SPECIES PROFILE AND ASSOCIATED INDIGENOUS KNOWLEDGE OF TREES AND SHRUBS USED AS TEA IN BENGUET

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ABSTRACT

To conserve indigenous shrubs and trees used as tea for environmental and socio-economic development, profiling of these species was conducted. The research focused in identifying and in obtaining initial information as to the nature of the habitat, flowering/fruiting periods, and respondents' indigenous knowledge of the shrubs and trees used as tea.

Data were gathered through interviews with community folks using structured questionnaire, augmented by field observations. There were 79 respondents who contributed information; almost all are farmers and the great majority are elders and women.

Eighteen indigenous trees/shrubs were identified by the respondents being used as tea. The most popular being known to more than one third of the respondents is 'Beltik' (*Syzygium sub-caudatum*), followed by 'Dael' (*Cipadessa baccifera*), and 'Amututin' (*Drimys/Tasmannia piperata*).

Among these species, only 'Beltik', 'Talugtug' (*Gaultheria leucocarp*a), and 'Tsa-ang gubat' (*Carmona retusa*) are used as tea; the rest are chiefly used as medicinal plants but being prepared as tea.

Mostly used are the leaves, followed by the bark, rarely both the leaves and the bark or the fruits/ seeds. These parts are used fresh, air-dried, or sun-dried, and prepared mainly by boiling. All species were reported to provide health benefits. As cited by the respondents, propagation of the species is mainly through the use of wildlings, seeds, cuttings, and flowering/fruiting usually varies with locations.

The species are found in mossy forest, except 'Bangkoro' (*Morinda citrifolia* L.), 'Dita' (*Alstonia scholaris*), 'Tuai' (*Bischofia javanica*), 'Narra' (*Pterocarpus indicus*) and 'Tsa-ang gubat' which are found in lower elevations.

Keywords*: Indigenous Knowledge, Tree Species, Profiling, Tea*

INTRODUCTION

As of 1987, the DENR reported that 50% of endemic flora is extinct. In 2000, Hilton-Taylor reported that 216 plant species in the country: two bryophytes, four conifers, eight monocots and 202 dicots, are endangered. Reported as 8th in the world list of most endemic plants and as among the 17 countries that holds the greatest number of species of living organisms, or a megabiodiversity area, the Philippines is now a biodiversity hotspot (The Philippine Biodiversity Conservation Priorities: Final Report, 2002). Base on the extent of forest in the Cordillera in 1997 and in 2003 as reported by the DENR, about 19,000 ha forests were lost yearly. Conducting research to domesticate and optimize utilization of our indigenous forest trees and other plants will help address the aforementioned situation.

In the Cordillera region, it is observed that several indigenous trees are used as tea. Their nutritional and medicinal values are yet to be fully known and their processing and packaging for commercialization are

yet to be developed. Meanwhile, due to the continuing conversion of forests into vegetable gardens and other uses, many indigenous trees and other plants are on the verge of being lost without being documented. Furthermore, while several indigenous trees are used as teas in the region, only very few people are using them while many are buying or using imported commercial teas.

Unpopularity and/or unavailability commercially of our native teas are seen as the main reasons. To optimize benefits and to conserve said trees for ecological and socio-economic development, a research to popularize their use as tea, package them for the market, and establish them in plantations has to be undertaken.

Pakipac (2010) reported wild teas in Mountain Province such as 'Gipas' (*Sarcandra glabra)*, 'Saknib' (*Cinnamomum mercadoi*), 'Tayogtog' (*Gaultheria leucocarpa*), and 'Ladew' (*Wenlandia sp.*). There could be other species that can be explored.

There are very limited studies conducted about the native trees and shrubs used as teas in the Cordillera Administrative Region (CAR). As to propagation, Pakipac (2010) reported that Tayogtog can be propagated by seeds; 'Ladew', 'Saknib', and 'Gotmo' can be possibly propagated by layering; 'Saknib' can be propagated by stem cuttings; and 'Gotmo' can be propagated by both root and stem cuttings. Gipas can be propagated by seeds and stem cuttings, even without treatments to hasten germination and application of root-inducing hormones respectively (Tacloy, 2000). More comprehensive research to develop the propagation/nursery techniques for every species will promote the conservation of the species.

As to processing of tea from the herbs, Bawang (2002) studied the effect of maturity stage and drying techniques on the beverage quality of Gipas and found the following: (1) oven-drying significantly hasten shoot drying, result to higher weight and change color from yellowish brown or green to dark green (as compared with these sun- or air-dried; (2) fresh shoots produce more aromatic beverage than oven-dried, but comparable with shoots that were either sun- or air-dried, and were significantly less bitter than air-dried but comparable with those sun-or oven-dried; (3) tea beverage from one-month old shoots was significantly more bitter than those prepared from five-month old, but comparable with three-month old; and (4) five-month old shoots tended to be more preferred and markedly more acceptable without sugar than younger shoots. Base on the results, Bawang (2002) recommended freshly harvested young or mature shoots and use of an oven to dry shoots regardless of age for the preparation of tea beverages, and a further study on the processing aspect.

