Musaceae)  Chuối  Whole plant for fodder
Nageia fleuryi (Hickel) de Laub (Podocarpaceae)  Kim giao  Timber for construction
Nauclea orientalis L. (Rubiaceae)  Gáo vàng  Stem bark for fishing
Oxalis corymbosa DC. (Oxalidaceae)  Chua me  Whole plant for food
Paphiopedilum hirsutissimum (Lindl. ex Hook.) Stein (Orchidaceae)  Tiễn hài  Ornamental plant
P. malipoense S.C.Chen & Z.H.Tsi (Orchidaceae)  Hài xanh  Ornamental plant
Phaius tankervilleae (Banks) Blume (Orchidaceae)  Hạc đỉnh  Ornamental plant
Parashorea chinensis Wang Hsie (Dipterocarpaceae)  Chò chỉ  Timber for construction
Passiflora foetida L. (Passifloraceae)  Lạc tiên  Young leaf for food
Pentaphragma sinense Hemsl. & E.H.Wilson (Pentaphragmataceae)  Rau tai voi  Whole plant for fodder
Peperomia pellucida (L.) Kunth (Piperaceae)  Càng cua  Whole plant for food
Persica vulgaris Mill. (Rosaceae)  Đào  Flower for decorative purpose
Pterocarya tonkinensis Dode (Juglandaceae)  Coi bắc bộ  Whole plant for fishing
Rosa chinensis Jacq. (Rosaceae)  Hoa hồng  Ornamental plant
Tagetes erecta L. (Asteraceae)  Vạn thọ  Ornamental plant

Nowadays, when pollution occurs in many places, and as many farmers apply large amounts of pesticides to cultivated vegetables, many wild vegetables are considered as safer for humans. This fact reveals that edible plant species hold a significant role in food security in rural mountainous areas, particularly in Nam Dong Commune with 100% of all households. Traditional wild edible plant products are used mostly as soup, boiled, spice, or eaten as a fresh vegetable [16].

3.2. Fish poison
The most effective method of fishing is the use of fish poison composed generally of the leaf and fruit extract of Derris elliptica, Nauclea orientalis, Millettia ichthyochtona, Pterocarya tonkinensis into a pool or stagnant water. After that, the fishes are paralyzed, rise to the water surface, become immovable, and are easily gathered. Fish poisons are also used in many other countries. The variation in used plants is particularly large in northwest Guyana and the Central African Republic, where the natives know at least 11 and 57 different fish poisons, respectively [17, 18].

3.3. Decorative purposes
Kinh people use several species as ornamental plants in their home gardens and temples. For example, flowers of Persica vulgaris, Rosa chinensis, Tagetes erecta, fruits of Citrus maxima, C. medical, C. reticulata, leaves of Arenga pinnata, Caryota urens. Whole cultivated plants of Calanthe triplicata, Paphiopedilum hirsutissimum, P. malipoense, Phaius tankervilleae, etc. are used for growing in home gardens and temples.
4. Conclusion
The knowledge of traditional plant use is still essential to the Nam Dong families living in the forest areas of Nam Dong Conservation Area. With changes in lifestyle and the associated decline of the use of plants, ethnobotanical knowledge might become depleted. The preservation of some native knowledge especially concerning economically important plants is noteworthy in the area. This result of the study revealed that Nam Dong people use many forest resources for their daily life.

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