

Dataset of 333 Climbing Seed Plants and Their Reproductive Habits in Karst Seasonal Rain Forest in Nonggang, Guangxi, China

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Abstract: Climbing plants are important vegetation components of tropical forest ecosystems. The recorded information on climbing plants in the Nonggang National Nature Reserve from 1979 to 2013 were collected, it was integrated with the data and information from the field investigation and monitoring from 2013 to 2017, and then, the 333 climbing seed plants and their reproductive habits compiled in a dataset for the Karst seasonal rain forest in Nonggang, Guangxi, China was developed. This dataset consists of two parts: (1) data concerning species' identity, growth form, flowering time, fruiting time, fruit types, and habitat of climbing seed plants; (2) photographs of the field works. The dataset is archived in .jpg, .pdf, and .xlsx data formats, with a size of 75.7 MB (compressed into one file, 75.4 MB). The study based on this dataset was published in the *Chinese Journal of Plant Ecology* (Vol. 41, No. 7, 2017).

Keywords: Chinese Journal of Plant Ecology; climbing seed plant; growth form; habitat; Karst seasonal rain forest; reproductive habit

1 Introduction

Climbing plants (or vines) are groups of structural parasites of other plants, namely trees, and their climbing behavior is conspicuous. The species diversity and abundance of climbing plants are highest in tropical regions, where they play key roles in tropical forest ecosystems^[1]. Climbing plants can compete intensely with trees for both above- and below-ground space and resources^[2-3]. They exploit their host tree's architecture to display their leaves above tree crowns, intercepting the light and reducing light availability for plants below the canopy. Because of their reputed well-developed root systems, climbing plants are thought to be particularly adept at competing for water and nutrients. These competitive interactions strongly influence the structure, dynamics, and functioning of forest ecosystems.

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[2] Jiang, Y. L., Xiang, W. S., Wang, B., *et al.* 333 climbing seed plants and their reproductive habit dataset in Karst seasonal rain forest in Nonggang, Guangxi, China [DB/OL]. Global Change Research Data Publishing & Repository, 2018. DOI: 10.3974/geodb.2018.06.16.V1.

Because climbing plants tend to grow faster than trees do in canopy-disturbed environments, their abundance and biomass there is considerably increased^[4]. Some research shows that climbing plants are now increasing in both abundance and biomass and this is likely driven by global climate change^[5–6]. However increasing climbing plants abundance and biomass were not found in African forests^[4].

Karst seasonal rain forest in a well-preserved state can be found in Nonggang (Guangxi, China), where it plays an important role in maintaining the ecological security of this tropical region. Knowledge of the taxonomic diversity and reproductive characters of climbing plants in this Karst seasonal rain forest will contribute to general forest ecology research, and is a per-requisite for better understanding and monitoring forest function and health. To this end, we sorted out the available information recorded from 1979 to 2013 on climbing plants in the Nonggang National Nature Reserve, wherein we carried out follow-up field investigations and *in situ* monitoring from 2013 to 2017. This led us to acquiring and identifying 333 climbing seed plants and their reproductive habits, which we compiled in this dataset for Karst seasonal rain forest of Nonggang, Guangxi, China.

2 Metadata of Dataset

The metadata for the dataset^[7] is summarized in Table 1. This includes the dataset full name, short name, authors, geographical region, year of the data, data format, data size, data files, publisher, data sharing policy, etc.

3 Methods

3.1 Data Collection and Processing

The study site is the Nonggang National Natural Reserve (22°13'56"N–22°33'09"N, 106°42'28"E–107°04'54"E), located in the Guangxi Zhuang autonomous region of southern China. This tropical region has an annual mean temperature of 22 °C. Rainfall is concentrated in June-to-August, and annual precipitation ranges from 1,150 to 1,550 mm. This reserve protects the nationally important (even internationally important) aboriginal Karst seasonal rainforest. Its landform is characterized by the Fengcong depression, an area that comprises a combination of clustered peaks sharing a common base and funneled landscapes, ranging in elevation from 150 to 600 m.

We gathered and recorded species name, the family name, genus name, and other important information as following items.