So far, only 'Gipas' has been packaged for commercial use. Developing the processing and packaging of the rest should be undertaken to promote their conservation and optimum use.

Objective

The study aimed to develop a profile of the shrubs and trees used as tea (mountain teas) in Benguet that consist of the identification and morphological characterization of the species and local knowledge as to their habitat characteristics, flowering/fruiting periods, utilization and medicinal and health benefits.

MATERIALS AND METHODS

Location of the Study

The study was conducted where mountain teas are known to exist in two representative municipalities: Tuba and Atok, representing medium and high elevation areas respectively (Figure 1).

Respondents

Seventy-nine key informants (KI's) were interviewed: 39 in Atok and 40 in Tuba (Table 1). Municipal officials were consulted for the initial identification of KI's who in turn were interviewed and identified more KI's. The majority are elders (>50 years old) and are women; almost all are farmers.

Collection of Data

Collection of data was accomplished through formal interviews with key informants using an interview schedule, augmented by field observations.

Local folks were asked of the local names of the trees and shrubs they use as tea. The reported species unknown to the researchers were photographed and botanical specimens were collected and preserved.

The photographs and specimens were compared with available herbaria and/or illustration in printed references for the determination of their family, common and scientific names, and further referred to a dendrologist when their identities were not ascertained.

The plant size and their leaves, stems, barks, fruits and flowers were described. The folks were also asked as to how they season and prepare the plant parts, its uses and corresponding health benefits, and other relevant information about the habitat, flowering/ fruiting periods and methods of propagation of the species.

A GPS unit was used to determine the elevation of the locations of the species; soil samples were collected for the determination of the texture and pH; and field observations augmented the information obtained through KI interviews.

To complete the profile of the species identified by the respondents, secondary data was used.

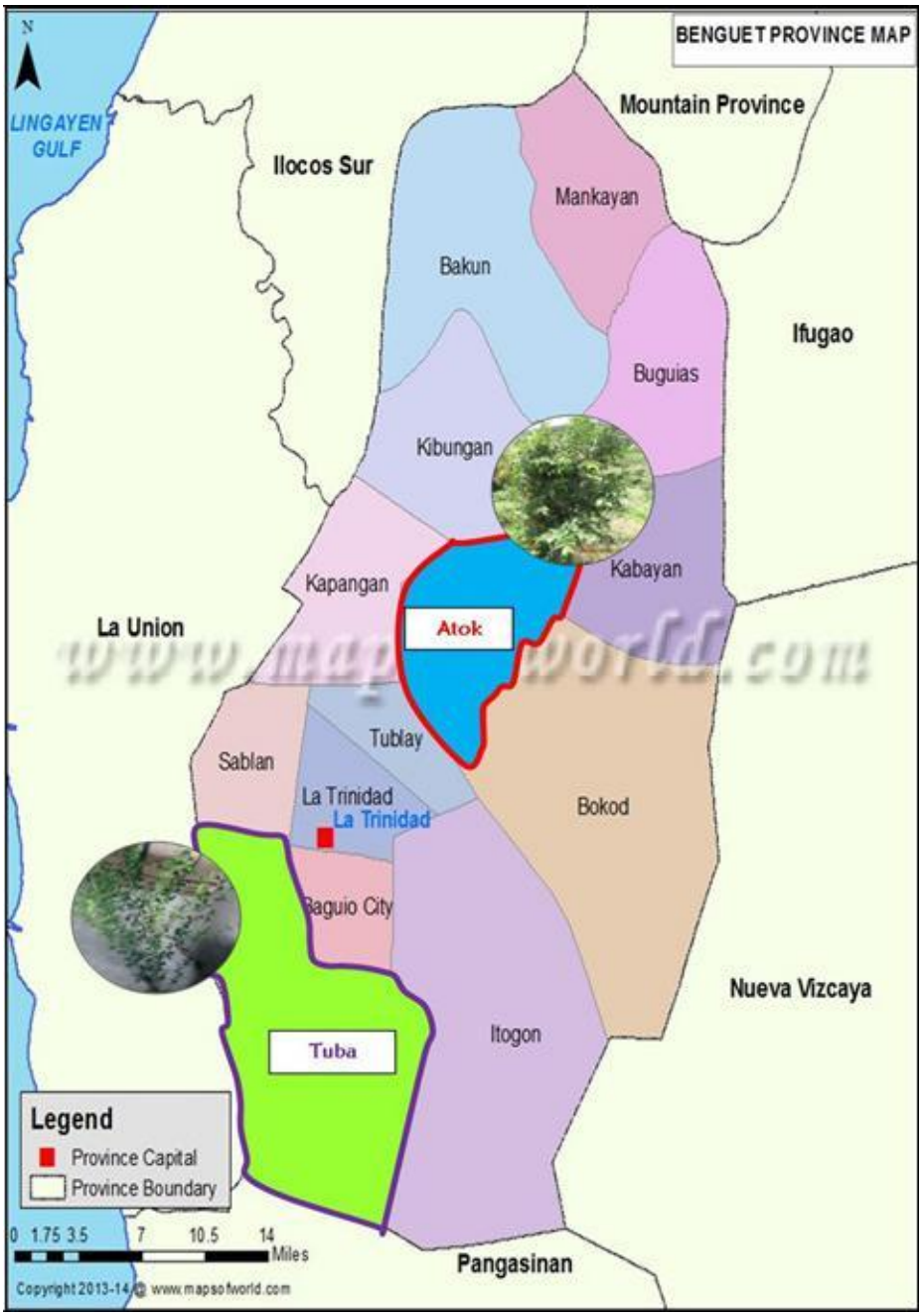

Figure 1. Map of Benguet showing the study sites (Blue and Green)

