



An ethnomedicinal field survey report on traditionally used plants by the Nepalese of Alubari Jungle Busty in Darjeeling Himalaya as potential immunity booster and fever-related herbal drugs

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As a result of several ethnobotanical field visits in and around Alubari Jungle Busty of Darjeeling Himalaya from August 2012 till May 2019, mostly new ethnic uses of different plant parts including dosimetry of 24 wild plant species were documented. Documentation was based on oral interviews with experienced and elderly Nepalese people mainly in respect to immunity boosters and instant remedies against fevers including COVID-19. Some plant parts which were also used by the Nepalese of Alubari Jungle Busty as blood purifiers, lowering high blood pressure, energy provider during a long walk, diarrhoea, chronic piles, bronchitis, asthma, throat pain, cold and cough, were also documented. Present work also embodies botanically authenticated binomial names of documented wild plant species, vernacular names, knowledge informants, voucher information, live photographic documentation and study area map.

Keywords: Antiviral and nonviral fevers, COVID-19, Darjeeling, Ethnomedicinal plants, Immunity booster, Nepalese

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From August 2012 till May 2019 under three state-sponsored projects funded by the Government of West Bengal, several ethnobotanical field visits in and around the Alubari Jungle Busty area, outskirts of Senchal Wildlife Sanctuary and about 9 km from Darjeeling town were conducted. Main purpose of these field visits were to document ethnomedicinal new ITKs from the Nepalese communities. For this purpose, first hand informations were gathered based on oral interviews with elder knowledgeable Nepalese and their ethnomedicinal practices were documented. A perusal of literature revealed that these ITKs are new to science¹⁻¹⁶. Recently, a local Nepalese herbal medicine man (JKT: second author) is also practising these herbal drugs with their dosimetry against COVID-19 patients in and around the Alubari Jungle Busty area including Darjeeling Municipal Ward No. 1 (part of Alubari TN Road) since the last week of May 2020 and revealed that 15 patients (mostly labours of age group between 30 and 55 coming from other states) out of 22 with COVID-19 symptoms (not tested as positive but remained under quarantine) are cured within 10 to 15 days, and

fortunately they are now healthy and safe. Most of these herbal drugs with their prescribed dosimetry are acting as immunity boosters against any type of viral fevers including COVID-19 and other non-viral fevers already mentioned. Therefore, present work embodies new and noteworthy ethnomedicinal uses of 24 wild plant species with their prescribed dosimetry by the Nepalese of Alubari Jungle Busty against viral fever including pandemic COVID-19, other non-viral fevers and other diseases as well as voucher information, vernacular names, knowledge informants, live photographic documentation and study area map.

Methodology

Study area

Alubari Jungle Busty lies 9 km from Darjeeling town and 1 km from Ghoom along the eastern side of T. N. Road starting from Alubari Ward No. 1 and continues till Alubari Monastery up to 1.5 km. The area has T.N. Road and a part of Jalapahar Cantonment on the west, part of Senchal WLS & a part of Rangeyroong valley on the east, Alubari Tea Garden on the north and Jorebunglow & Senchal WLS on the south. Geographically, the study area

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approximately lies between 27°01'21.29" N to 27°00'53.97" North Latitude & 88°15'45.32" E to 88°16'45.07" East longitude.

Demography

As per the 2011 Census, total population of the Alubari area comprises about 3256, of which about 350 are from Jungle Busty Area. The sex ratio is about 977 females per 1000 males (2011 census). The literacy rate of the Jungle Busty Area is poor (about 52%) compare to other parts of Darjeeling district (79.56%). The major religion is Hinduism (Nepalese Hindu) followed by Buddhism. Indigenous ethnic groups include different castes of Nepalese viz., Tamang, Gurung, Moktan, Thami, Chhetri, Rai, Sarki, Sharma, Mukhia and Thapa, although only 12 villagers belong to Lepchas or Rongpa (the ravine folks) and Bhutias who are claimed to be the original inhabitants of Jungle Busty Area since time immemorial. The predominant language spoken is Nepalese.

Present Socio-economic conditions

Agriculture is the main occupation, and of course, most people are engaged with the Alubari & Rangeyroong Tea industry which is not only the principal source of employment but has also played an important role in the field of economy and earnings. Besides, some are working as porters at Darjeeling Town, some are working as Carpenters, Artists, Lamas, Farmers as well as in Govt. services (mostly in Army Deptt.). A few people also earn money by selling milk & milk products, for this, they rear Himalayan cows down in Jungle Busty villages.

