

RESEARCH ARTICLE | AUGUST 15 2018

Potential of vascular plants as phytotourism products in Endau Rompin Johor National Park, Malaysia FREE

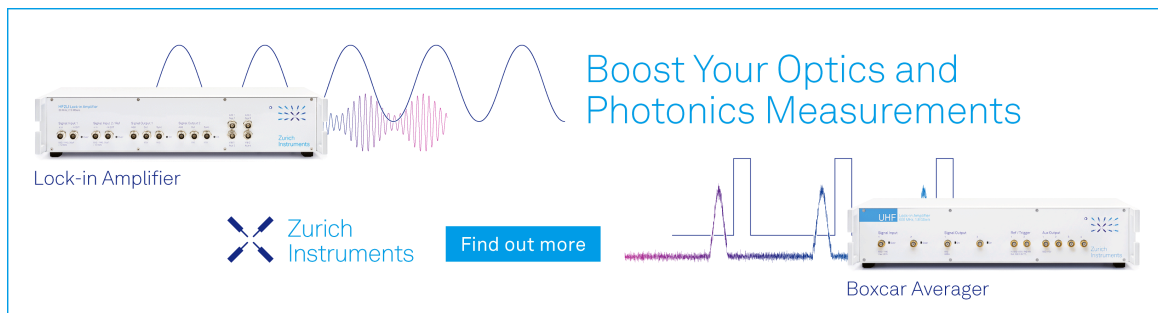
Salasiah Mohamad; Maryati Mohamed ✉; Muhammad Shafiq Hamdin



AIP Conf. Proc. 2002, 020054 (2018)


<https://doi.org/10.1063/1.5050150>





Boost Your Optics and Photonics Measurements

Lock-in Amplifier

 [Find out more](#)

Boxcar Averager

Potential of Vascular Plants as Phytotourism Products in Endau Rompin Johor National Park, Malaysia

Salasiah Mohamad, Maryati Mohamed^{a)}, and Muhammad Shafiq Hamdin

Centre of Research for Sustainable Uses of Natural Resources, Faculty of Science, Technology & Human Development, Universiti Tun Hussein Onn Malaysia, Johor, Malaysia.

^{a)}Corresponding author: maryati@uthm.edu.my

Abstract. Johor, the southernmost state in Peninsular Malaysia is rich in natural assets including plants, but this advantage is underexploited, tourism wise. More effort could be carried out by many parties to help promote nature tourism using plants. This paper provides data to support Phytotourism as the potential nature tourism asset, especially in Johor. Objectives achieved through mapping of the trail, inventory of potential vascular plants, and a survey to obtain information on tourists' interest. A pocket guidebook was produced and distributed to tourists as promotion media and signboards were set up. Twenty charismatic plants species along the trail measuring 2.176 m × 10 m were selected as Phytotourism products based on the modified criteria of good nature tourism products by WTO/UNDP. The criteria for selection consist of endemism, rarity, morphological attractiveness, behavioral enticement, reliability of sightings, safety, and linkage to local cultures. The selected plants comprised of 13 species of trees, four species of epiphytes, two species of herbs, and one species of shrub. From the survey, flora was chosen as the main extrinsic factor to visit ERJNP while herbs were selected as the most attractive plants along the trail. To discover endemic species specifically *Livistona endauensis* and to relax mind and body were chosen as the most important pull and push factors for their visits. Phytotourism has offered diversification in terms of nature tourism products in Johor. In addition, especially in ERJNP, Phytotourism could help improve the socio-economic status of local communities who are also participating in nature tourism. To ensure sustainable development of Phytotourism, it is important for stakeholders to be seriously involved especially in terms of coordination, provision of incentives and funds, and proper implementation of related policies and laws.

Keywords: Endau Rompin Johor National Park, Johor, nature tourism, Phytotourism, plant-based tourism

INTRODUCTION

Nature tourism refers to responsible travel to relatively undisturbed natural areas or related venues for the purposes of seeing, admiring, enjoying, and learning about the environment. It includes flora, fauna, as well as any local cultures found in the areas without causing perilous disturbances and destruction, which further bring positive impact to the environmental conservation and well-being of local people [1–4]. Malaysia was ranked in the top ten world's most visited countries by international tourist arrivals in 2012 and it is estimated that the number of visitors around the globe will increase to up to 1 600 000 000 in year 2020 which 13.7 % of this number will consist of nature-oriented visitors. It is likely to be proven in year 2000, around 1 250 000 million international tourists have visited Malaysia with the purpose to see and enjoy the nature [4].

Studies on the potential of nature tourism icons with regards to the uniqueness and endemism of organisms are not that new in Malaysia. These products such as the well-known holoparasite corpse flower (*Rafflesia* spp.), the odd-pod shaped pitcher plants (*Nepenthes* spp.), anurans (frogs and toads), Sumatran Rhino (*Dicerorhinus sumatrensis harrissoni*), entomotourism (insects), fireflies (*Pteroptyx tener*), orang utans (*Pongo pygmaeus*) and proboscis monkeys (*Nasalis larvatus*). These iconic biological species have not only captivated huge number of visitors yet successfully contributed to sociocultural and economic value to the stakeholders such as local community, tourism operators, and the government.

