

MAIN RESULTS OF INTERNATIONAL COOPERATIVE RESEARCH IN THE STUDY OF PLANT DIVERSITY IN VIETNAM, 1993-2002

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Abstract. Great progress in botanical explorations and scientific investigations in the field of plant diversity in Vietnam during past decade (1993-2002) have resulted in numerous new taxa and new additions to the flora of Vietnam. The collaborative efforts of the *Vietnam Botanical Conservation Program*, a scientific cooperation between the Institute of Ecology and Biological Resources (IEBR), Vietnam and the Missouri Botanical Garden (MBG), U.S.A. and of many other programs, including the *Program of the Basic Research in Natural Sciences*, Vietnam and the *Flora of Vietnam* project, have contributed to the revitalization of plant diversity research in Vietnam. In the past decade alone (1993-2002), more than two hundred new taxa, including thirteen genera, of higher vascular plants have been described. 77 new records of plants have been similarly documented. These findings accounted for a remarkable 3% increase in the flora. Significant gains in numbers of new taxa were made in the Orchidaceae, Myrsinaceae, Araceae, and Euphorbiaceae. The most spectacular discoveries are the new genus and species of conifer (*Xanthocyparis vietnamensis*), new genus and species of fern (*Caobangia squamata*), and two new genera and species of orchids (*Vietorchis aurea* and *Zeuxinella vietnamica*). The Vietnam Golden Cypress is the fourth new conifer genus described since 1948 while *Caobangia* is one of two fern genera recently described; the last new fern genera were described in the late 1960s. Most of new taxa and new records for the flora of Vietnam, were found in northernmost limestone areas and on high granite mountains.

1. Introduction

Vietnam is ranked as one of the most biologically diverse countries in the world and is widely recognized to have a globally significant proportion of rare and endemic species of plants and animals. A number of preliminary estimates of the flora (Nguyen Nghia Thin, 1997; Phan Ke Loc, 1998; Thai Van Trung, 2000) offer figures of about 9600 native species of higher vascular plants in Vietnam. In addition, about 750 cultivated species occur in Vietnam. An estimate of at least 2400 additional species is expected to be discovered and added to the flora. The

total number of native species of higher vascular plants known in Vietnam for the time being is about 9,628 species in 2,010 genera and 291 families (Phan Ke Loc, 1998). This is a remarkably diverse flora for a relatively small country like Vietnam. The ten largest families in this flora are Orchidaceae (897 species) (Averyanov & Averyanova, 2003), Fabaceae *s.l.* (557), Poaceae (467), Euphorbiaceae (416), Rubiaceae (395), Cyperaceae (304), Asteraceae (291), Lauraceae (245), Fagaceae (211) and Acanthaceae (177) (Phan Ke Loc, 1998).

The flora of Vietnam is not only large, but also rich in endemic species, adding to its significance. The proportion of endemics has been variously recorded, ranging from 20 percent (Pocs Tomas, 1965) to as high as 27.7 percent (Thai van Trung, 2000). A more conservative estimate suggests that about 10% of species and 3% of genera in this flora are endemic to Vietnam (Vo Quy, 1995). Among 291 vascular plant families reported for Vietnam, the highest levels of endemism are observed in the families Acanthaceae, Anacardiaceae, Annonaceae, Apocynaceae, Araceae, Arecaceae, Asclepiadaceae, Celastraceae, Ericaceae, Euphorbiaceae, Fagaceae, Myrsinaceae, Rubiaceae, Sapindaceae, Sapotaceae, Symplocaceae, Theaceae and Zingiberaceae (Schmid, 1974; Takhtajan, 1986; Rundel, 1999). A recent inventory of the orchid species in Vietnam places endemicity of the family at 20% (Averyanov & Averyanova, 2003).

