

## OPEN ACCESS



The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at [www.threatenedtaxa.org](http://www.threatenedtaxa.org). All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.

# Journal of Threatened Taxa

Building evidence for conservation globally

[www.threatenedtaxa.org](http://www.threatenedtaxa.org)

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

## NOTE

### CULTIVATION OF THE HIMALAYAN SEASONING *ALLIUM* IN A REMOTE VILLAGE OF UTTARAKHAND, INDIA

Chandra Prakash Kuniyal & Bir Singh Negi

26 October 2018 | Vol. 10 | No. 11 | Pages: 12614-12617  
10.11609/jott.3807.10.11.12614-12617



For Focus, Scope, Aims, Policies and Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-0>  
For Article Submission Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/submissions#onlineSubmissions>  
For Policies against Scientific Misconduct visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-2>  
For reprints contact [info@threatenedtaxa.org](mailto:info@threatenedtaxa.org)

## Partners



المحمد بن زايد  
للمحافظة على  
الكائنات الحية  
The Mohamed bin Zayed  
SPECIES CONSERVATION FUND



Member



Publisher & Host





ISSN 0974-7907 (Online)  
ISSN 0974-7893 (Print)

#### OPEN ACCESS



Himalayan Seasoning Allium or Strachey's Chive *Allium stracheyi* Baker (Family: Amaryllidaceae; vernacular: 'Faran', 'Jambu'), growing between 2000–4000 m in the western Himalaya, is a bulbous perennial herb that is commonly used as a spice and culinary herb. The pleasant aroma of Chives is favoured for flavouring and seasoning food items (Anonymous 2003), and this species is also useful in promoting digestion and in relieving cold and cough (Maikhuri et al. 2017). *Allium stracheyi* is enlisted as Vulnerable in the Red Data Book of Indian Plants (Dasgupta 1990). Ved et al. (2003) have also categorized it as Vulnerable in the western Himalayan states of Jammu & Kashmir, Himachal Pradesh, and Uttarakhand. Regional field information on its distribution and use categorized *A. stracheyi* under cultivation and low-pressure medicinal and aromatic plants in the Uttarakhand (Rawat 2005). In some parts of Uttarakhand, *A. auriculatum* Kunth is in cultivation and may be misidentified as *A. stracheyi* (Rawat 2005). Some authors have also mentioned 'Pharan' as *A. carolinianum* Redoute (Silori & Badola 2000). In some other reports, the vernacular for *A. stracheyi* is mentioned as Jambu (Negi 2012); however, the variation in local names may be due to different dialects. The foliage of *A. stracheyi* contains a higher quantity of carbohydrate, protein, vitamin C, vitamin E, and phosphorus as compared to its allied species such as *A. humile* Kunth and *A. rubellum* M. Beib. (Maikhuri

## CULTIVATION OF THE HIMALAYAN SEASONING *ALLIUM* IN A REMOTE VILLAGE OF UTTARAKHAND, INDIA

Chandra Prakash Kuniyal<sup>1</sup> & Bir Singh Negi<sup>2</sup>

<sup>1</sup>Herbal Research and Development Institute, Mandal, Gopeshwar, Chamoli, Uttarakhand 246401, India

<sup>2</sup>Department of Agriculture, Cooperation and Farmers Welfare, Government of India, Krishi Bhavan, New Delhi 110001, India  
Present address: Consultant to the National Horticulture Board and NABARD, Government of India, 302, Best Avenue Apartment, Balbir Road, Dehradun, Uttarakhand 248006, India

<sup>1</sup>cpkuniyal@rediffmail.com (corresponding author),

<sup>2</sup>negi.bir59@gmail.com

et al. 2017).

The Himalayan Seasoning Allium is cultivated in several cold desert villages located in the buffer zone of the Nanda Devi Biosphere Reserve (NDBR) in districts Pithoragarh and Chamoli in Uttarakhand, India. Tolma (~2600–2800 m; 30.524°N & 79.752°E), a small, remote village located between the cold desert and a temperate region of NDBR in Chamoli District, western Himalaya, however, is well-known for traditional cultivation of this species for generations (Fig. 1, Image 1). According to natives, cultivation of *A. stracheyi* in Tolma may have begun in 1915–1920 as an innovative trial and the area under cultivation was not more than a common kitchen garden having an expansion of few metres. Some reports, however, state that prior to the closure of Indo-Tibet trans-border trade during the early sixties, *A.*

DOI: <https://doi.org/10.11609/jott.3807.10.11.12614-12617>

Editor: D.S. Rawat, G.B. Pant University of Agriculture & Technology, Pantnagar, India.

