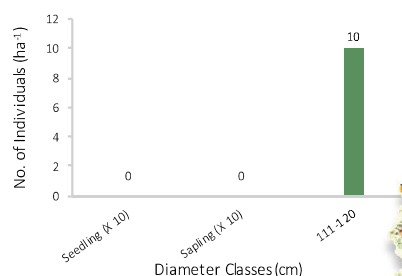


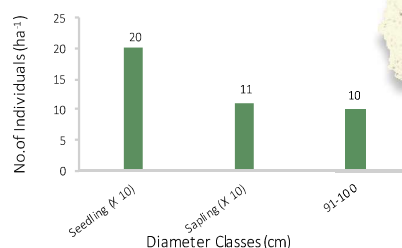


Regeneration Status and Population Structure

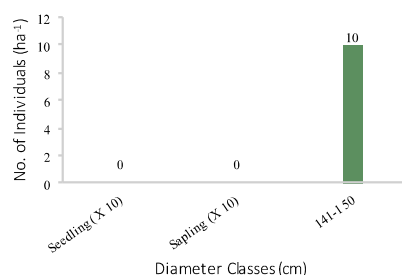
12/C1b Moru Oak Forest (n=10)



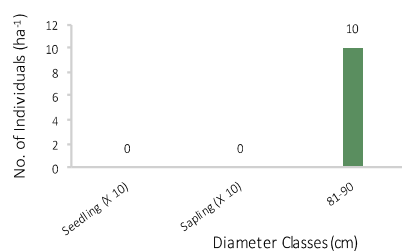
15/C1 Birch Rhododendron Scrub Forest (n=10)



12/C1a Ban Oak Forest (n=10)



14/C1b West Himalayan Sub-alpine Birch/fir Forest (n=10)



Sorbus cuspidata

(Spach) Hedl.



Distribution in Uttarakhand

Species occurs up to
1,350-3,700 m.

Occurrence in Forest Types

12/C1a, 12/C1b, 12/C2a, 12/C2b 14/C1a,
14/C1b and 15/C1.

Forest Divisions

Chamoli, Bageshwar and Pithoragarh.

Species exhibited 'no' regeneration as species was present only in adult stage in West Himalayan Sub-alpine Birch/Fir Forest, Ban Oak Forest and Moru Oak Forest while depicted 'good' regeneration in Birch Rhododendron Scrub Forest.

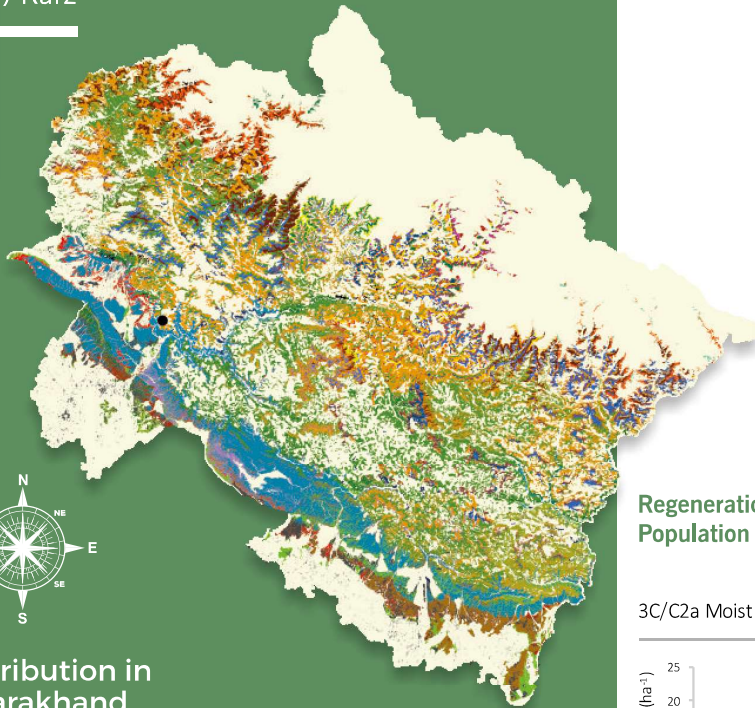
Seedling and sapling density values recorded were: 200 ha⁻¹ and 110 ha⁻¹ in Birch Rhododendron Scrub Forest, respectively. Adult tree density of 10 ha⁻¹ was estimated in all assessed forest types.