2. Previous studies on the flora of Vietnam

Our understanding of the flora of Viet Nam, albeit incomplete, is attributed to several fundamental taxonomic publications, such as "Flora Cochinchinensis" (Loureiro, 1790, 1793), "Flore Gônôrale de l' Indo-Chine" (Lecomte & Humbert (eds.), 1907-1951), "Flore du Cambodge, du Laos et du Viet-Nam" (Aubrôville, Leroy & Morat (eds.), 1960-2001), "An illustrated flora of Vietnam" (Pham Hoang Ho, 1991-1993, 1999-2000), "Vascular plant synopsis of Vietnamese flora" (Averyanov, et al., 1990, 1996) and a number of large recent floristic and taxonomic studies. Analyses of the systematic structure of the flora have been done by Phan Ke Loc (1998) and Le Tran Chan (1999).

The flora of Vietnam is being written, in French, as part of the regional flora *Flore du Cambodge, du Laos et du Viet Nam*, but the progress has been slow. From 1960-2001, it has published seventy-four families, which comprised only 26% (74/291) of the total number of families in Vietnam. Most major groups have not been revised, including Acanthaceae, Asteraceae, Cyperaceae, Euphorbiaceae, Ericaceae, Fagaceae, Lamiaceae, Lauraceae, Moraceae, Orchidaceae, Poaceae, Pteridophyta, Rubiaceae, Urticaceae, and Zingiberaceae.

Perhaps Loureiro gathered the first collections of herbarium specimens in Vietnam before 1790. Mostly French collectors, such as Balansa, Chevalier, Eberhardt, Harmand, Pôtelot, Pierre, Schmid, Thorel, Vidal, and especially Poilane, collected a majority of the extant specimens during the first four decades of the past century. Estimates of the number of collections made by these botanists is around 75,000 with a majority of the specimens deposited in the herbarium at the

Laboratoire de Phanogamie, Muséum National d'Histoire Naturelle in Paris (P) and several thousands duplicates kept in Herbaria of Institute of Tropical Biology, NCST in Ho Chi Minh City (HM) and the Department of Botany of the Vietnam National University in Hanoi (HNU).

3. International cooperative activities

After 1945, Vietnam has been racked by continuous warfare. There has been little botanical exploration in the country since the French colonial times. After the sweeping economic reforms in the 1990s Vietnamese botanists have sought larger foreign technical assistance and have more actively collaborated with their colleagues abroad in the study of Vietnam's flora. International cooperative agreements were made with the following institutions: Missouri Botanical Garden (U.S.A.), Komarov Botanical Institute (Russia), Royal Botanic Gardens, Kew (U.K.), National Herbarium of New South Wales (Australia), Singapore Botanic Gardens (Singapore), Kunming Botanical Institute (China), and with international conservation organizations working in Vietnam, namely, International Union for the Conservation of Nature (IUCN), World Wildlife Fund for Nature (WWF), and the Fauna and Flora International (FFI).

3.1. MBG-IEBR Vietnam botanical conservation program

The Missouri Botanical Garden (MBG) has collaborated with the Institute of Ecology and Biological Resources (IEBR) since 1994, when the two institutions signed a Memorandum of Understanding for mutual scientific cooperation. Several MBG botanists began collecting in Vietnam after 1994, and in 1998 the Missouri Botanical Garden and the American Museum of Natural History received a grant from the National Science Foundation to inventory the flora and fauna of threatened protected areas in Vietnam. In 1999, the Missouri Botanical Garden established an office in Hanoi and began to collaborate with scientific institutions and conservation agencies in a Vietnam Botanical Conservation Program. The collaborating partners in the program now include the Institute Materia Medica (IMM), the Department of Botany of the Vietnam National University, Hanoi (VNU), and the Forest Inventory and Planning Institute (FIPI). The program is currently carrying out an integrated project involving elements of botanical research in plant diversity, training, and conservation under a grant from the Henry Luce Foundation. This multi-tiered training program provides hands-on training in botanical field collecting, data recording, plant identification, and curatorial techniques for park rangers employed in protected areas and national parks, technical staff members of partner institutions, and university students.

3.2. Basic research in natural sciences, Vietnam

There are some grants for the investigation of threatened cycads and conifers of Vietnam, and for the study of plant diversity of some protected areas and national parks.