(i) Growth form. By referring to the categories proposed by Putz^[9], we assigned climbers into three growth groups: herbaceous vines, lianas, and bush ropes. Herbaceous vines are annual mostly, and are climbing or sprawling herbs incapable of self-support because their stems are slender and cannot be continually enlarged. Lianas are perennial, climbing or sprawling woody plants; their stem diameter can increase as they grow and develop, but they depend on other plants for direct support, or as an indirect backstop, to ascend into the canopy. Bush ropes are perennial, climbing woody plants; their stems diameter can increase with the growth process and they also require support from other plants (or a backstop) to grow upwardly, but unlike lianas they can remain free-standing in shrub form for their entire lifespan.

(ii) Flowering time and fruiting time. The time was recorded on a monthly basis. If the specimen was in flower or fruiting, its collecting date was either flowering time or fruiting time. In our field monitoring, we observed the phenology of climbing seed plants, and doc-

umented their flowering and fruiting time.

(iii) Fruit types. In this research, fleshy fruit and dry fruit are two main fruit types according to whether or not they have a pericarp and its features^[10]. The former includes berry, drupe, pome, etc., while the latter consists of legume, follicle, capsule, achene, samara, seed of gymnospermae, etc. To determine the fruit type of a climbing seed plant, we referred to the description of its fruit given for the Flora of China^[11] and the Flora of Guangxi^[12].

(iv) Habitat. The habitats of climbing plants could be clearly divided into valley, slope, or peak (summit)^[13]. The information per specimen, such as its locality, growing environment, and elevation, when combined with the topographical characteristics of the Reserve^[14], can assist in determining the habitat of a given species. Furthermore, in our field investigation we observed and documented the habitat of climbing plants.

Table 1 Metadata summary of the 333 climbing seed plants and their reproductive habit dataset in Karst seasonal rain forest in Nonggang, Guangxi, China

Items	Description
Dataset full name	333 climbing seed plants and their reproductive habit dataset in Karst seasonal rain forest in Nonggang, Guangxi, China
Dataset short name	ClimbingSeedPlant_Nonggang
Authors	Jiang, Y. L. P-6334-2018, Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, jiangyuliang11@126.com Xiang, W. S. X-4240-2018, Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, xwusheng@qq.com Wang, B. X-4372-2018, Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, wangbinzjcc@qq.com Li, D. X. X-8729-2018, Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, 904914213@qq.com He, Y. L. X-7596-2018, Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, 804905315@qq.com Chen, T. X-4217-2018, Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, 836648334@qq.com
Geographical region	Guangxi Nonggang National Nature Reserve (22°13'56"N–22°33'09"N, 106°42'28"E–107°04'54"E) of southwestern China
Year	1979–2017
Data format	.xlsx, .pdf, .jpg
Data size	75.4 MB (after compression)
Data files	A spreadsheet in .xlsx format: the characters and habits of climbing seed plants; photographs from the field work
Foundations	Ministry of Science and Technology of P. R. China (2015FY2102-00-14); National Natural Science Foundation of China (31660130, 31760131); Guangxi Zhuang Autonomous Region, China (2014GXNFSBA-118081, AB163802-56)
Data publisher	Global Change Research Data Publishing & Repository, http://www.geodoi.ac.cn
Address	No. 11A, Datun Road, Chaoyang District, Beijing 100101, China
Data sharing policy	Data from the Global Change Research Data Publishing & Repository includes metadata, datasets (data products), and publications (in this case, in the <i>Journal of Global Change Data & Discovery</i>). The Data sharing policy includes: (1) Data are openly available and can be freely downloaded via the Internet; (2) End users are encouraged to use the Data subject for citations; (3) Users, who are by definition also value-added service providers, are welcome to redistribute Data subject with written permission from the GCdataPR Editorial Office and the issuance of a Data redistribution license; and (4) If Data are used to compile new datasets, the ‘ten per cent principal’ should be followed, such that Data records utilized should not exceed 10% of the new dataset contents, while all sources should be clearly noted in suitable places in the new dataset ^[8]

3.2 Technical Route

The development process of the dataset is showed in Figure 1. We consulted the available specimen information on climbing seed plants from Nonggang National Natural Reserve archived in the Herbarium, Guangxi Institute of Botany. Most specimens had been collected from 1979 to 2013, with their species name, habitat, growth type, phenology, collecting date, among others (Figure 2). From 2013 to 2017, we monitored climbing seed plants in a 15-hm² plot and other four 1-hm² plots (Figure 3).