Survey, interview and data collection

As a result of ethnobotanical field visits from August 2012 till May 2019 in and around five villages under the Alubari Jungle Busty area (all villages are commonly called as Alubari Jungle Busty), new information on antiviral diseases including immunity boosters were documented (Fig. 1). These documentations were based on following 24 wild plant species. Oral interviews were taken with experienced and elderly Nepalese people belonging to ten different castes viz., Tamang, Gurung, Moktan, Thami, Chhetri, Rai, Sarki, Sharma, Mukhia and Thapa including forest guards and local Nepalese medicinemen who were sometimes employed as field guides. Before conducting oral interviews, a Prior Informed Consent (PIC) as per CBD guidelines was taken from each informant of the Alubari Jungle

Busty. Every time during data documentation, the details of Access and Benefit Sharing (ABS) were informed to the local Nepalese communities. As Biodiversity Management Committee (BMC) under Darjeeling Municipality is functioning based on Peoples' Biodiversity Register (PBR) prepared by the first author in 2014. Therefore, ethical approvals were taken from all informants in the form of a declaration along with a questionnaire during the preparation of PBR in 2014. A total 24 experienced Nepalese people belonging to ten different castes were orally interviewed with the age groups mostly belonging to 60–80 years (some belong to 30–60 age groups) that include both males (total=16) and females (08). The data thus collected were further verified among different castes of Nepalese people in a particular village (no particular name of a village is found, rather all villages often called 'Jungle Busty') for a particular plant species and finally cross-checked with the help of available published literature^{1-5,7,9-12}. Detailed information regarding local name(s), part(s) used, mode of administration or preparation and dosimetry were recorded in the field notebook. The quality of herbs and additives used for medicinal therapeutic purpose was not measured. Botanical identity was confirmed at CAL (Central National



Fig. 1 — Location map of Darjeeling showing study area Alubari Jungle Busty (Google Earth)

Herbarium, Howrah). Voucher specimens were deposited at Darjeeling Govt College (DGC) and Maulana Azad College (MAC) Herbarium. The methodology followed in this work is as prescribed by Jain¹⁷.

Result and Discussion

24 wild species are enumerated alphabetically with their authenticated correct botanical name, family, vernacular name(s), knowledge informant(s), mode of use including dosimetry and voucher information. All vernacular names are documented only from the Nepalese of Alubari Jungle Busty, therefore after a vernacular name, different castes of the Nepalese community are mentioned within parenthesis. The local uses of various parts of 24 wild plant species were noted as immunity boosters and in fever treatments. Some parts of these 24 wild plants were also used by the Nepalese to cure Gastro-intestinal tract infections, chronic piles, diarrhoea, asthma, bronchitis, energy providers during long walk, cough and cold and throat pain. Ten different castes of Nepalese communities interviewed during field visits were Tamang, Gurung, Moktan, Thami, Chhetri, Sarki, Sharma, Rai, Mukhia and Thapa.

Achyranthes bidentata Bl. (Amaranthaceae) (Fig. 2 a-c)

Vernacular name: *Ratoapamarga* (Tamang); *apamarga* (Thami, Sarki, Mukhia and Rai). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Mr. Abhijit Sharma (age 38) and other 10 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry*: extract of underground stems and roots (25 g fresh) is mixed with 500 mL of mild-warm water and prescribed to drink in the early morning with empty stomach to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT). *Voucher specimen*: 1 km down from Alubari T. N. Road, inside Jungle Busty, 6900 ft, 15.05.2014, S. Panda & JK Thami 161 (DGC); 6300 ft, 19.05.2019, S. Panda & JK Thami 616 (MAC).

Actinidia callosa Lindl. (Actinidiaceae) (Fig. 2 d-e)

Vernacular name: *Thekiphal* (Tamang, Thami, Sarki, Mukhia, Rai and Gurung). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Mr. Abhijit Sharma (age 38) and other 9 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry*: Use-1: extract of ripened and unripened fruits are

used to prepare a kind of liquor (1 kg fruits per 5 litres water) which is also fermented by mixing leaves and fruits of Morcha plant (50 g: *Polygala arillata* D. Don) and prescribed to drink after meal to the patients suffering from any type of viral fever including COVID-19 (as practising by the second author: JKT). Use-2: 1 unripened fruit (just before 7 days of ripening) is prescribed one-day interval after one hour of lunch for 1 month to the unaffected people to get immunity against any types of viral fevers and 1 fruit daily after one hour of lunch for one month to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT). *Voucher specimen*: 4 km down from Alubari T. N. Road, inside Jungle Busty, 5400 ft, 12.04.2015, S. Panda & JK Thami 291 (DGC).