Table 1. Profile of Key Informants

MUNICIPALITY/ BARANGAY	NUMBER OF KEY INFORMANTS											
	Per Barangay/ Municipality	AGE				SEX*		PROFESSION*				
		Below 40	41-50	51-60	>60	M	F	Fm	BO	LGU Employee	STK	CE
I. ATOK												
Abing	10	1	3	2	4	6	4	10				
Caliking	5	1	1	2	1	3	20	5				
Cattubo	2			1	1	2		2				
Naguey	4			3	1	1	3	4				
Paoay	4				4	4		3	1			
Pasdong	3		1	1	1	1	2	3				
Poblacion	5		1	2	2	1	4	4				
Topdac	6	2		1	3	4	2	5	1			
Sub-total	39	4	6	12	17	22	17	36	2			
II. TUBA												
Ansagan	4		1	2	1	2	2	4				
Camp 1	2	2				2		1				
Camp 3	3	1			2	2	1	1				2
Camp 4	2				2		2	1			1	
Nangalisan	2		1	1			2	1			1	
Poblacion	7	2	2		3	4	3	6				1
San Pascual	3		1	2		1	2	3				
Tabaan Norte	1		1				1	1				
Tabaan Sur	4	2	2				4	4				
Tadiangan	2			1	1		2	1	1			
Taloy Norte	7		3	3	1	3	4	5	1			1
Taloy Sur	2	1		1		1	1	1	1			
Twin Peaks	1		1			1		1				
Sub-total	40	8	12	10	10	16	24	30	4		2	4
TOTAL	79	12	18	22	27	38	41	66	6	1	2	4

* M=Male F=Female Fm=Farmer BO=Barangay Official Stk=Store-keeper CE=Council of Elders

RESULTS AND DISCUSSION

Trees and Shrubs Used as Teas

There are 18 indigenous shrub and tree species used as teas that were reported by the respondents: 12 species in Atok and 11 species in Tuba (Table 2). Five species are common in the two municipalities, namely *Beltik, Dael, Sapal, Talugtug,* and *Peday*.

The other identified species are *Tsa-ang gubat, Apatot, Balangbang, Bauntiak, Gutmo, Katilleg, Kawasi, Narra, Puday, Tuel, Banaba, Lagundi* and *Sagat*.

Beltik was identified by more respondents (33.33%) than the rest of the species, implying that it is the only native tree species that is commonly known as tea.

Tsa-ang gubat and *Talugtug* are the other species mainly used as tea. *Tsa-ang gubat* was reported by three respondents from Nangalisan, Taloy Sur, and Taloy Norte in the Municipality of Tuba.

Talugtug was reported by one farmer in Atok and three farmers in Tuba. The rest of the species are presumed to be mainly known and used as medicinal plants but not for tea. The more popular of these medicinal species are *Dael, Sapal,* and *Kawasi.*

Two of the identified tree species are exotic: *Itsa* or *Tsa-a* and *Sapang* (Sibukau). *Tsa-a* was reported both in Atok and Tuba by six respondents. This species was known to have been introduced and to be usually planted in backyards or home gardens.

Tsa-a is the third most popular tea species among the respondents, next to *Dael,* and is observed to thrive well where the representative trees are located. *Sapang,* with its important medicinal values, was reported by four respondents in Ansagan, Tuba.

Species Profile and Associated Indigenous Knowledge

Table 3 shows the identified tea species with the associated indigenous knowledge of key informants (KI's). Among the identified species used as tea, the following, namely: *Beltik, Dael, Sapa*l, *Talugtug, Tsa-ang gubat* and *Kawasi,* are presented with more detailed profile.

The two identified exotic species, namely: *Sapang* and *Tsa-a* are also described.

***Beltik* (*Syzygium sub-caudatum*)**

This species (Figures 1-4) belongs to family Myrtaceae. The other local name is *Daniwdiw*. It is a small, usually branchy tree with brown bark.

The leaves have a mild scent when crushed, and are oppositely arranged, lanceolet with entire margin and sub-caudate apex, pinnately veined, of smooth surfaces, and about 6-6.5 cm long and 2-3 cm in width.

Petiole measures about 0.4 - 0.5 cm long and about 1.5 mm in diameter. Flowers are white. Fruits are globular, green when young, turning reddish-violet when fully matured and about 0.5 - 0.8 cm in diameter.