3.3. Flora of Vietnam project

Recently the first four volumes: Annonaceae (Nguyen Tien Ban, 2000), Lamiaceae (Vu Xuan Phuong, 2000), Cyperaceae (Nguyen Khac Khoi, 2002), and Myrsinaceae (Tran Thi Kim Lien, 2002) have been published. During the preparation of these volumes and for the forthcoming ones, many of the specimens collected by Vietnam Botanical Conservation Program have been studied and cited.

4. Scientific contributions of international cooperative research

4.1. New herbarium collections

The international cooperative research activities have generated new specimens using modern data collection methods and have contributed significantly to our knowledge of the rich flora of Vietnam. Over the past ten years, international botanical teams conducted surveys in 80 sites in 22 provinces. More than 15,700 collection numbers with about 78,500 duplicate specimens were collected. Main part of collections have been kept in the Herbarium of the Institute of Ecology and Biological Resources (HN), other duplicates were distributed to well-known botanical institutions in the United States (MO), Russia (LE), etc.

4.2. Increased publications and information dissemination

A survey of the botanical literature, using the online version of the Kew Records of Taxonomic Literature (<http://www.rbgekew.org.uk/kr/KRHomeExt.html>), showed a dramatic increase in the number of publications on the Vietnam flora in mid-1990's when the international cooperative activities took place (Figure).

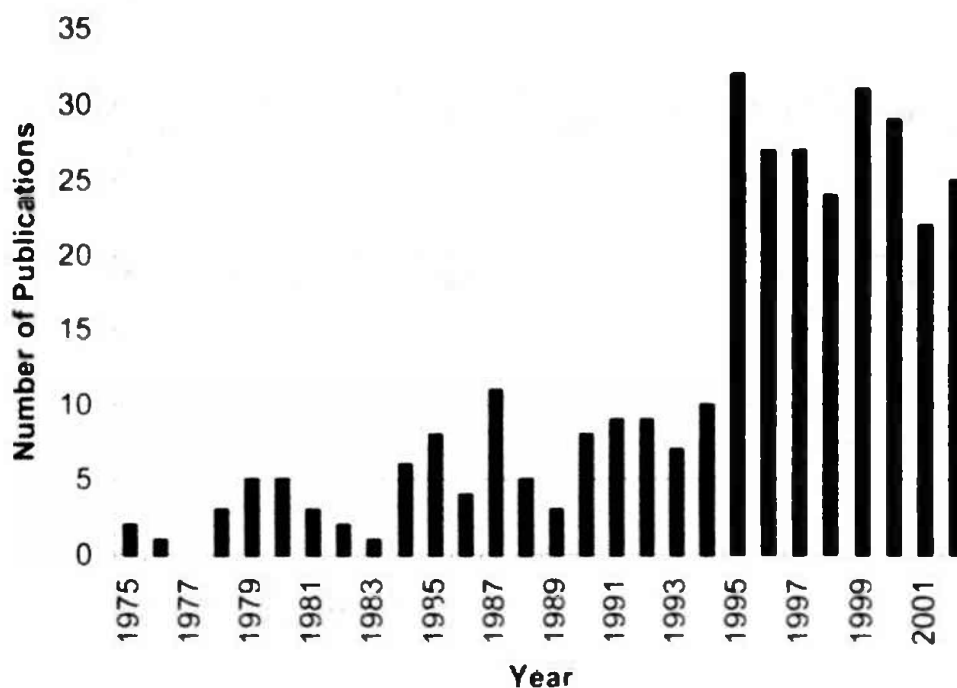


Figure 1. Rate of publications on Vietnam flora from 1975-2002.

4.3. Improved research capacity of Vietnamese institutions

As part of the goal of improving the research capacity of botanical institutions in Vietnam, the cooperative projects have purchased herbarium equipment and supplies, such as herbarium cases, plant presses and dryers, dissecting scopes, air conditioners, and computers. A reference library has been created by purchasing and donating books and photocopying journal articles. In order to improve the technical capacity, some junior scientists have been able to attend training courses held in Kunming (China) and Singapore and to pursue graduate studies in St. Petersburg (Russia) and St. Louis (U.S.A.).