Density of adult trees recorded was very low. Suitable management strategies are required for the species conservation.



Spondias pinnata

(L. f.) Kurz



Distribution in Uttarakhand

Species occurs commonly in cultivation up to 800 m.

Occurrence in Forest Types

3C/C2a and 9/C1b

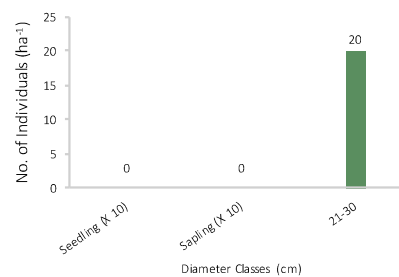
Forest Division

Narendranagar.

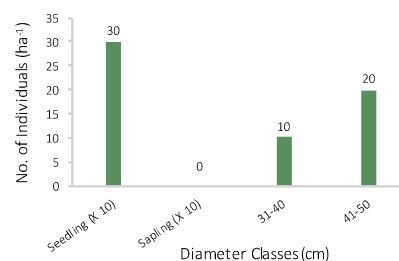
The species depicted 'fair' regeneration in Upper Himalayan Chir Pine Forest while 'no' regeneration was recorded in Moist Shiwalik Sal Forest. Seedling density value observed was 300 ha⁻¹ in Upper or Himalayan Chir Pine Forest while no seedling stage was observed in Moist Shiwalik Sal Forest. Sapling stage was conspicuously absent in both forest types. Adult tree density values recorded was 30 ha⁻¹ and 20 ha⁻¹ in Upper Himalayan Chir Pine Forest and Moist Shiwalik Sal Forest, respectively. Overall population of species was very low. Suitable strategies are required for the species conservation.

Regeneration Status and Population Structure

3C/C2a Moist Shiwalik Sal Forest (n=20)



9/C1b Upper or Himalayan Chir Pine Forest (n=30)



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

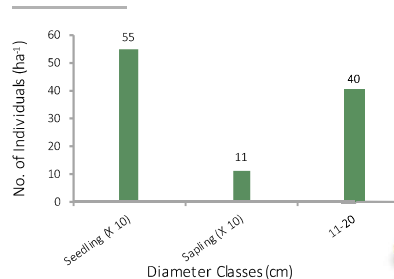
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Pilot Project

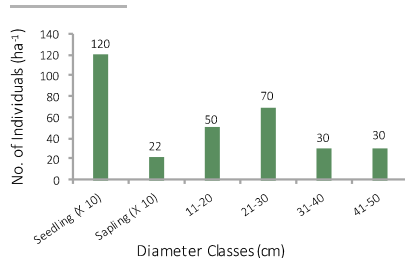


Regeneration Status and Population Structure

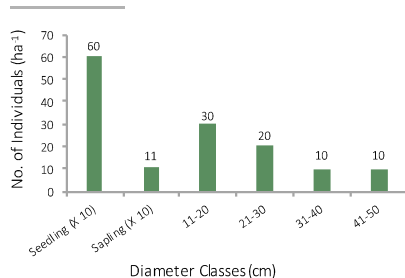
9/C1b Upper or Himalayan Chir Pine
Forest (n=40)



9/DS1 Himalayan Subtropical Scrub
(n=180)