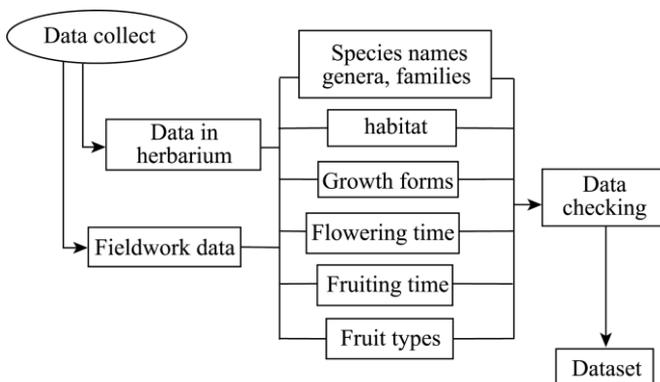


Figure 1 Development process of the dataset

From 2013 to 2017, we monitored climbing seed plants in a 15-hm² plot and other four 1-hm² plots (Figure 3).

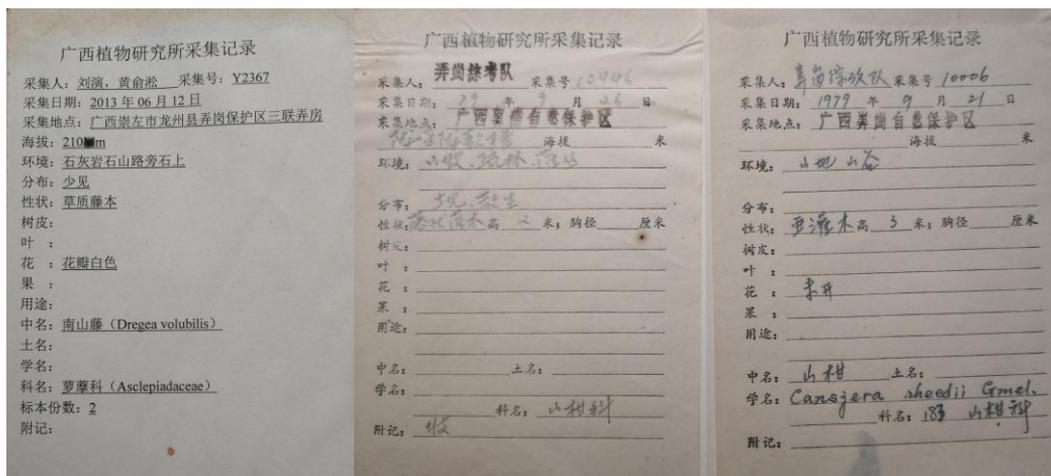


Figure 2 An example of record information on climbing plant specimens in the herbarium

4 Results and Validation

4.1 Data Composition

The dataset contains two parts: (1) Twelve photos taken during the field survey. They are archived in .jpg, .xlsx, and .pdf format with size of 75.7 MB. One of them is shown in Figure 4, which shows the typical scene of climbers swirling around a rock. (2) Data on species composition, flowering time, fruiting time, fruit type and habitat of climbing seed plants, recorded under these items: species name, family, genus, growth form, flowering time (month), fruiting time (month), fruit type, whether it prefers valley, whether it prefers slope, whether it prefers peak. This data was put in an excel table. Figure 5 and Figure 6 show excerpts of the table.

4.2 Data Products

This research identified 333 climbing seed plants representing 145 genera from 56 families.