4.4. Contributed to biodiversity conservation strategies in Vietnam

Botanical research has provided primary, up-to-date, and trustworthy data that formed the scientific basis for the conservation efforts of rare and endangered plant species in Vietnam. New plant discoveries have been used as a basis for *in situ* conservation in nature reserves where these plants have been found. Among the notable examples of these are in Bat Dai Son (set aside for the protection of conifer and orchid species, particularly the new conifer, *Xanthocyparis vietnamensis*), in Van Ban- Lao Cai (where *Taiwania cryptomerioides* was first recorded in Vietnam), and in Halong Bay World Heritage Site (*Cycas tropophylla*, *Livistona halongensis* and several new species for science). The scientific data were also used to evaluate the conservation status of many threatened taxa in Vietnam and to supplement the Red Data Book of Vietnam for plants. Finally, botanical research has provided new information for the Appendix for CITES, Decision of Government related to threatened species that are essential in order to effectively control international trade conforming to CITES and to implement strategies for the sustainable utilization of plant diversity in Vietnam.

4.5. New discoveries

Only a few of collected specimens was thoroughly studied but the international cooperative efforts have resulted in numerous and exciting plant discoveries. Thirteen new genera (Table 1) and 216 new species were described from 1993-2003, including 77 new records for the flora of Vietnam. Two families, Nartheciaceae and Coriariaceae, were found new to Vietnam flora (Regalado, *et al.*, 2003). These discoveries added 293 species to the flora of Vietnam, contributing to 3% (293/10,000) increase in the flora (Table 2). Significant gains in numbers of new taxa were made in the Orchidaceae (63 species), Myrsinaceae (34 species), Araceae (27 species), and Euphorbiaceae (15 species). Detailed lists of all new taxa for science and/or new discoveries for the flora of Vietnam taxa and related literature have been published (Regalado, *et al.*, 2003).

Table 1. New genera for Vietnam described from 1993-2003.

Family	Genus	Place of Publication
Orchidaceae	<i>Zeuxinella</i> Aver.	Updated checklist of the orchids of Vietnam, p. 96. Vietnam National University Publishing House, Hanoi (2003)
Orchidaceae	<i>Vietorchis</i> Aver. & Averyanova	Updated checklist of the orchids of Vietnam, p. 92. Vietnam National University Publishing House, Hanoi (2003)
Polypodiaceae	<i>Caobangia</i> A.R. Sm. & X.C. Zhang	Novon 12(4): 546-550 (2002)
Cupressaceae	<i>Xanthocypris</i> A. Farjon & T.H. Nguyen	Novon 12(2): 179-189 (2002)
Araliaceae	<i>Metapanax</i> J. Wen & D.G. Frodin	Brittonia 53(1): 117 (2001)
Rubiaceae	<i>Rubovietnamia</i> D.D. Tirvengadam	Biogeographica 74(4): 166 (1998)
Rubiaceae	<i>Vidalasia</i> D.D. Tirvengadam	Biogeographica 74(4): 164 (1998)
Rubiaceae	<i>Fosbergia</i> D.D. Tirvengadam & C. Sastre	Biogeographica 73(2): 88 (1997)
Zingiberaceae	<i>Distichochlamys</i> M.F. Newman	Edinburgh J. Bot. 52(1): 65 (1995)
Araliaceae	<i>Grushvitzkya</i> N.T. Skvortsova & L.V. Averyanov	Bot. Zurn. (Leningrad) 79(7): 108 (1994)
Asclepiadaceae	<i>Vietnamia</i> P.T. Li	J. S. China Agric. Univ. 15(4): 72 (1994)
Poaceae	<i>Vietnamochloa</i> J.F. Veldkamp & R. Nowack	Bull. Mus. Natl. Hist. Nat., B, Adansonia, Sér. 4, 16(2-4): 214 (1994)
Orchidaceae	<i>Christensonia</i> J.R. Haager	Orchid Dig. 57(1): 40 (1993)

Table 2. Summary of discoveries for Vietnam flora.