Artemisia indica Willd. (Asteraceae) (Fig. 2 f-g)

Vernacular name: *Titepate* (all castes of Nepalese community mentioned). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Mr. Bhawani Guragai (age 52) and other 22 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry*: Use-1. extract of leaves (10 g fresh) are mixed with 200 mL of mild-warm water and prescribed to drink in the early morning with an empty stomach for 7 days to the patients suffering of any type of viral fevers including COVID-19 (as practising by the second author: JKT). Use-2. leaves and twigs (200 g fresh) are directly allowed to boil in water till vapour comes out, this vapour is allowed to inhale through the mouth and nasal path for 1 min twice daily for the patients suffering from cold, cough, bronchitis, viral fever including COVID-19 (recently by JKT in June 2020) and other non-viral fevers for 7 days to cure completely. *Voucher specimen*: Jungle Busty 3rd village, 5600 ft, 15.05.2014, S. Panda & JK Thami 199 (DGC).

Astilbe rivularis Buch.-Ham. ex D. Don (Saxifragaceae) (Fig. 2 h-i)

Vernacular name: *Burookhati* (Tamang, Sarki, Rai, Thapa, Moktan and Gurung); *Ban Supari* (Thami). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Smt. Bishnumati Rai (age 85), Mr. Purno Tamang (age 79) and other 18 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry*: extract of rhizomes and roots of *Astilbe rivularis* and *Bergenia ciliata* (Haw.) Sternb. (Pakhanbet) (10 g each 1:1 ratio) are mixed with 500 mL of mild-warm water and prescribed to drink in the early morning with an empty stomach to the patients suffering from

any type of viral fevers including COVID-19 (as practising by the second author: JKT in June 2020), as it acts as an immunity booster. *Voucher specimen*: 1 km down from Alubari T. N. Road, inside Jungle Busty, 6900 ft, 15.05.2014, S. Panda & JK Thami 164 (DGC), 7200 ft, 28.04.2016, S. Panda & JK Thami 16 (MAC).

Bergenia ciliata (Haw.) Sternb. (Saxifragaceae) (Fig. 2 l–m)

Vernacular name: Pakhanbet (Tamang, Sarki, Thami, Thapa, Moktan, Rai, Chhetri and Gurung). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Smt. Lamu Doma Tamang (age 74) and the other 22 Nepalese people of Alubari Jungle busty. *Mode of*



Fig. 2 — Ethnomedicinal plants of Alubari Jungle Busty in Darjeeling Himalaya: – (a–c) underground stem and roots of *Achyranthes bidentata* Bl. along with Knowledge informant; (d–e) Fruits of *Actinidia callosa* Lindl. in habit; (f–g) leaves of *Artemisia indica* Willd. along with knowledge informant; (h–i) rhizomes and roots of *Astilbe rivularis* Buch.-Ham. ex D. Don along with Knowledge informant; (j–k) *Drymaria cordata* (L.) Willd. ex Schult. along with knowledge informant; (l–m) rhizomes and roots of *Bergenia ciliata* (Haw.) Sternb. along with knowledge informant; (n–o) *Boenninghausenia albiflora* (Hook.) Rchb. ex Meisn.

use and dosimetry: extract of rhizomes and roots *Bergenia ciliata* (Haw.) Sternb. (10 g fresh) is mixed with 500 mL of boiling water allowed to cool 5 min, then mix 4–5 drops of honey and stir for a while and prescribed to drink in the morning with empty stomach to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT in June 2020), as it acts as a potential immunity booster. *Voucher specimen*: 3 km down from Alubari T. N. Road, inside Jungle Busty, 5800 ft, 15.05.2014, S. Panda & JK Thami 192 (DGC).

Boenninghausenia albiflora (Hook.) Rehb. ex Meisn. (Rutaceae) (Fig. 2 n–o)

Vernacular name: *Dampate* (Tamang, Sarki, Thami, Rai, Thapa and Gurung). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Mr. Abhijit Sharma (age 38) and other 12 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry*: extract of roots (20 g fresh) is mixed with 500 mL of mild hot water, then mix 4–5 drops of honey and stir a while and prescribed to drink in the morning with empty stomach to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT in June 2020), it also acts as a potential immunity booster. *Voucher specimen*: 1 km down from Alubari T. N. Road, inside Jungle Busty, 6300 ft, 19.05.2019, S. Panda & JK Thami 617 (MAC).