Figure 3 Field investigation and monitoring



Figure 4 Climbing plants swirling around a rock

物种名	科	属	生长型	开花时间	
Species name	Family	Genus	Growth form	Flowering time (month)	
羽叶金合欢	Acacia pennata	Mimosaceae	Acacia	Bush rope	3-10
中越猕猴桃	Actinidia indochinensis	Actinidiaceae	Actinidia	Liana	3-4
阔叶猕猴桃	Actinidia latifolia	Actinidiaceae	Actinidia	Liana	5-6
乳突果	Adelostemma gracillimam	Asclepiadaceae	Adelostemma	Herbaceous vine	8-11
异叶蒴莲	Adenia heterophylla	Passifloraceae	Adenia	Herbaceous vine	1-7
海南香花藤	Aganosma schlechteriana	Apocynaceae	Aganosma	Bush rope	3-7
海南银珠藤	Alyxia hainanensis	Apocynaceae	Alyxia	Bush rope	8-10
广东蛇葡萄	Ampelopsis cantoniensis	Vitaceae	Ampelopsis	Liana	4-7
掌裂蛇葡萄	Ampelopsis delavayana Planch. var.	Vitaceae	Ampelopsis	Liana	5-6
异叶蛇葡萄	Ampelopsis glandulosa var. hetero	Vitaceae	Ampelopsis	Liana	4-6
大叶蛇葡萄	Ampelopsis megalophylla	Vitaceae	Ampelopsis	Liana	6-8
膝藤	Anodendron affine	Apocynaceae	Anodendron	Bush rope	11-4(next)
白鹤藤	Argyreia acuta	Convolvulaceae	Argyreia	Bush rope	6-9
头花银背藤	Argyreia capitata	Convolvulaceae	Argyreia	Bush rope	6-9
东京银背藤	Argyreia pierreana	Convolvulaceae	Argyreia	Liana	7-9
海南马兜铃	Aristolochia hainanensis	Aristolochiaceae	Aristolochia	Liana	10-2(next)
凹脉马兜铃	Aristolochia impresinervis	Aristolochiaceae	Aristolochia	Herbaceous vine	5-6
广西马兜铃	Aristolochia kwangsiensis	Aristolochiaceae	Aristolochia	Liana	4-5
弄岗通城虎	Aristolochia longgangensis	Aristolochiaceae	Aristolochia	Herbaceous vine	2
变色马兜铃	Aristolochia versicolor	Aristolochiaceae	Aristolochia	Liana	4-6
香港鹰爪	Artabotrys hongkongensis	Amnonaceae	Artabotrys	Bush rope	4-7
天门冬	Asparagus cochinchinensis	Liliaceae	Asparagus	Herbaceous vine	5-6

Figure 5 An excerpt of the data table recording 333 climbing seed plants and their reproductive habit (1)

结实时间 Fruiting time (month)	果实类型 Fruit type		是否生长在洼地 Whether it prefers valley	是否生长在坡地 Whether it prefers slope	是否生长在山顶 Whether it prefers peak
	Legume	Dry fruit	0	1	1
7-4(next)	Legume	Dry fruit	0	1	1
11	Berry	Fleshy fruit	1	0	0
11	Berry	Fleshy fruit	1	1	0
11-2(next)	Follicle	Dry fruit	1	0	0
8-10	Capsule	Dry fruit	1	1	0
8-2(next)	Follicle	Dry fruit	1	1	0
12-4(next)	Drupe	Fleshy fruit	0	0	1
8-11	Berry	Fleshy fruit	1	0	1
7-9	Berry	Fleshy fruit	1	1	0
7-10	Berry	Fleshy fruit	0	1	0
7-10	Berry	Fleshy fruit	1	1	0
6-8	Follicle	Dry fruit	0	1	0
9-1(next)	Berry	Fleshy fruit	1	0	0
9-1(next)	Berry	Fleshy fruit	1	1	0
8-11	Berry	Fleshy fruit	1	1	0
6-7	Capsule	Dry fruit	1	0	0
8-10	Capsule	Dry fruit	0	1	0
8-9	Capsule	Dry fruit	1	1	0
9	Capsule	Dry fruit	1	1	0
8-10	Capsule	Dry fruit	0	1	0
5-12	Berry	Fleshy fruit	0	1	0
8-10	Berry	Fleshy fruit	0	1	0

Figure 6 An excerpt of the data table recording 333 climbing seed plants and their reproductive habit (2)

We recognized 88 species of herbaceous vines, representing 51 genera from 20 families; 126

species of lianas, representing 60 genera from 31 families, and 119 species of bush ropes, representing 55 genera from 27 families. We found evidence suggesting these species had preferences for specific habitats, with members of each growth type sharing a main habitat. Flowering time of them was concentrated in the April-to-September period, while their fruiting was most pronounced in the July-to-December period (Figure 7). Berry occupied the highest proportion in all fruit types (Figure 8). The paper that analyzed this dataset was published in the *Chinese Journal of Plant Ecology*^[15].