Date of publication: 26 October 2018 (online & print)

Manuscript details: Ms # 3807 | Received 20 September 2017 | Final received 19 September 2018 | Finally accepted 01 October 2018

Citation: Kuniyal, C.P. & B.S. Negi (2018). Cultivation of the Himalayan seasoning *Allium* in a remote village of Uttarakhand, India. *Journal of Threatened Taxa* 10(11): 12614–12617; <https://doi.org/10.11609/jott.3807.10.11.12614-12617>

Copyright: © Kuniyal & Negi 2018. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

Funding: Financial assistance for field work was provided by the Government of Uttarakhand.

Competing interests: The authors declare no competing interests.

Acknowledgements: The authors are thankful to the Editor, *Journal of Threatened Taxa*, for constant support and to the anonymous reviewer for providing valuable suggestions on the initial draft of this manuscript. They have helped us a lot to improve this communication. Mr. Rudra Singh & Mr. Mohan Singh, Tolma Village, are acknowledged for providing field information.

*stracheyi* was exchanged with India by the Tibetan Lamas or other traders for bartering of daily need commodities, and possibly after 1960s, commercial cultivation of *A. stracheyi* was started in this region (Nautiyal & Nautiyal 2004). It is important to note that the cultivation of *A. stracheyi* is also acting as an anticipated measure for the conservation of its genetic resources (Pandey et al. 2008). Cultivation of *A. stracheyi* in Tolma Village is an interesting practice; therefore, the survey was conducted in 2015 for finding the cultivation status and economic benefits of *A. stracheyi*.

At present, a total of 20 out of 25 families in Tolma Village are cultivating *A. stracheyi* in a total of 1.10ha area. Of them, 17 have an average of 0.03ha area (0.02–0.06 ha) and three have an average of 0.18ha area (0.14–0.22 ha) under *A. stracheyi* cultivation. Being perennial, *A. stracheyi* is harvested twice a year (in June and September) and about 35.00kg dried leaf (foliage) is obtained from 0.02ha (equal to 1 'nali', 1 nali = 10 x 20 m area, 50 nali = 1ha; nali-vernacular) is a common parameter used for measurement of land) in a year. At the village level, during 2015–16, the prices (per kg) for Faran were close to about INR 350.00 (USD 5.44; INR 64.29 = USD 01, as on 19 September 2017). Therefore, the gross income of farmers having a minimum of 0.02ha area under cultivation was approximately INR 12,250.00 per year (USD 190.54) and those having a maximum

of 0.22ha area under cultivation was approximately INR 134,750.00 per year (USD 2,095.97). Therefore, the estimated gross income from the cultivation of *A. stracheyi* in a hectare was INR 612,500.00 (USD 9,527.14). The gross income from cultivation of *A. stracheyi* in 0.02ha area was INR 8,750.00 in 2011. The price/kg for Faran at village level then was INR 250.00 while the estimated gross income from the cultivation of Potato *Solanum tuberosum* from 0.02ha was merely around INR 1,600.00 (Kuniyal & Sundriyal 2013). Therefore, cultivation of *A. stracheyi* is economically profitable than that of traditional crops. Marketing of this species, both at the local level and outside, is quite comfortable and in local fairs, approximately 10.00g Chive may be sold at INR 20–25. Sometimes, the expected produce in this village is booked by traders in advance; therefore, the tradition of cultivation and effortless trade of *A. stracheyi* is remarkable. The produce when dried, can be stored easily for a few months. Being a light and dried plant material, the transportation of the produce is easy and does not require special means.

Total cultivation cost in an established field (excluding the cost of planting material, as once this species is planted, it will flourish for many years; nearly 1.8 to 2.7 lakh plants may be required in a hectare) (Nautiyal & Nautiyal 2004), including the cost of farmyard manure, weeding, harvesting, and processing for *A. stracheyi*



Figure 1. Map of Uttarakhand showing the location of Tolma Village in Chamoli District (not to scale)





**Image 1. Cultivation of *Allium stracheyi* in Tolma Village, Chamoli District, Uttarakhand**

is around INR 140,000.00/ha/annum and the net profit is likely to be INR 472,500.00/ha/annum. After processing (chopping and preferably shade drying), average production per ha of *A. stracheyi* is estimated to be around 1,750.00kg (1.75 metric ton (MT); 1MT = 1,000.00kg). In some other mountain valleys located in the vicinity of NDBR, however, the production of *A. carolinianum* (Pharan — the species used similarly as *A. stracheyi*) and *A. wallichii* Kunth (Jambu) are reported to be 79.3 kg/ha/year and 102.8 kg/ha/year (Silori and Badola 2000) and around 2,431.00kg *A. stracheyi* (Jambu) from 3.45ha area (Negi 2012).