Habitat. *Beltik* is found in the interior or edges of forests or in open areas, including stony areas, with various plant species that include *Api-it, Pedped-aso,* Tree fern, *Gipas, Tikem, Illog, Anitap, Lusong,* and *Gutmo*. Representative plants were located on areas with elevation range of 1,872 – 2,325 m asl and with soil type of the clay – silty clay loam and pH of 3.9 – 4.7 (strongly acidic).

Flowering/fruiting period. The reported fruiting months are March – May in Brgy. Topdac, August – September in Brgy. Cattubo, and November – December in Brgy. Abiang, in the municipality of Atok; and in December – February in Brgy. Poblacion and Brgy. Tadiangan in the municipality of Tuba.

Propagation. Wildlings and stem cuttings can be used according to the KI's. In the initial propagation trial, seedlings were successfully raised but the stem cuttings planted failed to grow.

However, shoots from the planted cuttings were observed to developed roots easily.

Utilization. Farmers use the leaves, either fresh or sun-or air-dried. Four informants reported that drinking *Beltik* as tea cleanses the urinary tract and cures mild cough.

Table 2. Indigenous trees and shrubs (with two exotic species) used as tea as identified by key informants in Atok and Tuba, Benguet

SPECIES*		No. # OF KI's WHO REPORTED THE SPECIES					
LOCAL/COMMON NAME	SCIENTIFIC NAME	ATOK		TUBA		TOTAL	
		No#.	%	No#.	%	No#.	%
Apatot/Bangkoro	*Morinda citrifolia*			2	5	2	2.56
Banaba	*Lagerstroemia speciosa*			1	2.5	1	1.28
Balangbang	*Medinilla sp.*	2	5.13			2	2.56
Bauntiak/Hanga	*Pittosporum resiniferum*	2	5.13			2	2.56
Beltik	*Syzygium sub-caudatum*	20	51.28	6	15	26	33.33
Dael/ Bieum	*Cipadessa baccifera*	8	20.51	2	5	10	12.82
Gutmo	*Vaccinium jagori*	1	2.56			1	1.28
Itsa (exotic)	*Camellia sinensis*	4	10.26	2	5	6	7.69
Katilleg/Oak	*Lithocarpus sp.*	2	5.13			2	2.56
Kawasi/Kalingag	*Cinnamomum mercadoi*	3	7.69			3	3.84
Lagundi	*Vitex negundo L.*	1	2.56	1	2.5	1	1.28
Narra	*Pterocarpus indicus*			2	5	2	2.56
Peday/Dita	*Alstonia scholaris*	1	2.56	1	2.5	2	2.56
Puday	(Undetermined)	1	2.56			1	1.28
Sagat/Molave	*Vitex parviflora Juss.*			1	2.5	1	1.28
Sapal/Amututin	*(Drimys/Tasmannia piperata)*	3	7.69	1	2.5	4	5.13
Sapang/Sibukau	*Caesalpinia sappan*			4	10	4	5.13
Talugtug	*Gaultheria leucocarpa*	1	2.56	3	7.5	4	5.13
Tsa-ang gubat	*Ehretia/Carmona retusa*			3	7.5	3	3.84
Tuel/Tuai	*Bischofia javanica*	1	2.56			1	1.28

* Arranged alphabetically based on local/common name

Table 3. Associated indigenous knowledge of the tree and shrub species used as tea in Benguet

SPECIES	HABITAT	ASSOCIATED PLANTS	FLOWERING/ FRUITING MONTHS	PROPAGATION	UTILIZATION AS TEA & MEDICINE			
				PROP-TIONAGATION	PARTS USED	SEASONING SEASONING	PREPARATION	HEALTH BENEFITS
Beltik/ Daniwdiw (Malaruhat buntotan)	Interior of forest; open areas, including stony sites	*Api-it, Pedped-aso*, Tree fern, Gipas, *Tikem, Illog, Anitap*, *Lusong*, and Gutmo	March-May (Topdac) Aug.-Sept. (Cattubo) Nov.-Dec. (Abiang) Dec.–Feb. (Poblacion and Tadiangan)	Use of stem cuttings and wildlings	Leaves	Fresh, sun-dried, or air-dried	Boiling	Cleanses urinary tract and cures mild cough
Dael (Bieum)	Interior or edges of forest; along creeks; open areas; home garden	*Lusong*, Alnus, Makabuhay	Feb.–Mar. (Abiang) Sept.–Oct. (Pasdong)	Use of stem cuttings and wildlings	Leaves and bark	Fresh, sun-dried, or air-dried	Boiling and pounding (for bark)	Medicine for stomachache, asthma, loose bowel movement and menstrual disorder; normalizes blood pressure
Sapal (Amututin)	Mossy forest			Use of wildlings and stem cuttings	Leaves and fruits	Fresh, sun-dried, or air-dried	Boiling; seeds/ fruits may be eaten raw or pulverized	Cures acute kidney trouble, dysentery, cough, and stomachache
Talugtug	Interior of forest (disturbed part of mossy forest)	*Sapal, Katilleg/ Palayen*, Bamboo and other small trees and shrubs	September		Leaves	Fresh, sun-dried, or air-dried	Boiling	Alleviates stomachache
Peday (Dita)	Interior of forest; base of mountains; sandy and stony areas			Use of wildlings	Bark	Fresh, sun-dried, or air-dried	Boiling	Cleanses the urinary tract and cures stomachache
Tsa-ang gubat (Kalimonog)	Interior of forest			Use of stem cuttings and wildlings	Leaves	Fresh, sun-dried, or air-dried	Boiling	Cleanses the urinary and cures cough
Apatot (Bangkoro)	Interior of forests		Nov.–Dec. (Nangalisan)	Use of wildlings and seeds	Leaves	Fresh, sun-dried, or air-dried	Boiling	Cleanses urinary tract
Bauntiak	Interior of forest		May (flowering) June (fruiting)	Use of seeds and wildlings	Leaves and fruits	Fresh, sun-dried, or air-dried	Boiling	Cures cough