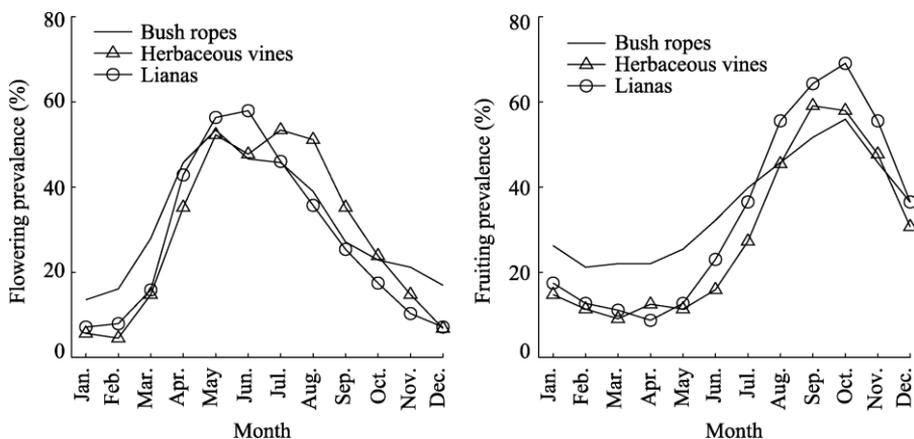


Figure 7 Monthly flowering and fruiting prevalence in climbing seed plants of the Nonggang Karst seasonal rain forest^[15]

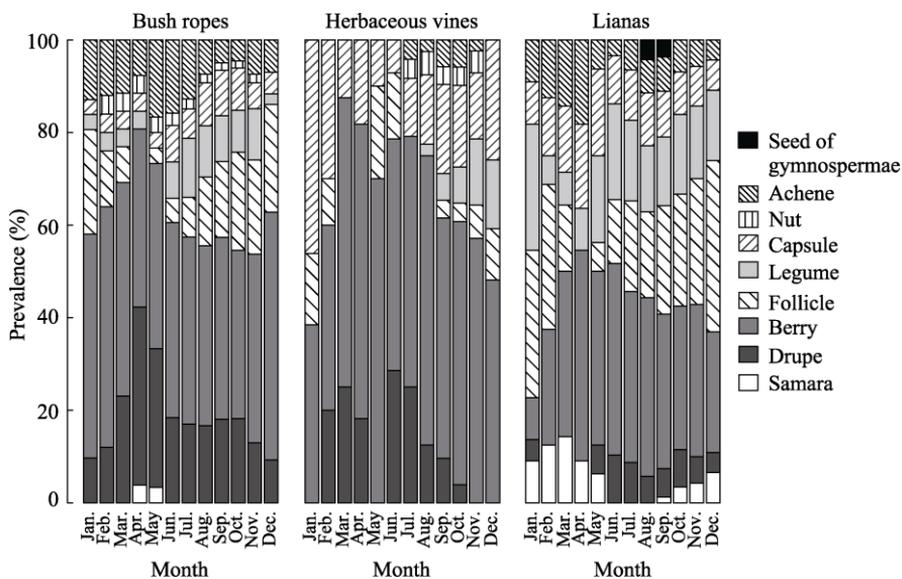


Figure 8 Monthly prevalences of different fruit types of the climbing seed plants in the Nonggang Karst seasonal rain forest^[15]

4.3 Data Validation

To confirm the reliability of our dataset we consulted published books for the reproductive habit of each species, crosschecked the data, and then conducted long-term observations.