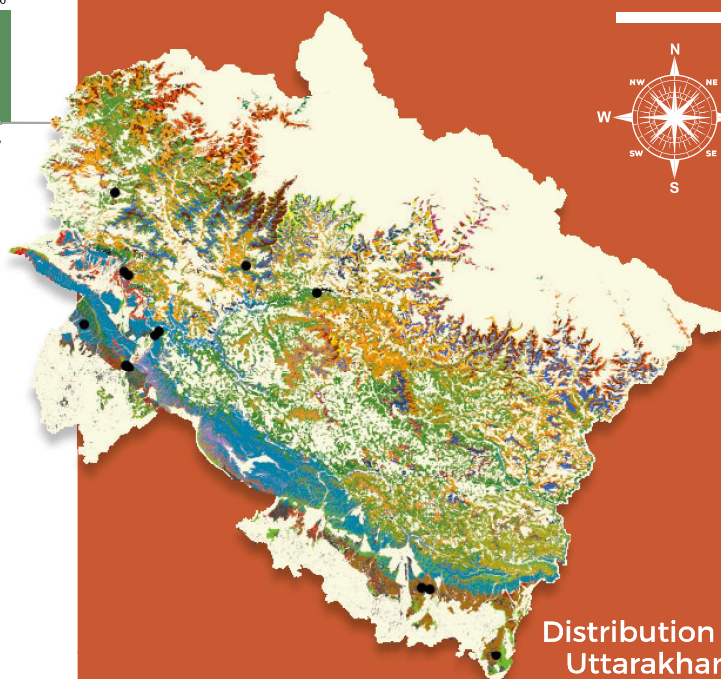


5B/C2 Northern Dry Mixed Deciduous
Forest (n=70)



Sterculia villosa

Roxb. ex Sm.



Distribution in Uttarakhand

Species occurs throughout the area up to 1,300 m. It commonly occurs in miscellaneous forests especially in the Bhabar and on Southern aspects in the outer hills.

Occurrence in Forest Types

3C/C1c, 3C/C2a, 3C/C2c, 5B/C2, 5/1S2, 9/C1b and 9/DS1.

Forest Divisions

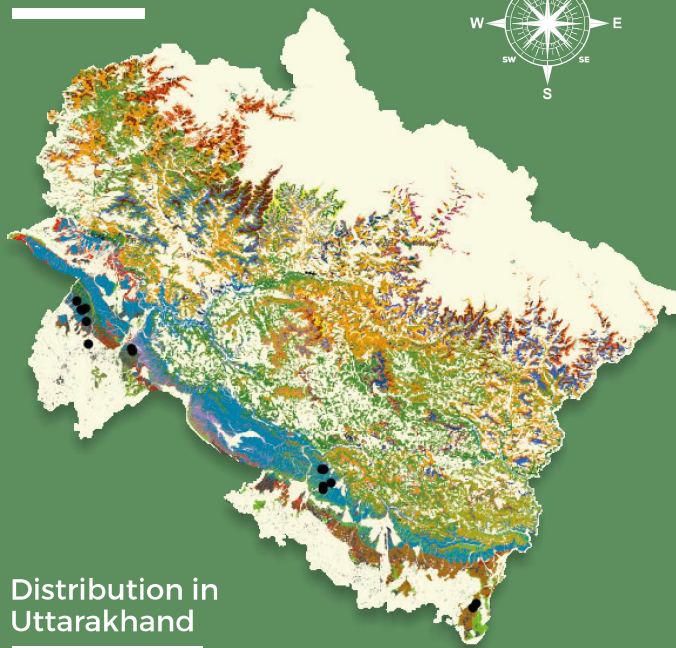
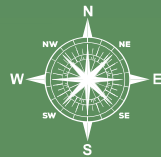
Terai East, Mussoorie, Rudrapur, Tehri Dam-I, Tehri, Dehra Dun, Lansdowne, Pithoragarh and Uttarkashi.