Table 3 – Continuation…

Gutmo	Interior of forest				Leaves	Fresh, sun-dried, or air-dried	Boiling	Cleanses the urinary tract
Katilleg/ Palayen	Mossy forest			Use of seeds, stem cuttings and wildlings	Fruits	Fresh, sun-dried, or air-dried	Boiling	Alleviates rheumatism
*Kawasi (*Kalingag)	Along creeks/ rivers	Balete, Alnus, *Kamuweg*	March–April	Use of wildlings	Bark	Fresh, sun-dried, or air-dried	Boiling	Cures cough and asthma
Narra	Interior of forest; base of the mountain			Use of seeds and wildlings	Bark	Fresh	Boiling	Medicine for diabetes and goiter
Puday	Base of mountain; along rivers				Leaves	Fresh, sun-dried, or air-dried	Boiling	Cures loose bowel movement and stomachache
Tuel (Tuai)	Interior of forest	Uyok, *Pedped-aso, Lusong, Katilleg*	March		Bark	Fresh, sun-dried, or air-dried	Boiling	Cleanses the urinary tract and cures toothache
Banaba				Use of seeds and wildlings	Leaves, bark, and flowers	Fresh, sun-dried, or air-dried	Boiling	Promotes flow of urine
Dangla (Lagundi)				Use of cuttings	Leaves and bark	Fresh, sun-dried, or air-dried	Boiling	Cures cough
*Sagat (*Molave)				Use of seeds and wildlings	Leaves	Fresh, sun-dried, or air-dried	Boiling	Cures kidney trouble and mayoma
Balangbang/ Bangbang					Leaves	Fresh, sun-dried, or air-dried	Boiling	Cleanses the urinary tract
Tsa-a	Backyard (domesticated)		Sept. – Oct.	Use of wildlings and seeds	Leaves/ shoots	Fresh, sun-dried, or air-dried	Boiling	Cleanses urinary tract and cures cough and asthma
*Sapang (*Sibukau/ Sappanwood)	Opening or edge of the forest; and parang			Use of seeds and wildlings	Bark	Fresh, sun-dried, or air-dried	Boiling	Improves urinary discharge and menstruation and cures diarrhea and dysentery

Figure 2. The *Beltik* plant

Figure 3. Leaves

Figure 4. Flowers

Figure 5. Fruits

Bieum (Cipadessa baccifera (Roth) Mig.)

This species (Figures 5-9) belongs to family Meliaceae and is locally known as 'Dael'. It is a medium tree with brown outer, and red inner bark. Leaves taste bitter, and are odd-pinnate, spirally arranged; leaflets are oppositely arranged, oval-elliptical, with inequilateral base and acuminate tip, and about 2.7-9.8 cm long and 0.8-4.9 cm in width; petiolule measures about 0.3- 0.7 cm long. Flowers are white and the fruits are green when young, turning violet when fully matured.

Figure 6. Fruits

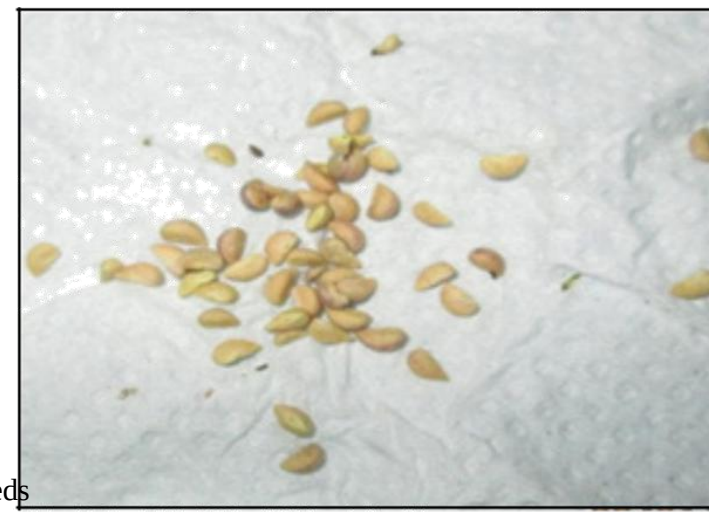

Figure 7. Seeds

Figure 8. The plant

Figure 9. Portion of main stem; inner bark is reddish brown (right photo)

Figure 5-9. Leaves, fruits, seeds, a plant and portion of main stem of *Bieum*

Habitat. *Dael* is found in the interior or edges of forests and along creeks with various plant species that include *Lusong*, *Alnus*, and *Makabuhay* (vine). A representative plant is located in a home garden with sandy loam, and strongly acidic (pH 4.5) soil and an elevation of 1,690 m asl.