The word Phyto refers to anything relates to or presents plants. Thus, Phytotourism promotes charismatic plants as the tourism products. It can be categorized as light and casual tourism as the activities are mainly involved sightseeing and admiring significant plants without requiring special skills, unlike adventure tourism or ecotourism. The study to promote Phytotourism is also synergized by the idea that nature tourism should be

exploited to the natural elements of flora [5, 6] as well as specific ecosystems [7] in addition to the fauna that comparatively more common.

Undoubtedly, the effort to promote Phytotourism is in line with the state government's recommendation through the Johor Tourism Master Plan 2014 to 2023 which one the objective is to promote high impact and iconic tourism products in order to achieve a higher number of tourists' arrival each year [8, 9]. Indeed, there is still no viable promotion effort in highlighting the nature and uniqueness of plants species in its natural habitat as a tourism image. In addition, the federal government through Entry Point Project in the tourism sector of National Key Economic Areas (NKEA), has also intended to make the country as the global Biodiversity Hub and become the world's premium nature tourism destination in order to increase tourism revenue [10]. Thus, it is timely to wisely exploit the country's benefit as one of the 12 mega-diversity countries in the world in terms of biodiversity per unit area to further diversify the tourism industry and be more competitive in the world ranking.

Endau Rompin Johor National Park (ERJNP) located in Mersing, Johor is the largest and oldest rainforest in southern Malaysia. ERJNP which is governed by the Johor National Park Corporation (JNPC) under Johor state's government was gazetted as National Park in 1993 and consisted of 48,905 ha covering Selai to Peta areas [11]. Two major forest systems in Endau Rompin comprised of lowland dipterocarp forests which dominated by big trees from Dipterocarpaceae and hill edaphic forests. From previous records, diverse medicinal plants were recorded including 52 plants species that used to treat common ailments, 118 species of plants containing alkaloids, saponin, triterpene, and steroids, 10 species of palms with medicinal properties [12], as well as 160 plants species commonly used by the local community in medications, constructions, and rituals [13, 14].

Dato' Abdul Ghani trail in the vicinity of Gunung Janing Barat located in ERJNP (Peta) with coordinates 02°31.824'N latitude and 103°22.072'E longitude was selected as the study site. The trail is unique as it endowed with four types of forests vegetation comprised of lowland dipterocarp forest (50 m to 150 m above sea level (asl)), hill dipterocarp forest (150 m to 350 m asl), *Livistona* palm forest (350 m to 430 m asl) and swampy heath forest (430 m to 450 m asl) just within a small area. In addition, the trail is a habitat for an endemic wild ginger species *Scaphochlamys endauensis* and endemic palm species *Livistona endauensis*. This paper aims to provide a baseline data on the potential charismatic plants found in the study site as Phytotourism products based on the modified criteria of good nature tourism products. To support the study, tourists' interest towards the Phytotourism products was also obtained via a structured survey.

METHODS

Inventory of Potential Vascular Plants for Development of Phytotourism Products

Mapping of vascular plants (tracheophytes) was only performed considering the trail's measurement of 2 176 m length × 10 m width, due to safety reason. Meanwhile, mapping of vascular plants includes mature trees with diameter at breast height (DBH) ≥ 30 cm and other groups of plants. This was followed by collection, identification of species and preparation of herbarium specimens. Collection of specimens was accordance with CBioD Tropical Biodiversity Assessment Guideline Manual [15] and all specimens were deposited at the Repository Room, Faculty of Science, Technology and Human Development, UTHM. Identification of taxa was based on references from [16–18].

To promote Phytotourism, species that complement the criteria of good nature tourism product were focused and information about the species was then presented in a pocket guidebook and signboards as the promotion media. The criteria of nature tourism product were guided by UNDP Guidelines [1] which later adapted accordingly. It comprises of seven aspects namely (1) endemism, (2) rarity, (3) morphological attractiveness, (4) behavioral enticement, (5) reliability of sightings, (6) safety, and (7) linkage to local cultures.

Survey on Tourists' Interest Towards Phytotourism Package

A survey form containing nine close-ended questionnaires has been designed and categorized into two main parts; demographic profiles and interest construct. The demographic profiles consisted of four items including interest to nature tourism, gender, age, and educational background which formulated in the form of dichotomous, and multichotomous. While the tourists' interest construct was divided into five main items particularly motivational factors to visit ERJNP, types of attractive plants, pull and push factors toward involvement in Phytotourism as well as efforts to promote Phytotourism. This construct was composed in the form of *Likert* scale from ne (not important) to five (very important). Reliability and validity testing were performed after pilot study using Cronbach's Alpha from IBM SPSS Version 20. Cronbach Alpha Coefficient is

an internal consistency measurement which evaluates the consistency of the research's survey in range of zero to one whereby only range 0.7 and above are accepted.