Drymaria cordata (L.) Willd. ex Schult. (Caryophyllaceae) (Fig. 2 j–k)

Vernacular name: *Avijal* (Tamang, Sarki, Thami, Mukhia, Chhetri, Thapa and Gurung). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Mr. Abhijit Sharma (age 38), Smt. Bishnumati Rai (85) and the other 18 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry*: extract of whole plants except roots (5 g fresh) is mixed with 500 mL of mild hot water and prescribed to drink in the early morning with an empty stomach to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT in June 2020), it also acts as a potential immunity booster. *Voucher specimen*: 7 km down from Alubari T. N. Road, inside Jungle Busty near the last village, 5200 ft, 19.05.2019, S. Panda & JK Thami 644 (MAC).

Ficus auriculata Lour. (syn. *F. roxburghii* Wall. ex Miq.) (Moraceae) (Fig. 3 a–c)

Vernacular name: *Nebharo* (Tamang), *Nebhara* (Chhetri), *Timilo* (Sarki, Thami, Mukhia, Thapa and

Gurung). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Mr. Sailendra Chhetri (age 31) and other 19 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry*: Use-1: extract of ripened fruits (2 fruits per 100 mL normal water) are prescribed daily in the morning with an empty stomach for 14 days to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT in June 2020), it also acts as a potential immunity booster. Use-2: Immature fruits (7–8) are cooked with mung dal and taken during lunch one-day interval for one month to increase body immunity. *Voucher specimen*: 7 km down from Alubari T. N. Road, inside Jungle Busty near the last village, 5200 ft, 19.05.2019, S. Panda & JK Thami 646 (MAC).

Ficus carica L. (Moraceae) (Fig. 3 d–f)

Vernacular name: *Anjeer* (Tamang, Rai and Thami). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Mr. Satyam Tamang (age 64) and other 16 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry*: extract of ripened fruits (4 fruits per 100 mL normal water) are prescribed daily in the morning with an empty stomach for 7 days to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT in June, 2020), it also acts as a potential immunity booster. *Voucher specimen*: 7 km down from Alubari T. N. Road, inside Jungle Busty near the last village, 5100 ft, 19.05.2019, S. Panda & JK Thami 657 (MAC).

Gaultheria stapfiana Airy Shaw (Ericaceae) (Fig. 3 g–h)

Vernacular name: *Patpate* (Tamang, Rai and Thami). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72) and other 7 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry*: fresh ripened bluish or bluish-white fruits (6–8 fruits per day) are chewed raw or dry fruits (10–12 soaked in normal water) and prescribed daily at any time of the day after or before foods for at least 15 days for increasing body's immunity as well as to relieve from throat pain due to cold and expelling cough. As these fruits are seasonal, local people used to collect and preserve it for future use. According to a local experienced Knowledge informant (Mr. J. K. Thami of Alubari), these fruits are rich source of vitamins and minerals. *Voucher specimen*: 1 km down from Alubari T. N. Road, inside Jungle Busty just before first village, 6800 ft, 23.11.2015, S. Panda & JK Thami 35 (DGC).

Heracleum wallichii DC. (Apiaceae) (Fig. 3 i–k)

Vernacular name: *Chimphing* (Tamang, Sarki, Mukhia, Moktan, Rai, Gurung and Thami).
Knowledge Informant(s): Mr. Jai Kumar Thami (age 72), Mr. Abhijit Sharma (age 38), Smt. Lamu Doma Tamang (74), Smt. Bishnumati Rai (85) and the other 20 Nepalese people of Alubari Jungle busty.
Mode of use and dosimetry: Use-1: 4–6 raw or dry fruits are chewed after lunch every day on regular basis to

increase body's energy and immunity as well as good stomach and liver functioning. Use-2: 8–9 fresh or raw fruits (chewed after lunch daily till symptoms disappear) are prescribed to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT).
Voucher specimen: 2 km down from Alubari T. N. Road, inside Jungle Busty after the first village, 6000 ft, 19.05.2019, S. Panda & JK Thami 667 (MAC).