	New species	New species records
Ferns	1	10
Cycads	1	8
Conifers	1	5
Dicots	106	12
Monocots	107	42
Total:	216	77

The most spectacular findings are the new genera and species of a cupressoid conifer, *Xanthocypris vietnamensis* (Farjon, et al., 2002) and polypodiaceous fern,

Caobangia squamata (Smith & Zhang, 2002). The Vietnam Golden Cypress is the fourth new conifer described since 1948. The unusual conifer bears both juvenile needle and mature scale leaves on the same branches of mature trees. This species closely resembles the Nootka Cypress (*Chamaecyparis nootkatensis* = *Xanthocyparis nootkatensis*) of western North America, reflecting ancient links between eastern Asia and western North America. On the other hand, *Caobangia* is one of two fern genera recently described. The discovery of a new genus of fern is an uncommon event. Quite recently, a new fern genus was described from Korea in 2001 but previous to that, the last such new genera were described in the late 1960's.

Results of the study have proven that the plant diversity in the limestone areas of the northern Vietnam is very rich and diverse, but is far from known yet. A lot of new taxa for science and/or new discoveries for the flora of Vietnam were found there. There are genera new for science, such as the fern genus *Caobangia*, the conifer genus *Xanthocyparis*, two orchid genera *Vietorchis* and *Zeuxinella*, *Grushvitzkya* of the family *Araliaceae*, and some other ones, and several species new for science, such as the fern species *Caobangia squamata*, the conifer species *Xanthocyparis vietnamensis*, and *Amentotaxus hatuyenensis*, more than fifty new orchid species, especially slipper orchids (*Paphiopedilum hangianum*, *P. helenae*, *P. herrmannii*, *P. tranlienianum*, and *P. vietnamense*), etc, were found there (Regalado, *et al.*, 2003). New discoveries for the flora of Vietnam are two angiosperm families *Coriariaceae* and *Nartheciaceae*, one fern genus *Anogramma*, one coniferous genus *Pseudotsuga*, some angiosperm genera as *Aletris*, *Anredera*, *Coriaria*, *Gardneria*, a lot of species such as 4 fern species, 3 coniferous species (*Pseudotsuga brevifolia*, *Keteleeria davidiana*, and *Tsuga chinensis*), 5 slipper orchid species (*Paphiopedilum barbigerum*, *P. dianthum*, *P. micranthum*, *P. henryanum*, and *P. malipoense*) and many other orchid species, etc. These limestone areas have 14 out of 18 slipper orchid species of Vietnam, and are most important centers of diversity of the slipper genus in general. Nearly two third of known in Vietnam coniferous species (21 out of 33 species) is found also here. Habitats of most cited genera and species are coniferous *Pseudotsuga brevifolia* forest on the ridges and tops of submontane mountains, and broad-leaved *Burretiodendron hsienmu* forest on slopes of lowland mountains.

5. Conclusions

The present knowledge of the plant diversity in Vietnam reveals that the flora is very rich but far from being completely understood. Many new taxa are still waiting to be discovered. Botanical explorations in mountainous regions, particularly along western and northern border areas of Vietnam, are expected to yield more interesting and important additions to the flora. However, with the rapid environmental degradation as a result of the country's opening of an international market economy, it is a race against time to find and document these species. In order to accomplish this, international cooperation has to be expanded and the collection of herbarium specimens must be accelerated.

Acknowledgments. Field work and laboratory studies that resulted in a number of exciting botanical discoveries which are summarized in this paper were funded by various grants from the following sources for which we give thanks: U.S. National Geographic Society (grants #5094-93, 5803-96, 6300-98, 6383-98, 6733-00), U.S. National Science Foundation (grant # DEB-9870231), Fauna and Flora International, American Orchid Society, San Diego County Orchid Society Conservation Committee, the Henry Luce Foundation, and the Basic Research in Natural Sciences Program (grant # 6.110.01).