Upon validity testing, the survey was conducted throughout October 2015 towards 50 randomly chosen tourists after their visit to the trail that has been facilitated with new developed Phytotourism tools, pocket guidebook, and signboards. The number of respondents was quite scarce since the trail is still under promoted which also became the factor in selecting the study site.

RESULTS

Analysis of Inventory of Phytotourism Product

Based on the fieldwork data, a total of 342 individual vascular plants were recorded along the main trail consisted of 325 individual of mature trees and 17 individuals of another group of plants. The composition of these plants comprised of 86 species, 65 genera, and 43 families. Dipterocarpaceae showed the highest number of individuals and species along the trail with 76 individuals and 14 species respectively.

Out of these 86 potential species, only 20 species were further highlighted to present Phytotourism which have fulfilled many criteria of good nature tourism product. The selected species comprised of 13 species of trees, four species of epiphytes, two species of herbs, and one species of shrub. From these 20 species, Dipterocarpaceae recorded as the highest number of species with six species followed by Nepenthaceae and Euphorbiaceae, both with three species. Detail information of selected species in the order of their location from the trail entrance can be referred to Table 1. Several Phytotourism products in Endau Rompin Johor National Park, Malaysia showed in Fig. 1 – 12.

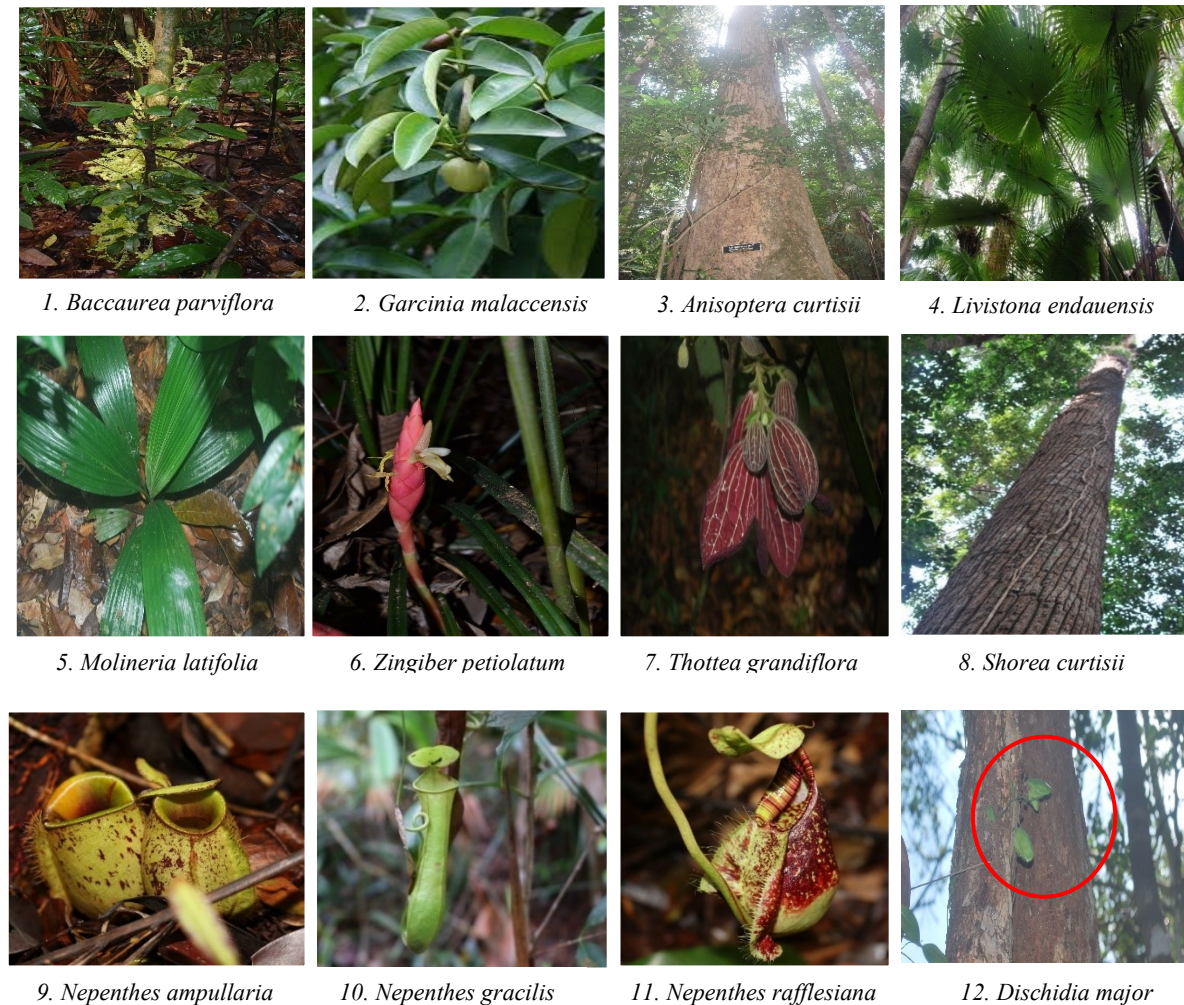


FIGURE 1 – 12. Several Phytotourism products in Endau Rompin Johor National Park, Malaysia. (1) *Baccaurea parviflora* (2) *Garcinia malaccensis* (3) *Anisoptera curtisii* (4) *Livistona endauensis* (5) *Molineria latifolia* (6) *Zingiber petiolatum* (7) *Thottea grandiflora* (8) *Shorea curtisii* (9) *Nepenthes ampullaria* (10) *Nepenthes gracilis* (11) *Nepenthes rafflesiana* and (12) *Dischidia major*