Fig. 3 — Ethnomedicinal plants of Alubari Jungle Busty in Darjeeling Himalaya: – (a–c) Fruits of *Ficus auriculata* Lour. along with Knowledge informant; (d–f) Fruits of *Ficus carica* L. with knowledge informant; (g–h) Fruiting twigs of *Gaultheria stapfiana* Airy Shaw; (i–k) Fruiting twigs of *Heracleum wallichii* DC. along with knowledge informants; (l–m) *Hydrocotyle himalaica* P. K. Mukh. along with knowledge informant; (n–o) Fruits of *Litsea sericea* Wall. along with knowledge informant.

Hydrocotyle himalaica P. K. Mukh. (Apiaceae) (Fig. 3 l–m).

Vernacular name: *Golepata* (Sarki, Mukhia, Rai, Moktan and Chhetri); *Dhungripata* (Tamang, Gurung and Thami). *Knowledge Informant(s):* Mr. Jai Kumar Thami (age 72), Mr. Abhijit Sharma (age 38), Mr. Kesar Karki (age 52) and the other 19 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry:* extract of leaves (10–12 leaves) mixed in 100 mL of normal water or 10 clean leaves are prescribed to chew raw in the early morning with an empty stomach daily on regular basis to increase body's immunity, memory of brain, to purify blood, to relieve throat pain due to cold and expelling cough. Recently the above dosimetry is prescribed to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT). *Voucher specimen:* 7 km down from Alubari T. N. Road, inside Jungle Busty after the last village, 5000 ft, 28.04.2016, S. Panda & JK Thami 222 (MAC).

Koenigia mollis (D. Don) T. M. Schust. & Reveal (Syn. *Aconogonum mole* (D. Don) H. Hara)

(Polygonaceae). *Vernacular name:* *Thotne* (Tamang, Thami, Sharma, Sarki, Rai, Mukhia, Moktan, Gurung and Chhetri). *Knowledge Informant(s):* Mr. Jai Kumar Thami (age 72), Mr. Abhijit Sharma (age 38) and the other 14 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry:* middle part of the stem (25 g for children and 50 g for an adult) are prescribed to chew raw after cleaning and washing at any time of the day before or after food on regular basis. This can improve body's immunity and vitamin C levels. It can also alleviate fever as a Paracetamol 650 tablets (It was proved by Mr. JK Thami in May 2016 by curing 12 patients suffering from fever). Recently the above dosimetry is prescribed to the patients suffering from any type of viral fevers including COVID-19 (as practising by the second author: JKT). *Voucher specimen:* 4 km down from Alubari T. N. Road, inside Jungle Busty, 5900 ft, 28.04.2016, S. Panda & JK Thami 207 (MAC). (Fig. 4 a–c)

Litsea sericea (Wall. ex Nees) Hook. f. (Lauraceae) (Fig. 3 n–o)

Vernacular name: *Lekh Sil Timur* (Tamang, Thami and Rai). *Knowledge Informant(s):* Mr. Jai Kumar Thami (age 72), Smt. Bishnumati Rai (age 89) and the other 10 Nepalese people of Alubari Jungle busty. *Mode of use and dosimetry:* dust or extracts of 4–5

aromatic scented fruits of Lekh Sil Timur and 4–6 fruits of Chimphing (Species no. 11) are mixed and used in Chutney, dal or any other vegetables. It is mostly used in preparing a special chutney to eat boiled potatoes to increase the functioning of stomach, liver and intestine as well as to increase body's immunity. Recently it is also provided to the COVID-19 patients as immunity booster (as practising by the second author: JKT). *Voucher specimen:* 2 km down from Alubari T. N. Road, inside Jungle Busty, 6100 ft, 18.07.2015, S. Panda & JK Thami 115 (DGC).

Lonicera glabrata Wall. (Caprifoliaceae) (Fig. 4 d–f)

Vernacular name: *Sweto Lahara* (Thami and Tamang). *Knowledge Informant(s):* Mr. Jai Kumar Thami (age 72) and Smt. Lamu Doma Tamang (age 74) of Alubari Jungle busty. *Mode of use and dosimetry:* extracts of tender leaves and flowers (4:1 proportion: 20 g: 5 g) are mixed with 300 mL of normal water and prescribed for 7 days in the morning with an empty stomach to the patients suffering mainly from viral fever or flu a common traditional practice among the Nepalese of Jungle Busty since time immemorial to cure viral fever. Recently it is also provided to the COVID-19 patients (as practising by the second author: JKT). *Voucher specimen:* 2 km down from Alubari T. N. Road, inside Jungle Busty, 6000 ft, 18.08.2015, S. Panda & JK Thami 171 (DGC).