Literature cited

1. Aubréville, A., Leroy, J.F., Morat, Ph. (eds.). *Flore du Cambodge, du Laos et du Vietnam. Fasc. 1-30*. Paris. 1960-2001.
2. Averyanov, L.V. et al. (eds.). *Vascular plant synopsis of Vietnamese flora. Vol. 1-2*. Nauka, Leningrad. 1990-1996 (in Russian).
3. Averyanov, L. V. & A.L. Averyanova. Updated Checklist of the Orchids of Vietnam. Vietnam National University Publishing House, Hanoi. 2003, 101 pp. (in English and Vietnamese).
4. Farjon, A., Hiep, N.T., Harder, D.K., Loc, P.K., and Averyanov, L.V. A new genus and species in Cupressaceae (Coniferales) from northern Vietnam, *Xanthocyparis vietnamensis*. *Novon* 12(2) (2002), pp. 179-189.
5. Le Tran Chan, *Some Basic Characteristics of Vietnam Flora*. Science and Technics Publ. House, Hanoi, 1999, 307 pp. (in Vietnamese).
6. Lecomte, M.H. and Humbert, H. (eds.). *Flore Générale de l'Indochine. Vol. 1-7, Supplément*, Paris, 1907-1951.
7. Loureiro, J. *Flora Cochinchinensis*, T. 1-2, *Lisboa*, 1790, 744 pp.
8. Loureiro, J. *Flora Cochinchinensis*. Ed. 2. T. 1-2, *Berolini*, 1793, 882 pp.
9. Nguyen Khac Khoi, *Flora of Vietnam. Vol. 3. Cyperaceae*, Science and Technics Publ. House, Hanoi. 2002, 570 pp. (in Vietnamese).
10. Nguyen Nghia Thin, *Manual on Research of Biodiversity*, Agr. Publ. House, Hanoi. 1997, 223 pp. (in Vietnamese).
11. Nguyen Tien Ban, *Flora of Vietnam. Vol. 1. Annonaceae*, Science and Technics Publ. House, Hanoi, 2000, 342 pp. (in Vietnamese).
12. Pham Hoang Ho, *An Illustrated Flora of Vietnam, 3 vols, 6 parts*, Mekong Printing, Santa Ana, California. 1991-1993 (in Vietnamese).
13. Pham Hoang Ho, *An Illustrated Flora of Vietnam, 2nd ed., 3 vols*. NXB Tre, 1999-2000 (in Vietnamese).
14. Phan Ke Loc, On the systematic structure of the Vietnamese flora. In Zhang, A. and S. (eds.), *Floristic Characteristics and Diversity of East Asian Plants*, Beijing and Berlin, 1998, pp. 120-129.
15. Pocs, T. Analyse aire-géographique et écologique de la flore du Vietnam Nord. *Acta Acad. Paed. Agriens (Eger), nouv. sér.* 3 (1965), pp. 395-452.
16. Regalado, J., D. Harder, Nguyễn Tiến Hiệp, Nguyễn Thị Thanh Hương, L. Averyanov, Phan Kế Lộc, Các taxôn thực vật bậc cao có mạch mới cho khoa học và/hoặc bổ sung cho

- hệ thực vật Việt Nam. *Những vấn đề nghiên cứu cơ bản trong khoa học sự sống*, Nxb Khoa học và Kỹ thuật, Hà Nội, 2003, pp. 145-149.
17. Rundel, P.W., *Conservation Priorities In Indochina - WWF Desk Study. Forest habitats and flora in Lao PDR, Cambodia, and Vietnam*, World Wide Fund for Nature, Indochina Programme Office, Hanoi, 1999, 194 pp.
 18. Schmid, M. *Végétation du Vietnam: le Massif Sud-Annamitique et les régions limitrophes*, Mém. ORSTOM 74, Paris, 1974, 243 pp.
 19. Smith, A.R., Zhang, X.C., Caobangia, a new genus and species of Polypodiaceae from Vietnam. *Novon* 12(4) (2002), pp. 546-550.
 20. Takhtajan, A., *Floristic Regions of the World*, Univ. California Press, Berkeley, Los Angeles, London, 1986, 522 pp.
 21. Thái Van Trung, *The Tropical Forest Ecosystems in Vietnam*, Science and Technic Publ. House, Ho Chi Minh city branch (2000), 276 pp. (in Vietnamese, summary in French).
 22. Tran Kim Lien, *Flora of Vietnam. Vol. 4. Myrsinaceae*, Science and Technics Publ. House, Hanoi, 2002, 237 pp. (in Vietnamese).
 23. Vo Quy, Conservation of flora, fauna, and endangered species in Vietnam, *Tropical Forest Ecosystems/ BIOTROP Special Publication* 55 (1995), pp. 139-146.
 24. Vu Xuan Phuong, *Flora of Vietnam. Vol. 2. Lamiaceae*, Science and Technics Publ. House, Hanoi, 2000, 278 pp. (in Vietnamese).