Flowering/fruiting period. The plant bears fruits in February – March in Brgy. Abiang, March - April in Brgy. Caliking, and August – September in Brgy. Pasdong, Atok. The matured seeds used in the initial germination study were collected from Pasdong in August 2014, indicating that the plant flowered earlier than August.

Propagation. The species can be propagated using wildlings and stem cuttings as reported by the key informants. Initial propagation trials show that seedlings are easily grown but the stem cuttings planted were not successful.

Utilization. The leaves and bark, either fresh or sun-or air-dried are boiled and used as tea. The bark may be pounded prior to utilization. The KI's reported that decoction from *Dael* normalizes blood pressure and is used as medicine for stomachache, asthma, loose bowel movement and menstrual disorder. One of them reported that this species should not be taken in by pregnant women as it may cause abortion. Such reports indicate that this species is mainly known as a medicinal plant.

***Amututin* (*Drimys/Tasmannia piperata* Hook. f.)**

This species (Figures 10-12) belongs to family Winteraceae and is locally known as *Sapal* (Mt. Province) and *Lupol* (Bontoc). It is a small tree, sometimes scrambling. The fruits are small, obovoid to ellipsoid, black and nitidous to orange brown and dull; leaves are scattered to pseudo-verticillate, with elliptic or obovate to lanceolate lamina (Vink, 1970).

Habitat. Four of the KI's reported that Sapal is found in the interior of mossy forest. Two plants are located on areas with soil of the clay type and pH 3.84 – 4.14 (strongly acidic) and an elevation of 1,839 - 2,321 m asl. In Mount Pulag, it is found up to 2,600 m asl, and it is also reported in Mindoro, Camarines Sur, and Mindanao in the Philippines, and in Borneo and New Guinea (Aguilar, *et al*., 2000).

Figure 10. Amututin Plant

Figure 11. Amututin Flowers

Figure 12. Amututin Fruits

Flowering/fruiting period. The plant bears fruits in the months of March – April. Matured fruits were collected in October 2013 from Mount Data plateau, Bauko and Mountain Province.

Propagation. The plant can be propagated through wildlings and stem cuttings according to the KI's. Through an initial propagation trial, several seedlings, and two rooted cuttings (out of the many stem cuttings planted) were produced.

Utilization. The KI's reported that the leaves, either fresh or sun-or air-dried, are boiled. The seeds are pulverized then taken orally as powder, followed by drinking water, or mixed in liquid and drunk as tea. Two KI's reported that the seeds can be eaten fresh as a medicine for acute kidney trouble, dysentery, cough and stomachache, and decoction from leaves alleviates cough and stomachache. According to Pladio and Villasenor (2004), *Amututin* leaves contain flavonoids, a substance which has the ability to treat cough and colds (http://en.wikipedia.org/wiki/flavonoids).

Talugtug (*Gaultheria leucocarpa Blm*. var. *leucocarpa forma cumingiana* Vid.)

This plant (Figures 13-14) belongs to family Ericaceae. It is a shrub that grows from 0.3 – 2.0 m tall. The leaves are elliptic-lanceolate with obtuse to rounded base, serrate margin, and acuminate to caudate apex. The inflorescence is axillary, racemose with broadly triangular calyx lobes and white, campanulate corolla.

Habitat. A KI in Atok and three KI's in Tuba reported that *Talugtug* is found in partly open parts of mossy forest with various plant species that includes *Sapa*l, *Katilleg*, bamboos and other small trees and shrubs. Co (1989), reported that this species is common on open slopes, ravines and thickets between 1,300 - 2,400 m asl in Mountain Province, Benguet and Eastern Uplands of Abra of the Cordilleras, in Mount Banahaw and Mayon in Luzon, Mount Halcon in Mindoro, Canlaon Volcano in Negros and Mt. Apo in Mindanao; and is also found in Burma, SW to S China, Thailand, Indo China, Malaysia and Taiwan.

Flowering/fruiting period. The KI's reported that the plant bears fruits in September. Representative plants were observed at Legleg, Kibungan, Benguet in September 2014 bearing flowers.

Propagation. There was no reported propagation method by the respondents but Pakipac (2010)

Figure 13. The plant

Figure 14. A stem with flowers

Figure. 15 Leaves

Figure 16. Branches with flowers

reported that the species can be propagated through seeds.