The cultivation of Himalayan Seasoning *Allium* in other villages such as Malari, Jhelum, Gamshali and Niti in Chamoli District and Martoli, Pachhu and Milam in Pithoragarh District in Uttarakhand is either sparse or not practiced by the majority of the families inhabiting the village, and harvesting from the wild is also common (Bhatt 1999). Since agro-climatic conditions vary in mountains areas, the information on production may vary. The villagers of Tolma, however, have been cultivating this species for generations and, therefore, their information on productivity may be considered as more reliable. Cultivation of *A. stracheyi* in Tolma Village is an excellent example of a traditional practice being upheld as a customary one, as well as being established as a profitable business. It was also interesting to note that out of the 20 families cultivating

*A. stracheyi* in this village, only one has received any kind of financial support from government agencies for extension activities. Therefore, this is an exemplary practice for a MAP cultivation that is flourishing without any subsidy or support price. In addition to attractive economic benefits, *A. stracheyi* has its importance as a domestic culinary herb and indispensable gift. This village is also a source of planting material of this species for surrounding areas and nearby villages. On the other hand, cultivation of *Picrorhiza kurroa* and *Saussurea costus* are some of the other examples of medicinal plant cultivation in Uttarakhand; however, in order to maintain the cultivation of these two species, intensive and extensive attempts were initiated at the policy, legal, and facilitation levels (Kuniyal et al. 2015; Kuniyal & Negi 2016).

The cultivation of *A. stracheyi* in this village is an excellent conservation practice. Also, some of the produce grown by villagers is stored for 4–6 months for domestic use during winter season. The post-harvest practices for *A. stracheyi*, however, are still traditional and the area under cultivation is nearly consistent from many years. Sometimes, the material chopped and dried traditionally also gets infected by diverse types of fungal/ bacterial infections. Therefore, for financial attractiveness, advancement in technology is essential (Buschke 2015). It is suggested that the traditional method of chopping and drying must be replaced with

new and less destructive methods. Studies are required to standardize suitable moisture content in dried materials. Better post-harvest processing, attractive packaging, and organic branding will also help the farmers in terms of increased economic returns as compared to their current income. In the advent of more attractive and new food crops like Pea (*Pisum sativum*), challenges may occur for maintaining this practice. Attempts for establishing exact scientific identity of similarly used cultivated *Allium* in Uttarakhand and their area expansion are also suggested. Microclimatic conditions for cultivation of *A. stracheyi* in this village are suitable and the flavour of Tolma's Faran is much favoured; therefore, this village may also act as an excellent research site for initiating the work on development of improved varieties.

## References

- Anonymous (2003).** *The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products, Vol. I - A (revised)*. National Institute of Science Communication and Information Resources, CSIR, New Delhi, India, 187pp.
- Bhatt, V.P. (1999).** Ethnobiology of high altitude Himalayan communities in district Chamoli: a conservation perspective. *Zoos' Print Journal* 14(11): 137–146; <https://doi.org/10.11609/JoTT.ZPJ.14.11.137-46>
- Buschke, F.T. (2015).** The startup culture of conservation entrepreneurship. *Conservation Biology* 29(1): 300–302; <https://doi.org/10.1111/cobi.12340>
- Dasgupta, S. (1990).** *Allium stracheyi* Baker, pp. 9–10. In: Nayar, M.P. & A.R.K. Shastri. *Red Data Book of Indian Plants, Vol. 2*. Botanical Survey of India, Calcutta.
- Kuniyal, C.P. & R.C. Sundriyal (2013).** Conservation salvage of *Cordyceps sinensis* collection in the Himalayan mountains is neglected. *Ecosystem Services* 3: e40–43.
- Kuniyal, C.P., D.S. Rawat & R.C. Sundriyal (2015).** Cultivation of *Saussurea costus* cannot be treated as 'artificially propagated'. *Current Science* 108(9): 1587–1589.
- Kuniyal, C.P. & B.S. Negi (2016).** Export of cultivated *Picrorhiza kurroa* is profitable, but requires rigor. *Current Science* 111(11): 1738.
- Maikhuri, R.K., V.S. Negi, L.S. Rawat & D.S. Pharswan (2017).** Bioprospecting of medicinal plants in Nanda Devi Biosphere Reserve: linking conservation with livelihood. *Current Science* 113(4): 571–577.
- Nautiyal, M.C. & B.P. Nautiyal (2004).** *Agrotechniques for High Altitude Medicinal Plants*. Bishen Singh Mahendra Pal Singh, Dehradun, India, 202pp.
- Negi, C.S. (2012).** Sustaining life and livelihood: a case study of Askote conservation landscape, central Himalaya. *International Journal of Biodiversity and Conservation* 4(4): 164–178;
- Pandey, A., R. Pandey, K.S. Negi & J. Radhamani (2008).** Realizing value of genetic resources of *Allium* in India. *Genetic Resources and Crop Evolution* 55(7): 985–994.
- Rawat, G.S. (2005).** *Alpine Meadows of Uttaranchal: Ecology, Landuse and Status of Medicinal and Aromatic Plants*. Bishen Singh Mahendra Pal Singh, Dehradun, 219pp.
- Silori, C.S. & R. Badola (2000).** Medicinal plant cultivation and sustainable development: a case study in the buffer zone of the Nanda Devi Biosphere Reserve, western Himalaya, India. *Mountain Research and Development* 20(3): 272–279.
- Ved, D.K., G.A. Kinhal, K. Ravikumar, V. Prabhakaran, U. Ghate, R. Vijayshankar & J.H. Indresha (2003).** Conservation Assessment and Management Prioritization for the Medicinal Plants of Jammu & Kashmir, Himachal Pradesh and Uttaranchal. Proceedings of Regional Workshop, May 22–25, 2003, Shimla, HP, India. Foundation for Revitalisation of Local Health Traditions, Bangalore, India, 206pp.