TABLE 1. List of Phytotourism icons at Dato' Abdul Ghani's trail, ERJNP.

No.	Species	Families	Vernacular names	Elevation	Ecology
1.	<i>Baccaurea parviflora</i> (Müll.Arg.) Müll. Arg.	Euphorbiaceae	Wild rambai, <i>Setambun</i>	51	Lowland mixed dipterocarp forest
2.	<i>Garcinia malaccensis</i> Hook.f. ex. T.Anderson	Guttiferae	Wild mangoesteen, <i>Manggis burung</i>	65	Lowland mixed dipterocarp forest
3.	<i>Anisoptera curtisii</i> Dyer ex King	Dipterocarpaceae	<i>Mersawa kuning</i> , <i>Rengkong</i>	67	Lowland mixed dipterocarp forest
4.	<i>Streblus elongatus</i> (Miq.) Corner	Moraceae	<i>Tempinis</i>	68	Lowland mixed dipterocarp forest
5.	<i>Molineria latifolia</i> (Dryand. ex W.T.Aiton) Herb. ex Kurz.	Hypoxidaceae	<i>Lemba</i> , <i>Lemba kilat</i>	98	Lowland mixed dipterocarp forest
6.	<i>Endospermum diadenum</i> (Miq.) Airy Shaw	Euphorbiaceae	<i>Membulan</i> , <i>Sesendok</i>	101	Lowland mixed dipterocarp forest
7.	<i>Thottea grandiflora</i> Rottb.	Aristolochiaceae	<i>Hempedu beruang</i> , <i>Telinguk kelawar</i>	102	Lowland mixed dipterocarp forest
8.	<i>Dryobalanops aromatica</i> C.F. Gaertn.	Dipterocarpaceae	Bornean camphor, <i>Kapur</i>	125	Lowland mixed dipterocarp forest
9.	<i>Zingiber petiolatum</i> (Holttum) Theilade	Zingiberaceae	Wild ginger, <i>Halia liar</i>	129	Lowland mixed dipterocarp forest
10.	<i>Dipterocarpus costulatus</i> Slooten	Dipterocarpaceae	<i>Keruing kipas</i> , <i>Keruing mara keluang</i>	149	Lowland mixed dipterocarp forest
11.	<i>Elateriospermum tapos</i> Blume	Euphorbiaceae	<i>Perah</i> , <i>Buah perah</i>	151	Lowland mixed dipterocarp forest
12.	<i>Dipterocarpus crinitus</i> Dyer	Dipterocarpaceae	<i>Keruing bulu</i> , <i>Keruing mempelas</i>	167	Lowland mixed dipterocarp forest
13.	<i>Shorea blumutensis</i> Foxw.	Dipterocarpaceae	<i>Meranti kelim</i> , <i>Damar hitam kelim</i>	191	Lowland mixed dipterocarp forest
14.	<i>Eurycoma longifolia</i> Jack	Simaroubaceae	<i>Tongkat ali putih</i> , <i>Pasak bumi</i>	191	Lowland mixed dipterocarp forest
15.	<i>Livistona endauensis</i> J. Dransf. & K.M. Wong	Palmae / Arecaceae	Fan palm, <i>Serdang</i>	350	Lowland mixed dipterocarp forest, <i>Livistona</i> fan palm forest
16.	<i>Shorea curtisii</i> Dyer ex King	Dipterocarpaceae	Dark red meranti, <i>Meranti seraya</i>	372	Hill dipterocarp forest
17.	<i>Nepenthes ampullaria</i> Jack	Nepenthaceae	Flask-shaped pitcher plant, <i>Periuk kera kendi</i>	425	Swampy heath forest forest
18.	<i>Nepenthes gracilis</i> Korth.	Nepenthaceae	Slender pitcher plant, <i>Periuk kera</i>	440	Swampy heath forest forest
19.	<i>Nepenthes rafflesiana</i> Jack	Nepenthaceae	Raffles' pitcher plant, <i>Periuk kera</i>	440	Swampy heath forest forest
20.	<i>Dischidia major</i> (Vahl.) Merr.	Apoxynaceae	Ant-plant, <i>Tumbuhan semut</i>	441	Swampy heath forest forest

Analysis of Tourists' Profiles and Interests

Consistency and reliability of the survey using Cronbach's Alpha analysis gave the value of 0.932. Based on the demographic survey, respondents were equally divided; half male and half female, and majority of the respondents aged between 21 y o to 30 y o. In addition, most of the visitors have higher learning institutions backgrounds. Analysis of the respondents' demographic profiles is as shown in Table 2.