Utilization. It is reported that the leaves, either fresh or sun-or air-dried, can alleviate stomach ache when boiled and drunk as tea. The KI in Atok warns that drinking too much of the decoction can be poisonous. Co (1989) reported that the plant is quite popularly used as a tea beverage and its leaves are pleasantly aromatic (with an odor like that of wintergreen oil) due to a main component which is salicylate (oil of wintergreen), a substance with antipyretic, analgesic and anti-rheumatic actions quite similar to those of other salicylate drugs when taken orally. Co further reported that drinking infusion from *Talugtug* leaves can alleviate fever, sore mouth and sore throat, and this plant can be mistaken with *Baket* (*Coriaria intermedia*), a species which is similar in appearance and poisonous.

***Kalimonog* (*Carmona retusa* (*Vahl*) Masam)**

This species (Figures 15-16) belongs to family Boraginaceae and is locally known as Tsa-ang gubat. Other names are *Ehretia microphylla* (Lawn) and *Carmona microphylla* (Lawn) G. Don (Rojo, 1999). It is a shrub. The leaves are simple, fascicled, elliptical, about 1.2-1.8 cm wide and 3-6 cm long, entire but some are toothed near the apex, of cuneate base, short stalked and slightly rough on the upper surface. The flowers are small, white, axillary, solitary, 2 or 4 on a common stalk. Fruits are yellow when ripe, about 3-4 mm in diameter, fleshy, and with 4-seeds.

Habitat. The KI's reported that *Tsa-ang gubat* is found in the interior of forest. Two representative trees are located within forest openings with elevations of 789 and 207 m asl, and soil of extremely-strongly acidic (3.10 – 4.65) pH, and of the silty clay and silty clay loam types.

Flowering/fruiting period. Matured fruits were collected on May 21, 2014 in Ansagan, Tuba, Benguet. The plants observed in September 2014 at Benengbeng, Sablan and in Legleg, Kibungan, in the province of Benguet, have immature fruits.

Propagation. The KI's reported that the plant is propagated through the use of wildlings and cuttings.

Utilization. The KI's reported that the leaves, either fresh or sun-or air-dried, are boiled, and drinking the decoction cleanses the urinary tract and cures cough.

***Kalingag* (*Cinnamomum mercadoi* Vid.)**

This species (Figures 17-18) belongs to family 13

Lauraceae and is locally known as *Kawasi*. It is a medium tree with thick and aromatic bark. The leaves are opposite - sub-opposite, smooth, pale green, sub-glaucous beneath, shiny above, ovate - oblong to broadly lanceolate, occasionally sub-elliptic, tri-nerved, 8 to 20 cm long, and 4 to 6 cm wide, and with short (about 5 to 15 mm) petioles.

Habitat. Three of the KI's reported that *Kawasi* is found along the creeks or rivers with various plant species that include *Balete, Alnus* and *Kamuweg*. A representative tree is located in an area with strongly acidic (pH 3.95) and silty clay soil and with an elevation of 1,204 m asl.

Flowering/fruiting period. The plant bears fruits in March – April according to the respondents.

Propagation. The KI's reported that the plant can be propagated through the use of wildlings. Pakipac (2010) reported that this species can be propagated through stem cuttings.

Utilization. The KI's reported that they use the bark, either fresh or sun-or air-dried, simply by boiling. They further reported that it can cure cough and asthma. A KI believes that obtaining the plant during the Lent (Holy Week) make it more effective for medicinal use. Co (1989) reported that decoction from 1 – 3 g of dried powdered bark of *Kalingag* is used to cure cough, flatulence and gastric and abdominal pains, but also reported that the bark of the tree contains volatile oil mainly made-up of safrole that possesses paralyzing action towards the respiratory center of animals, and can cause fatty degenerations in the liver and kidney, similar to phosphorous poisoning when administered to cat and other domestic animals in low dozes over a period of time, and vomiting in dogs when administered at 0.75 kg. With such report, the plant should not be used as tea until proven to be medicinally or nutritionally beneficial.

Tsa-a (Camellia sinensis (L.) O. ***Ktze***.)

This species (Figures 19 - 22) is exotic. It belongs to family Theaceae and is locally named as *Tsa-a* or *Itsa*. It is a medium tree. The leaves are shiny, finely hairy underneath, about 4-15 cm long and about 2-5 cm broad. The flowers are about 2.5 cm in diameter, with 7-8 white petals and many yellow stamens, scented and occurring singly or in cluster of 2-4. The fruits are green capsule, turning brown when dried and containing 1-4 spherical – semi - flattened seeds.

Flowering/fruiting period. The plant bears fruits in September to October as reported by the respondents but the mature fruits used in the propagation trial were collected in February 2013 at Caliking, Atok.

Propagation. The KI's reported that they use wildlings and seeds to propagate the plant. Initial germination study produced healthy seedlings. Several wildlings were also observed under a mother tree.

Utilization. The leaves or shoots, either fresh or sun-or air-dried, are boiled. The KI's reported that drinking the decoction can cleanse the urinary tract and can cure cough and asthma. Green tea, Black tea, Oolong tea and Pu-ehr tea are derived from *Camellia sinensis* that contains unique anti-oxidants called flavonoid (Edgar, 2009); drinking of these teas are reported to be helpful in medical conditions such as cancer, rheumatoid, arthritis, high cholesterol levels, cardiovascular disease, infections, and impaired immune function (Parkinson, 2014).