Overall species exhibited 'good' regeneration. Highest seedling density value observed was 1,200 ha⁻¹ in Himalayan Subtropical Scrub followed by 600 ha⁻¹ in Northern Dry Mixed Deciduous Forest and 250 ha⁻¹ in Upper or Himalayan Chir Pine Forest. Sapling density values recorded was 220 ha⁻¹ in Himalayan Subtropical Scrub and 110 ha⁻¹ in Northern Dry Mixed Deciduous Forest and Upper or Himalayan Chir Pine Forest. Highest value was 180 ha⁻¹ in Himalayan Chir Pine Forest and the lowest of 40 ha⁻¹ was in Himalayan Subtropical Scrub. Higher proportion of lower diameter classes indicated that species was in evolving stage. Overall population was very low. Appropriate strategies are required for species conservation and tree improvement program.



Stereospermum chelonoides

(L. f.) DC.



Distribution in Uttarakhand

Species occurs throughout the Sub-Himalayan tract and central & outer hill ranges up to 1,000 m.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C2, 5/1S2, and 12/C1c.

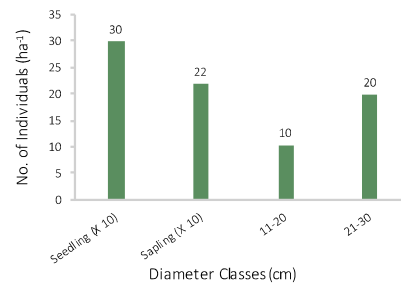
Forest Divisions

Forest Research Institute (Planted but Naturalized), Terai East, Ramnagar, Terai West and Haridwar.

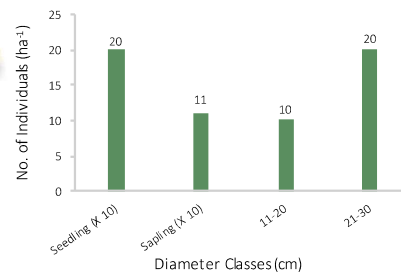
The species depicted 'good' regeneration in Moist Shiwalik Sal Forest, Northern Dry Mixed Deciduous Forest and Moist Terai Sal Forest while 'poor' regeneration was observed in West Gangetic Moist Mixed Deciduous Forest. Highest seedling density value recorded was 400 ha⁻¹ in Northern Dry Mixed Deciduous Forest. Seedling stage was not observed in West Gangetic Moist Mixed Deciduous Forest. Highest sapling density value recorded was 220 ha⁻¹ in Moist Shiwalik Sal Forest while density value of 110 ha⁻¹ was recorded in all other assessed forest types. Adult tree density value recorded was 20 ha⁻¹ in Northern Dry Mixed Deciduous Forest while it was 30 ha⁻¹ in all other assessed forest types. Overall population was very low. Suitable strategies are required for species conservation.

Regeneration Status and Population Structure

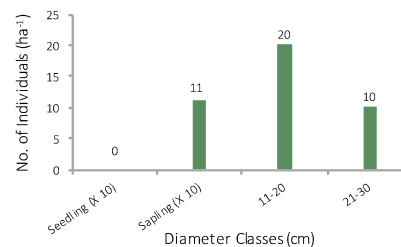
3C/C2a Moist Shiwalik Sal Forest (n=30)



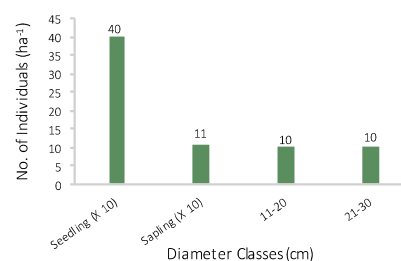
3C/C2c Moist Terai Sal Forest (n=30)



3C/C3a West Gangetic Moist Mixed Deciduous Forest (n=30)



5B/C2 Northern Dry Mixed Deciduous Forest (n=20)