On interest construct, respondents have selected flora as the main extrinsic element that motivated them to visit ERJNP with highest mean score 4.56. It was also shown that herbs had been selected as the most attractive plants on the trail with scored mean 4.22. To discover endemic species and to relax their mind and body were selected as the most crucial extrinsic and intrinsic factor that encouraged them to choose Phytotourism, with mean value 4.36 and 4.54 respectively. Analysis of respondents' interest towards Phytotourism can be referred to Fig. 2.

Table 2. Demographic profiles of respondents.

Profiles	Items	(%)
Interested in nature tourism	Yes	100
	No	0
Gender	Male	50
	Female	50
Age	< 20	4
	21 – 30	48
	31 – 40	24
	41 – 50	20
	51 – 60	4
	> 60	0
Educational background	Primary school	2
	Secondary school	24
	Higher learning institutions	74

DISCUSSION

Evaluation of Criteria for Selection of Phytotourism Product

The potential of Phytotourism in ERJNP is measured through seven criteria:

(1) Endemism

Endemism which represents the biological uniqueness of a certain area is seen as the most effective catalyst to market a nature tourism product. Visitors are willing to pay and travel miles away from their homes just to see and take photographs of the endemic species that cannot be found in their territories. These factors will help to ensure sustainability of nature tourism market if compared to the human-made product. Endemism is determined through intensive studies especially on the distribution of species. The knowledge would be beneficial in the context of tourism wise which will offer identity or could act as iconic flagship in that particular tourism destination. In Peninsular Malaysia itself, we have estimated 2 500 endemic species of vascular plants out of 15 000 species countrywide. All these species and their natural ecosystems or habitats have potentials as a Phytotourism product and destination. The studied trail has also supported stable habitat for common and endemic plant species. *L. endauensis*, a gregarious fan-palm to 15 m tall is an endemic species found only in Endau Rompin and Bukit Bauk Forest Reserve, Terengganu, would obviously attracted visitors due to its endemism element [19, 20]. In Gunung Janing Barat, a magnificent and rare mid-sized *Livistona* grows along ridgetops and on steep slopes on shallow soils. It forms a slender smooth trunk that carries a dense crown of glossy green leaves with rather stiff segments. The sub-canopy species is best suited for cultivation in the tropics or warm temperate climates.

(2) Rarity

A rare species is a group of organisms that are very uncommon, scarce, or infrequently encountered. Species that are rare and hard to find could as well support marketability of a tourism product and help to maximize the satisfaction level to tourists. A species is also considered as rare in terms of limited distribution of habitats or localities. Species *S. blumutensis* that have been declared as endangered is rare since it is selectively growing only in Endau Rompin forests and Sumatera [20, 21]. Examples of limited localities in Peninsular Malaysia include heath forest, forest on ultramafic soils, peat swamp forest, and limestone forest. Phytotourism products that have also fulfilled this criterion include those that particularly lived in the heath forest, in this case, pitcher plants (*Nepenthes* spp.) and ant-plant (*D. major*). They can survive in poor-nutrient soil vegetation and have a special adaptation to sustain its life for example by having a symbiotic relationship with insects to obtain nutrients. Surprisingly, among thousands of plants species in Malaysia, it is estimated only 100 species of Ant-plants from different families and habits, for instance, *Hydnophytum* spp., *Myrmecodia* spp., and *Macaranga* spp. [22]. Whereas, Pitcher plants are also considered exclusive since it is categorized as one of 47 carnivorous species in Malaysia [23].

(3) Morphological Attractiveness

Difference in habit is displayed through physical features which can be seen via naked eyes. Unique features such as shape, size, color, texture are among the main visual attraction of an organism. Morphological attraction is important to entice nature tourists' interest. The well-known nature tourism icons such as the world's largest single flower, *Rafflesia*, gentle, and cuddly looking *orangutan* and beige-furred proboscis monkeys have attracted nature tourists from all over the world by their charming features. Indeed, size, height, and age of the charismatic megaflores are found to be the important physical factors that commonly attracted the tourists [6]. From all 20 Phytotourism species, variation in terms of main physical features can be seen with regards to their habits and life forms, i.e., leaves, bole, bark, flowers, fruits, or roots system. Table 3 classified several species according to their main morphological attraction.

Table 3. Morphological attractiveness on most Phytotourism icons.