TAP CHÍ KHOA HỌC ĐHQGHN, KHTN & CN, T. XIX, N₀4, 2003

NHỮNG KẾT QUẢ CHỦ YẾU CỦA VIỆC HỢP TÁC NGHIÊN CỨU QUỐC TẾ VỀ TÍNH ĐA DẠNG THỰC VẬT Ở VIỆT NAM, GIAI ĐOẠN 1993-2002

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Viện Sinh thái và Tài nguyên sinh vật, TTKHTN & CNQG

Những nỗ lực hợp tác quốc tế của Chương trình bảo tồn thực vật Việt Nam, một chương trình hợp tác khoa học giữa Viện Sinh thái và Tài nguyên sinh vật, Việt Nam với Vườn thực vật Mitxuri, Hoa Kỳ và của nhiều chương trình khác, trong đó có Chương trình nghiên cứu cơ bản trong khoa học tự nhiên và đề án Thực vật chí, Việt Nam đã góp phần thúc đẩy mạnh mẽ những nghiên cứu đa dạng thực vật ở Việt

Nam. Chỉ trong 10 năm qua (1993-2002) hơn 200 taxôn Thực vật bậc cao có mạch mới cho khoa học đã được mô tả, trong đó có 12 chi. Ngoài ra đã bổ sung cho hệ thực vật Việt Nam 77 loài khác.

Những nỗ lực hợp tác quốc tế của *Chương trình bảo tồn thực vật Việt Nam*, một chương trình hợp tác khoa học giữa Viện Sinh thái và Tài nguyên sinh vật, Việt Nam với Vườn thực vật Mitxuri, Hoa Kỳ và của nhiều chương trình khác, trong đó có *Chương trình nghiên cứu cơ bản trong khoa học tự nhiên* và đề án *Thực vật chí*, Việt Nam đã góp phần thúc đẩy mạnh mẽ những nghiên cứu đa dạng thực vật ở Việt Nam. Chỉ trong 10 năm qua (1993-2002) hơn 200 taxôn Thực vật bậc cao có mạch mới cho khoa học đã được mô tả, trong đó có 12 chi. Ngoài ra đã bổ sung cho hệ thực vật Việt Nam 77 loài khác. Những phát hiện mới đó đã nâng tổng số loài biết được của hệ thực vật Việt Nam lên 3 %. Nhiều taxôn mới cho khoa học tìm thấy trong các họ Lan Orchidaceae (63 loài), Đơn nem Myrsinaceae (34 loài), Ráy Araceae (27 loài), và Thầu dầu Euphorbiaceae (15 loài). Những phát hiện mới nổi bật nhất là chi và loài *Bách vàng Xanthocyparis vietnamensis*, chi và loài *Ráng vẩy cao bằng Caobangia squamata* và 2 chi Lan việt Vietorchis và Zeuxinella. Bách vàng là chi Thông thứ 4 của thế giới được mô tả từ 1948 cho đến nay, còn Ráng vẩy cao bằng là chi Ráng thứ hai của thế giới được mô tả từ 1960 cho đến nay. Rất nhiều phát hiện mới được ghi nhận ở vùng núi đá vôi thuộc đai núi thấp rộng lớn của bắc Việt Nam và ở vùng núi đá granít thuộc đai núi trung bình khắp cả nước. Riêng vùng núi đá vôi kể trên là trung tâm đa dạng cao nhất của chi Lan hài Paphiopedilum, là nơi có nhiều loài của lớp Thông nhất của Việt Nam và là nơi có nhiều loài đặc hữu hẹp