## OPEN ACCESS



The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at [www.threatenedtaxa.org](http://www.threatenedtaxa.org). All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

October 2018 | Vol. 10 | No. 11 | Pages: 12443–12618

Date of Publication: 26 October 2018 (Online & Print)

DOI: 10.11609/jott.2018.10.11.12443-12618

[www.threatenedtaxa.org](http://www.threatenedtaxa.org)

### Article

**The terrestrial life of sea kraits: insights from a long-term study on two *Laticauda* species (Reptilia: Squamata: Elapidae) in the Andaman Islands, India**  
-- Zoya Tyabji, Nitya Prakash Mohanty, Erina Young & Tasneem Khan, Pp. 12443–12450

### Communications

**Fishing Cat *Prionailurus viverrinus* Bennett, 1833 (Carnivora: Felidae) distribution and habitat characteristics in Chitwan National Park, Nepal**  
-- Rama Mishra, Khadga Basnet, Rajan Amin & Babu Ram Lamichhane, Pp. 12451–12458

**Status distribution and feeding habit of Wild Boar *Sus scrofa* (Mammalia: Artiodactyla: Suidae) in Pench Tiger Reserve, Madhya Pradesh, India**  
-- Shaheer Khan & Orus Ilyas, Pp. 12459–12463

**The composition and status of waterbirds of Perur Lake in Tamil Nadu, India**  
-- G. Parameswaran & R. Sivashankar, Pp. 12464–12488

**The herpetofauna of Jigme Singye Wangchuck National Park in central Bhutan: status, distribution and new records**  
-- Sangay Tshewang & Letro Letro, Pp. 12489–12498

**The Odonata (Insecta) of Dhofar, southern Oman**  
-- Elaine M. Cowan & Peter J. Cowan, Pp. 12499–12514

**New kissing bug (Hemiptera: Reduviidae: Triatominae) records from Napo and Morona-Santiago provinces with distribution updates in Ecuador**  
-- Ana Soto-Vivas, Sandra Enríquez, Ernesto Villacrés, Jazmin Arrivillaga, Martín Hinojosa & Jonathan Liria, Pp. 12515–12522

**Orchid diversity in two community forests of Makawanpur District, central Nepal**  
-- Bijaya Pant, Mukti Ram Paudel, Mukesh Babu Chand, Shreeti Pradhan, Bijaya Bahadur Malla & Bhakta Bahadur Raskoti, Pp. 12523–12530

**Habitat distribution modeling for reintroduction and conservation of *Aristolochia indica* L. - a threatened medicinal plant in Assam, India**  
-- Bhaskar Sarma, Prantik Sharma Baruah & Bhaben Tanti, Pp. 12531–12537

**Pollination ecology of *Synedrella nodiflora* (L.) Gaertn. (Asteraceae)**  
-- B. Usharani & A.J. Solomon Raju, Pp. 12538–12551

### Review

**Status of studies on zooplankton fauna of Arunachal Pradesh, India**  
-- Bikramjit Sinha, Pp. 12552–12560

### Short Communications

**First record of the endangered Arabian Tahr *Arabitragus jayakari* (Thomas, 1894) in the Hatta Mountain Conservation Area, Dubai, United Arab Emirates**  
-- Jeruel Cabadonga Aguhob, Junid N. Shah, Esmat Elfaki Mohammed Elhassan, Aisha Almurr Al Muhery, Mohamed Mustafa Eltayeb Mohamed, Juma Abdulla Saeed Mohammad Al Omairi, Hamad Hashim Mohammed Khalaf Albedwawi, Obaid Mohammed Salem Mohammed Al Bedwawi, Hassan Zain Alsharif & Afra Mahmood Mohammad Ali Haji, Pp. 12561–12565

### Partners



### Member



### Publisher & Host