Lyonia ovalifolia (Wall.) Drude (Ericaceae) (Fig. 4g)

Vernacular name: *Angeri* (Thami, Tamang, Rai, Moktan, Sarki, Thapa and Gurung). *Knowledge Informant(s):* Mr. Jai Kumar Thami (age 72) and Smt. Bishnumati Rai (age 85) of Alubari Jungle busty. *Mode of use and dosimetry:* smoke from the dried leaves or steam vapour from fresh leaves (5–7) are prescribed to inhale through nasal cavities and mouth for 2–3 min twice per day (morning and night) to kill any types of germs to relieve from acute runny nose, bronchitis, asthma and many types of respiratory infections. Recently this practice is also prescribed to the COVID-19 patients to reduce the viral loads inside nasal cavities and respiratory tract (as practising by the second author: JKT). *Voucher specimen:* 2 km down from Alubari T. N. Road, inside Jungle Busty, 5900 ft, 19.05.2019, S. Panda & JK Thami 669 (MAC).

Miscanthus nepalensis (Trin.) Hack. (Poaceae) (Fig. 4 h–k)

Vernacular name: *Siru* (Thami, Tamang, Sharma and Rai). *Knowledge Informant(s):* Mr. Jai Kumar

Thami (age 72) and Mr. Abhijit Sharma age 38) and 6 more Nepalese community of Alubari Jungle busty. *Mode of use and dosimetry*: immature spikelets and inflorescence are prescribed to chew raw during long trekking to get energy as well as to increase body's immunity. Recently this spikelets are provided to the COVID-19 patients to increase their body's immunity

(as practising by the second author: JKT). *Voucher specimen*: 1 km down from Alubari T. N. Road, inside Jungle Busty, 6300 ft, 28.04.2016, S. Panda & JK Thami 197 (MAC).

Piper peepuloides Roxb. (Piperaceae) (Fig. 4l)

Vernacular name: *Dabai pan* (Thami, Tamang and Sharma); *Jangali pan* (Moktan, Sarki, Gurung and



Fig. 4 — Ethnomedicinal plants of Alubari Jungle Busty in Darjeeling Himalaya: – (a–c) edible stems of *Koenigia mollis* (D. Don) T. M. Schult. & Reveal along with Knowledge informant; (d–f) leaves and flowers of *Lonicera glabrata* Wall. along with its habitat in 2nd village; (g) leaves of *Lyonia ovalifolia* (Wall.) Drude; (h–k) edible spikelets inflorescence of *Miscanthus nepalensis* (Trin.) Hack. along with Knowledge informant; (l) *Piper peepuloides* Roxb. along with knowledge informant; (m) young twigs of *Rubus ellipticus* Sm.; (n–o) stems and leaf petioles of *Sarcopyramis nepalensis* Wall. along with knowledge informant.

Rai). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72) and 10 more Nepalese community of Alubari Jungle busty. *Mode of use and dosimetry*: 3–4 mature fresh and clean leaves are prescribed to chew raw at any time on regular basis to increase body's immunity, normal functioning of stomach and liver as well as to gain energy during trekking. Recently leaves of this plant are provided to the COVID-19 patients to increase their body's immunity (as practising by the second author: JKT). *Voucher specimen*: 3 km down from Alubari T. N. Road, inside Jungle Busty, 5900 ft, 14.09.2014, S. Panda & JK Thami 77 (DGC).

Potentilla fulgens Wall. ex Hook. (Rosaceae) (Fig. 5 a–d)

Vernacular name: Chirya phal (Thami, Tamang and Sharma). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Mr. Kesar Karki (age 52) and 6 more Nepalese community of Alubari Jungle busty. *Mode of use and dosimetry*: extract of fresh underground stem and roots (10 g) is mixed in 300 mL of normal

water and prescribed to drink in the early morning with an empty stomach daily for 10 days in every month to increase body's immunity, to purify blood, to cure acute piles (same dose but continues till the symptoms disappear) and to reduce viral and non-viral fevers. Recently the above dosimetry are provided to the COVID-19 patients to increase their body's immunity as well as to reduce viral loads and fever (as practising by the second author: JKT). *Voucher specimen*: 1 km down from Alubari T. N. Road, inside Jungle Busty, 6900 ft, 22.06.2015, S. Panda & JK Thami 152 (DGC).