Sibukau/Sappanwood (***Caesalpinia sappan*** L.) This species (Figures 23-25) belongs to Fabaceae (Caesalpinoidae) and locally known as *Sapang*. It is a shrub with scattered prickles all over the stem. The pith (center of the stem) is bright red. The leaves are spirally arranged, bipinnate with oblong-ovate shiny leaflets. The flowers are yellow panicles found at the axils of upper leaves or terminating the twigs. The pods are 7.5 - 10 cm long and about 3.5 cm wide.

Propagation. The shrub can be propagated through seeds and wildlings according to the KI's. Initial study shows that the species can be easily propagated through seeds.

Utilization. The KI's reported that decoction from *Sapang* bark, fresh or air-dried, improves urinary discharge and menstruation, and cures diarrhea. This report is corroborated by Kurian (2010) who reported that the decoction of the wood and bark of *Sapang* stimulates menstruation, and is good for diarrhea, dysentery and tonic.

Figure 19. A young plant

Figure 20. Upper leaf surface

Figure 22. Flower

Figure 21. Main stem

Figures 19-21. A young plant, upper leaf surface, main stem, and flower of *Tsa-a*

Figure 23. The plant

Figure 24. Leaves

Figure 25. Fruits (pods)

Figures 23-25. Plant, leaves, and fruits (pods) of *Sapang*

CONCLUSIONS AND RECOMMENDATIONS

There are several valuable indigenous trees and shrubs that are used as teas by the local people in Benguet mainly due to their presumed or experienced health or medicinal effects.

Most important are *Beltik*, *Talugtug*, *Dael*, *Sapal* and *Tsa-ang gubat*. Popular medicinal plants such as *Peday* (*Alstonia scholaris*), *Banaba* (*Lagerstroemia speciosa*), *Lagundi* (*Vitex negundo*), and *Apatot* (*Morinda citrifolia*) are also found in Benguet.

From the results and objective of the study, the following are recommended:

1. Conduct follow-up study to validate claims on health and/or medicinal values and the flowering and fruiting periods of the reported species.

2. Conduct chemical content analysis of the leaves/ shoots and bark of the species, and of studies to determine appropriate processing and packaging into tea, and propagation of the species found to be nutritionally and/or medicinally valuable.

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LITERATURE CITED

Aguilar, N. O., B. L. Cardenas, and M. A. O. Cajano. 2000. Spore and Seed-bearing Plants of Mt. Pulag, Benguet, Philippines. Museum of Natural History. UPLB, College, Laguna, Philippines

Bawang, F. G. 2002. Effect of Maturity Stage and Drying Techniques on the Beverage Quality of Mountain Teas (Gipas). Unpublished Thesis. Graduate School, Benguet State University, La Trinidad, Benguet

DENR-FMB, 1996. Philippine forestry Statistics. DENR, Quezon City, Manila.

Guinabang, L. I. 2000. Yield Performance of *Mentha cordifielia* and *Camellia javonica* Under Four Kinds of Mulch Materials, Three Pruning Frequencies and Types of Training Systems. MPSPC Research Journal. 011956. 53-59.

Edgar, J. 2009. Types of Trees and their Health Benefits. Retrieved from http://www.webmd. com/ diet/ features/tea.types-and-their-health benefits?page=2&print=true#.

Kurian, J. C. 2010. Amazing Healing Plants. Printed by Phil. Publishing House, M a n i l a , Philippines. P.16.

CO, L. L. 1989. Common Medicinal Plants of the Cordillera Region: A Trainers Manual for Community- Based Health Programs, CHESTCORE, Baguio City. Bustamante Press, Quezon City.

Hilton-Taylor, C. (COMPILER). 2000. IUCN Red List of Threatened Species. Gland, Switzerland & Cambridge, UK. Pp. xviii and 6.

Pakipac, E.D. 2010. Appropriate Propagation Techniques of Selected Wild Tea Species. MPSPC Research Journal. 011956. 3-9.

Parkinson, R. 2014. The Miracle of Green Tea. Retrieved from http://chinese food.about.com/ library/ weekly/aa0114000a.htm?p=1.

Pladio, L. and I. Villaseñor, 2004. Anti-Spasmodic Constituents of *Drimys piperata* Hook.f. Leaves. Unpublished MS Thesis. Science and Technology Information Institute, Department of Science and Technology. Gen. Santos Avenue Bicutan, Taguig City, Metro Manila

Rojo. J. P. 1999. Revised Lexicon of Philippine Trees. FPRDI and DOST, College Laguna

Tacloy, J. G. 2000. Propagation Using Stem Cuttings & Pre-germination Treatments of Gipas (*Sarcandra glabra*).BSU Research Journal 29. 61-71.

Vink, W.1970. The Winteraceae of Old World; Pseudo Winteraceae and Drimys Morphology and Taxonomy. Blimea 18 (2). 314-316

The Philippine Biodiversity Conservation Priorities: Final Report, 2002.