Physical characters	Description	Species
Crown	Bluish grey color	<i>S. curtisii</i>
Leaves	Size up to 2 m width covering most of the palm forest canopy	<i>L. endauensis</i>
	Thick and fibrous textures suitable for fishing net and ropes	<i>M. latifolia</i>
	Heart-shaped or ladle-like and clustered at the tip of the twig	<i>E. diadenum</i>
	Leaves can modify into pitcher equipped with special nectary gland and enzyme to attract and digest preys	<i>Nepenthes</i> spp.
Bark	Highly scaled	<i>D. aromatica</i>
	Boat-shaped fissured	<i>S. curtisii</i>
Flowers/ fruits	Pink inflorescence with creamy flowers and horn-like anther crest	<i>Z. petiolatum</i>
	Big-sized flower petal up to 12.5 cm long	<i>T. grandiflora</i>
	Edible sweet-sour fruits	<i>G. malaccensis</i> , <i>M. latifolia</i>
Exudates	Citrus smelling flowers and edible fruits	<i>B. parviflora</i>
	Bole and inner bark secretes resin	Dipterocarpaceae
	Bole and inner bark secretes white latex	<i>E. tapos</i>

(4) Behavioral Enticement

Flora and fauna that have special behaviors are able to catch appeal nature tourists. Plants display enticing behaviors too. Special or attractive behaviors include interaction with plants, animals and humans, and adaptation or organs modification to the extreme environment such as the production of phytochemicals. Pitcher of *N. ampullaria* in Gunung Janing Barat has been found to be a shelter for a crab species *Geosesarmid malayanum* [11] which seek protection from drought. It was also reported that the locals from Kampung Peta, ERJNP have found shrimps living inside the Pitcher plants cup [24]. Unique myrmecophytes such as Ant-plant (*D. major*) works with ants that stay in their hollowed-leaves by absorbing nutrients from fall outs carried by the ants. Apart from that, promotion of Phytotourism is also in line with efforts to increase awareness to the general public in conserving the natural heritage such that towards conserving the threatened and endangered species. Four Phytotourism products have been categorized in Malaysia Plant Red List particularly as endangered for *S. blumutensis* and near threatened for *Dryobalanops aromatica*, *Dipterocarpus costulatus*, *D. crinitus*, and *S. curtisii* [20, 21].

(5) Reliability of sightings

Organisms that can be easily seen will create satisfaction and trust to the visitors. Plants grow throughout the year and can be categorized as evergreen in Malaysia's tropical rainforest. Common species in lowland and hill dipterocarp forests have also featured Phytotourism products such as *B. parviflora*, *Elaterospermum tapos*, *Eurycoma longifolia*, and *G. malaccensis*. This effort may help to ensure satisfaction and trust among tourists which allows them to familiarize themselves with the common tropical species even though they are outside the studied area. Apart from that, if compared to wild organisms such as big mammals that are harder to be seen in a particular period or season, plants are way easier to be found in wider habitat range, in any time. Dipterocarps species of *A. curtisii* and *S. curtisii* with DBH sizes of 121.5 cm and 124.5 cm respectively, are the largest trees on the studied trail specifically in lowland and hill dipterocarp forests, can draw attention and create curiosity to tourists because of their bole sizes. In addition, with the aid of proper signboards, guidebooks or gears such as binoculars, plants' species at their habitat will become more easily identified by the public.

(6) Safety

Safety is extremely critical in all tourism activities especially nature tourism as it mostly involves protected or remote areas. In this case, the rule of thumb is to wear covered and neat outfit during the activity because of

some species on the site particularly *Gluta* spp. (*rengas*) produced black latex which may cause irritation to some people. The challenging element would somehow create sensation and excitement for nature tourists which would trigger their curiosity to know further about the species.

(7) Linkage to local cultures

Nature and local communities have special relationship in so many unique and different ways. Nature particularly plants provide utilitarian values in terms of food sources, shelters, medicines, constructions, transportations; intrinsic values as carbon sink and mitigate natural disasters; aesthetic values as symbol of calmness as well as moral values such as in ritual or religious purposes. Indigenous people from the Jakun ethnic in Kampung Peta, ERJNP are still practising traditional knowledge especially medicinal plants to cure various ailments [12]. Phytotourism have highlighted species with significant medicinal and other values such as handicrafts, rituals, and food sources. These for examples, the sweet-sour fruits of *M. latifolia* which contained neoculine which is freshly consumed to increase appetite, to cure coughing and fever, while decoction of the roots is used to treat stomach ache and urinary problem [25]. The decoction or fresh roots of *T. grandiflora* is used by the locals to cure asthma and cough [25] while the roots' extract have proven contained antimicrobial properties and have potential as an anti-tuberculosis agent [26]. *E. longifolia* and *M. latifolia* are also contained phytochemicals useful for treatment of TB and its related symptoms [26]. In addition, fruits of *G. malaccensis* and *B. parviflora* are also eaten raw and cooked as for *E. tapos* which sometimes they are served during feast. Through nature tourism, continuous knowledge sharing among local community and tourists can be nurtured to help safeguard the traditional knowledge while offering added values to the products.

Evaluation on Tourists' Interest

Phytotourism have primarily shown involvement among youth generation aged 21 years old to 30 years old. This situation may be explained from the context that the studied site is a hiking trail and may be considered as quite challenging and risky to some people most likely to the younger and older ones. In fact, nature-based tourism normally tends to be conducted in remote and isolated areas. Therefore, Phytotourism would meet the niche market for nature tourists and could be segmented into age group according to the conformity of the locations.