Rubus ellipticus Sm. (Rosaceae) (Fig. 4m)

Vernacular name: Aiselu (Thami, Tamang, Moktan, Sarki, Thapa, Gurung, Chhetri and Sharma). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Smt. Lama Doma Tamang (age 51) and 16 more Nepalese community of Alubari Jungle busty. *Mode of use and dosimetry*: fresh and young shoots (Child: 25, Adult: 50 g) are prescribed to chew daily for 10 days per month at any time after and before food to

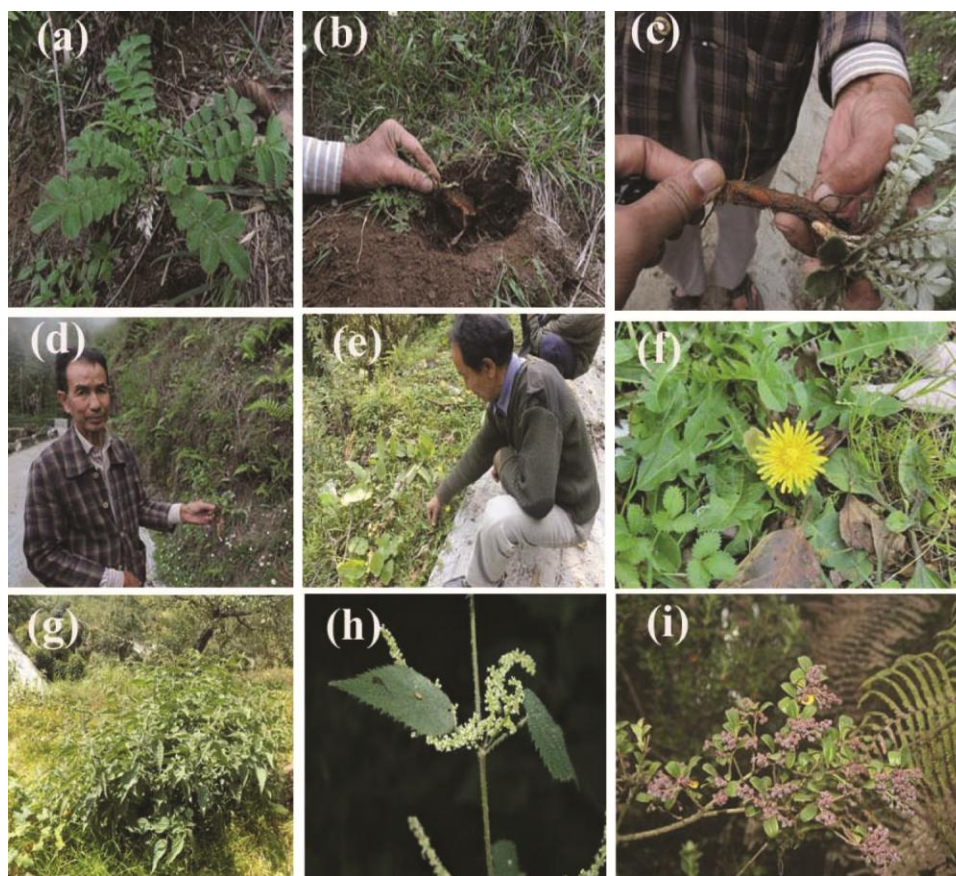


Fig. 5 — Ethnomedicinal plants of Alubari Jungle Busty in Darjeeling Himalaya: – (a–d) underground stems and roots of *Potentilla fulgens* (Wall.) Hook. along with Knowledge informant; (e–f) *Taraxacum officinale* (L.) Weber ex F. H. Wigg. along with knowledge informant; (g–h) leaves and inflorescence of *Urticadioica* L.; (i) edible fruits of *Vaccinium retusum* (Griff.) C. B. Clarke.

increase body's immunity, to cure tonsillitis, throat pain, viral/nonviral fevers and respiratory infections. Recently the above prescription is provided to the COVID-19 patients to increase their body's immunity as well as to reduce viral loads and fever with same dose but continues till symptoms disappear (as practising by the second author: JKT). *Voucher specimen*: 4 km down from Alubari T. N. Road, inside Jungle Busty, 5800 ft, 28.04.2016, S. Panda & JK Thami 216 (DGC).