Overall, we are confident that this dataset faithfully conveys the actual diversity and reproductive habits of climbing seed plants currently in the Nonggang Karst seasonal rain forest.

5 Discussion and Conclusion

Much research in the last 25 years suggests that climbing plants are a group of highly evolved plants, with distinct adaptations and traits for competitiveness in growth and reproduction. The diversity and abundance of climbing plants are undergoing insensible changes due to anthropogenic disturbances and a changing climate, which may well cause alterations in structure and function of tropical forest ecosystems. Karst seasonal rain forest is a special type of remnant ecosystem, whose study and monitoring can be strengthened with this dataset, thus enabling us to better manage it.

Author Contributions

Xiang, W. S. and Li, X. K. designed the algorithms of the dataset. Jiang, Y. L., Wang B., Li, D. X., He, Y. L., and Chen, T. contributed to the data processing and analysis. Jiang, Y. L. wrote the data paper.

References

- [1] Schnitzer, S. A., Bongers, F. The ecology of lianas and their role in forests [J]. *Trends in Ecology and Evolution*, 2002, 17(5): 223–230.
- [2] Ding, L. Z., Chen, Y. J., Zhang, J. L. Leaf traits and their associations among liana species in tropical rainforest [J]. *Plant Science Journal*, 2014, 32(4): 362–370.
- [3] Chen, Y. J., Cao, K. F., Schnitzer, S. A., *et al.* Water-use advantage for lianas over trees in tropical seasonal forests [J]. *New Phytologist*, 2015, 205: 128–136.
- [4] Schnitzer, S. A., Bongers, F. Increasing liana abundance and biomass in tropical forests: emerging patterns and putative mechanisms [J]. *Ecology Letters*, 2011, 14(4): 397–406.
- [5] van der Heijden, G. M. F., Powers, J. S., Schnitzer, S. A. Lianas reduce carbon accumulation and storage in tropical forests [J]. *Proceedings of the National Academy of Sciences of the United States of America*, 2015, 112(43): 13267–13271.
- [6] Wright, S. J., Sun, I. F., Pickering, M., *et al.* Long-term changes in liana loads and tree dynamics in a Malaysian forest [J]. *Ecology*, 2015, 96(10): 2748–2757.
- [7] Jiang, Y. L., Xiang, W. S., Wang, B., *et al.* 333 climbing seed plants and their reproductive habit dataset in Karst seasonal rain forest in Nonggang, Guangxi, China [DB/OL]. Global Change Research Data Publishing & Repository, 2018. DOI: 10.3974/geodb.2018.06.16.V1.
- [8] GCdataPR Editorial Office. GCdataPR data sharing policy [OL]. DOI: 10.3974/dp.policy.2014.05 (Updated 2017).
- [9] Putz, F. E. Vine Ecology [Z]. *Ecology, Info* 24, 2012. <http://www.ecology.info/vines.htm>.
- [10] Zhou, Y. L. *Plant Biology* [M]. Beijing: Higher Education Press, 2004: 224–228.
- [11] *Delectis Florae Reipublicae Popularis Sinicae Agendae Academiae Sinicae Edita. Flora Reipublicae Popularis Sinicae* [M]. Beijing: Science Press, 1959–2004.
- [12] Guangxi Institute of Botany, Chinese Academy of Science. *Flora of Guangxi* [M]. Nanning: Guangxi Science and Technology Publishing House, 1991–2016.
- [13] Liang, C. F., Liang, J. Y., Liu, L. F., *et al.* A report on the floristic survey on the Nonggang Natural Reserve [J]. *Guihaia*, 1988, 8(Sup.1): 83–184.
- [14] Li, K. Y. Primary exploration of the geomorphological districts and the development of surface forms in the Nonggang Natural Reserve [J]. *Guihaia*, 1988, 8(Sup.1): 33–51.
- [15] Jiang, Y. L., Li, X. K., Guo, Y. L., *et al.* Diversity of climbing seed plants and their reproductive habit in a Karst seasonal rain forest in Nonggang, Guangxi, China [J]. *Chinese Journal of Plant Ecology*, 2017, 41(7): 716–728.