Majority of the respondents came from higher educational institutions which may have received more exposure and hands-on experience about nature education in their respective institutions compared to that in primary and secondary level institutions. In addition, the 'youth tourists' consisted of students from higher learning institutions aged below 30 years old, claimed that adventure activities through clubs and associations play the most important role in giving them knowledge and confidence to participate in more nature-oriented activities.

Consequently, there are factors affecting nature tourists perception to pick a destination, including physical, social, culture, technology, economy, and politics. Physical elements which include landscape, flora, fauna, and climate have commonly chosen as the utmost factor [27]. Flora as the top motivational factor to visit ERJNP provides aesthetical value for which plants synonymy act as a symbol of calmness and tranquility. This would also point out why the respondents have selected factor to relax and rejuvenate their selves as the main internal motivator for their travel.

Herbs are also referred to as medicinal plants based on its uses, especially in healthcare. Plants with the ability to produce phytochemicals with numerous benefits such as anti-oxidant, anti-cancer, anti-bacterial, anti-diabetic, anti-viral, and wound healing have been widely utilized in pharmaceuticals, nutraceuticals, pest controls, and cosmetics. With many products available on the market that so-called derived from herbs, general public becomes more aware of the great wealth and importance of the amazing species that occur around them. Herbal tourism would have high potential to be commercialized as one of nature tourism products in Malaysia as we have about 2 000 (3 %) species of medicinal out of 52 885 species in the world [26].

For this study, pull and push factors were examined to look at tourists' perceptions and parameters that influenced the choice to get involved in tourism activity. Pull factors referred to aspects and features of a particular destination or product that affected individual's decisions, whereas push factors defined as internal aspects that are more specific from each person that motivated them to travel to the desired location [28]. As for push factors, respondents were mostly looked to relax their mind and body while taking part in Phytotourism. Phytotourism involves a moderate or low level of challenge and does not require high skills. Activities such as watching and enjoying the beauty of diverse habit of plants' species will create positive intrinsic values to nature tourists.

For pull factor analysis, respondents were highly anticipated to see endemic species when they travel to the studied trail, followed by species that are morphologically attractive and rare. Thus, these three elements should be emphasized more compared to common species in a nature tourism package to capture and retain tourists' excitement throughout the activity. This may also explain why herbs had attracted the tourists the most when they traveled to the studied site.

CONCLUSION

Tourism has admittedly changed a perspective of a common species to a highly valuable asset. Inventory of potential plants on tourists' trail and promotion of Phytotourism have helped achieve the objective to diversify tourism products in Johor and the country. Tourists' attraction in ERJNP that commonly focused on trekking and recreational activities in waterfalls can now be shifted to admiring charismatic flora that has fulfilled satisfactory criteria. By considering the well-tested criteria of nature tourism products, Phytotourism is promising enough to be applied to other protected areas around the country and worldwide. To help in the promotion of Phytotourism, supports from all authorities and agencies are seemed to be the most crucial part. Inventors and entrepreneurs may provide with financial capital while the state government would always need to ensure the tourism plans, policies and the local strategic plans are adopted by all the stakeholders. Channeling funds to improve basic and recreational facilities such as proper signages, guidebooks or interactive mobile devices with proper product information would also be beneficial.

ACKNOWLEDGEMENTS

We would like to thank staff of Johor National Parks Corporation, staff of Centre of Research for Sustainable Uses of Natural Resources, staff of Forest Research Institute Malaysia and our respondents for the great assistance in completing this study.