Sarcopyramis nepalensis Wall. (Melastomataceae) (Fig. 4 n–o)

Vernacular name: Charibang (Thami, Tamang, Moktan and Thapa). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Smt. Lama Doma Tamang (age 74) and 5 more Nepalese community of Alubari Jungle busty. *Mode of use and dosimetry*: juice from the fresh stems and petioles (50 g) are mixed in 300 mL of cold boiled water and prescribed to drink in the morning with an empty stomach for 10 days in every month to increase body's immunity. It is prescribed to take twice on regular basis in case of acute diarrhoea till symptoms disappear, but one time per day for 7 days in case of viral and nonviral fevers. Recently the above prescription is provided to the COVID-19 patients to increase their body's immunity as well as to reduce viral loads and fever with same dose but continues till symptoms disappear (as practising by the second author: JKT). *Voucher specimen*: 1 km down from Alubari T. N. Road, inside Jungle Busty, 6800 ft, 14.09.2015, S. Panda & JK Thami 182 (DGC).

Taraxacum officinale (L.) Weber ex F.H. Wigg. (Asteraceae) (Fig. 5 e–f)

Vernacular name: Tuki Phool (Thami, Tamang, Moktan and Thapa). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Smt. Lama Doma Tamang (age 74) and 10 more Nepalese community of Alubari Jungle busty. *Mode of use and dosimetry*: extract of entire plant parts except roots (50 g) is mixed in 300 mL mild-warm water and prescribed to drink in the morning with an empty stomach daily on regular basis in case of viral and nonviral fevers. Recently the above prescription with same dosimetry is provided to the COVID-19 patients to reduce viral loads and fever till symptoms disappear (as practising by the second author: JKT). *Voucher specimen*: 2 km down from Alubari T. N. Road, inside Jungle Busty, 5900 ft, 19.05.2019, S. Panda & JK Thami 670 (MAC).

Urtica dioica L. (Urticaceae) (Fig. 5 g–h)

Vernacular name: Sishnu (Thami, Tamang, Moktan, Gurung, Rai, Chhetri, Sarki, Sharma and Thapa). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Smt. Lama Doma Tamang (age 74) and 20 more Nepalese community of Alubari Jungle busty. *Mode of use and dosimetry*: Gharia Soup--fresh and washable tender leaves and inflorescence (50 g) are mixed with black mung (100 g) and garlic (5 g) in 1 litre water are allowed to boil till mungs are boiled. This soup called Gharia is prescribed daily after lunch for 10 days in every month, to increase body's immunity, maintaining normal functioning of liver and to lower blood pressure. Recently the above prescription with same dosimetry on regular basis is provided to the COVID-19 patients to increase their body's immunity (as practising by the second author: JKT). *Voucher specimen*: 2 km down from Alubari T. N. Road, inside Jungle Busty, 5800 ft, 19.05.2019, S. Panda & JK Thami 674 (MAC).

Vaccinium retusum (Griff.) Hook. f. ex C. B. Clarke (Ericaceae) (Fig. 5i)

Vernacular name: Rate (Tamang), Tomarke (Thami and Moktan). *Knowledge Informant(s)*: Mr. Jai Kumar Thami (age 72), Smt. Lama Doma Tamang (age 74) and 5 more Nepalese community of Alubari Jungle busty. *Mode of use and dosimetry*: tender leaves and fruits (both mature and immature) (1:1 ratio of about 20 g each) are prescribed to chew raw after cleaning and washing daily at any time of the day to increase body's immunity, to cure throat pain due to cold and expelling cough. Recently the above prescription with same dosimetry on regular basis is provided to the COVID-19 patients to increase their body's immunity (as practising by the second author: JKT). *Voucher specimen*: 1 km down from Alubari T. N. Road, inside Jungle Busty, 6900 ft, 19.05.2019, S. Panda & JK Thami 679 (MAC).

Conclusion

Mostly new and unknown local ethnic uses of different plant parts including dosimetry of 24 wild plant species by ten different Nepalese communities of Alubari Jungle Busty are documented in respect to instant remedies against fevers including COVID-19, immunity booster, blood purifier, lowering high blood pressure, energy provider during long walk, diarrhoea, chronic piles, bronchitis, asthma, throat pain, cold and cough. Most of these first hand cross-checked information are not reported earlier, when reported^{4,5,7,9,11,15} their dosimetry and plant parts are different.

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Conflict of Interest

Both authors declare that there is no conflict of interest.

Authors' Contributions

Both authors are equal contributors of this work.

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