REFERENCES

1. J. A. McNeely, J. W. Thorsell, and H. Ceballos-Lacsurain, *Guidelines: The Development of National Parks and Protected Areas for Tourism* (World Tourism Organization, Minnesota, United State, 1992). pp. 29–39.
2. D. Newsome, S. A. Moore, and R. K. Dowling. *Natural Area Tourism: Ecology, Impacts and Management* (Channel View publications, Clevedon, 2002). pp 35–42.
3. A. Hamzah and H. A. Ismail, *Perancangan Koridor Pelancongan Berasaskan Budaya dan Alam Semulajadi, Projek Lapangan di Kelantan Darul Naim [A Design of Nature-culture Based Tourism Corridor; A Pilot Project at Kelantan Darul Naim]*, (Universiti Teknologi Malaysia, Johor Bahru, 2008), pp. 8–9.
4. UNWTO (United Nations World Tourism Organisation), *Tourism Highlights 2013 Edition* (UNWTO, Madrid, 2013), pp. 6–9.
5. R. Molina and B. G. Marcot, “Definitions and attributes of little-known species,” in *Conservation of rare or little-known species: Biological, social, and economic considerations*, edited by M. G. Raphael *et al.* (Island Press, Washington DC, 2007), pp. 125–164.
6. C. M. Hall, M. James, and T. Baird, *Journal of Heritage Tourism* 6(4), 309–323 (2011).
7. C. M. Duarte, W. C. Dennison, R. J. W. Orth, and T. J. B. Carruthers, *Estuaries and Coasts* 31(2), 233–238 (2008).
8. Iskandar Malaysia, *Jumlah Pelancong Ke Johor Tahun 2013 di Sasar Melebihi 17 Juta [Predicted More than 17 Million Tourist Went to Johor in 2013]* [Online] from <http://www.iskandarmalaysia.com.my/news/>, [Accessed on June 16, 2017]. [Bahasa Melayu].
9. Bernama, Johor Lancar Pelan Induk Pacu Industri *Pelancongan [Johor Launch Tourism Electric Relay Station]* [Online] from <http://www.sinarharian.com.my/ultras/johor-lancar-pelan-induk-pacu-industri-pelancongan-1.287731>, [Accessed on June 6, 2017]. [Bahasa Melayu].
10. MONRE (Ministry of Natural Resource and Environment, Malaysia), *Biodiversity in Malaysia* (Conservation and Environmental Management Division, MONRE, Putrajaya, 2006). pp. 1–32.
11. K. L. Chew, *A Pictorial Guide to Endau Rompin Johor: The Premier National Park in Southern Peninsular Malaysia* (Johor National Parks, Johor, 2007), pp. 10–12.
12. C. B. Jin, *J. Trop. Med. Plant* 6(1), 79 – 83 (2005).
13. J-BioTech (Johor Biotechnology Corporation), *Khazanah Endau Rompin: Herba – Second Edition*, edited by M. Z. Omar *et al.* (Utusan Publications & Distributors Sdn Bhd, Johor Baru, 2008), pp. 1–117.
14. J-BioTech (Johor Biotechnology Corporation), *Khazanah Endau Rompin: Herba*, edited by M. Z. Omar *et al.* (Utusan Publications & Distributors Sdn Bhd, Johor Baru, 2009), pp. 1–175.
15. C. Fletcher, S. Selvakannu, N. Z. A. Mustafa, J. C. Luruthusamy, and E. Butod, *CBioD Tropical Biodiversity Assessment Guideline Manual* (UNDP-GEF-ITTO-FRIM CBioD Project & FRIM, Kuala Lumpur, 2012), pp. 26–36.
16. T. C. Whitmore, *Tree flora of Malaya 1: A Manual for Foresters* (Longman, Kuala Lumpur, 1972), pp. 34–137.
17. T. C. Whitmore, *Tree Flora of Malaysia 2: A Manual for Foresters* (Longman, Kuala Lumpur, 1973), pp. 1–444.

18. C. L. Symington, *Malayan Forest Records: Foresters' Manual of Dipterocarps*, revised by Ashton, P.S. and S. Appanah (Caxton Press Ltd, Kuala Lumpur, 2004), pp. 1–519.
19. J. L. Dowe, *Gardens' Bulletin Singapore* **60**(2), 11–175 (2009).
20. IUCN (International Union for Conservation of Nature), *The IUCN Red List of Threatened Species* [Online] from <http://www.iucnredlist.org/>. IUCN (2015), [Accessed on May 15, 2015].
21. L. S. L. Chua, M. Suhaida, M. Hamidah, and L. G. Saw, *Malaysia Plant Red List Peninsular Malaysia Dipterocarpaceae* (Forest Research Institute Malaysia & Ministry of Natural Resources and Environment, Kuala Lumpur, 2010), pp. 1–210.
22. E. Soepadmo, *The Encyclopaedia of Malaysia: Plants* (Institut Penyelidikan Perhutanan, Kuala Lumpur, 2006), pp. 70–71.
23. J. Kemalok (personal communication).
24. R. Jala (personal communication).
25. S. F. Sabran, M. Mohamed, and M. F. A. Bakar, “Potential of medicinal plants used by the Jakun people as antituberculosis agents,” *Prosiding Persidangan Industri Herba 2015*, edited by O. Asiah *et al.* (Institut Penyelidikan Perhutanan Malaysia (FRIM), Selangor Darul Ehsan, Malaysia, 2015), pp. 303–308.
26. N. A. Aziz, A. A. M. Ariffin, and T. W. Vien, *Jurnal Pengurusan*, **29**, 57–74 (2009). [Bahasa Melayu].
27. L. B. Hiong, “Pembangunan ekopelancongan di Cameron Highlands: satu kajian kes [Ecotourism development in Cameron Highlands: a case study],” Thesis, Pulau Pinang: Universiti Sains Malaysia, 2007. [Bahasa Melayu].
28. S. F. Sabran, M. Mohamed, and M. F. A. Bakar, “Potential of medicinal plants used by the Jakun people as antituberculosis agents,” in *Memperkasa Jalinan Industri Herba ke Arah Transformasi Ekonomi-2015*, *Prosiding Persidangan Industri Herba 2015* (Institut Penyelidikan Perhutanan Malaysia (FRIM), Putrajaya, 2015), pp. 303–308.