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

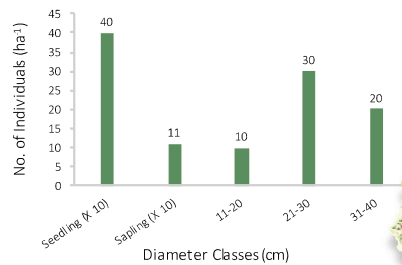
300

Pilot Project

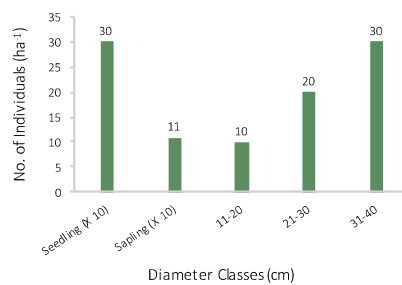


Regeneration Status and Population Structure

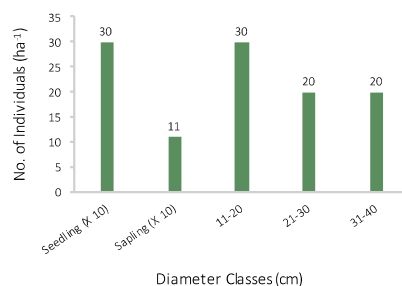
9/C1b Upper or Himalayan Chir Pine
Forest (n=60)



12/C1a Ban Oak Forest (n=60)

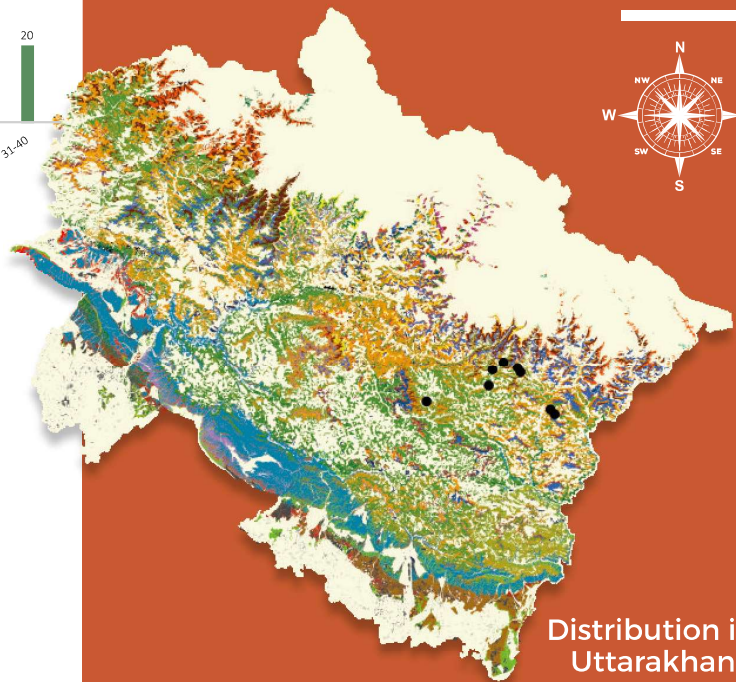


12/C1b Moru Oak Forest (n=70)



Stranvaesia nussia

Lindl.



Distribution in Uttarakhand

Species occurs throughout the
Sub-Himalayan tract and the
outer hill ranges up to 2,400 m.

Occurrence in Forest Types

9/C1b, 12/C1a, and 12/C1b.

Forest Divisions

Pithoragarh and Bageshwar.

Scanty distribution in sub-tropical region. Further study can be taken up for its improvement and conservation. Overall species exhibited 'good' regeneration. Highest seedling density value observed was 400 ha⁻¹ in Upper or Himalayan Chir Pine Forest and 300 ha⁻¹ in Ban Oak Forest and Moru Oak Forest. Sapling density value estimated was 110 ha⁻¹ in all assessed forest types. Adult tree density value of 70 ha⁻¹ was recorded in Moru Oak Forest while density value of 60 ha⁻¹ was recorded in Upper or Himalayan Chir Pine Forest and Ban Oak Forest. Overall population was low. Suitable strategies are required to be developed for species conservation and improvement program.



Syzygium cumini

(L.) Skeels



Distribution in Uttarakhand

Species occurs throughout the Sub-Himalayan tract and central & outer hill ranges up to 1,300 m.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C1a, 5B/C2, 5/DS1, 5/1S2, 9/C1a, 9/C1b and 12/C1a.

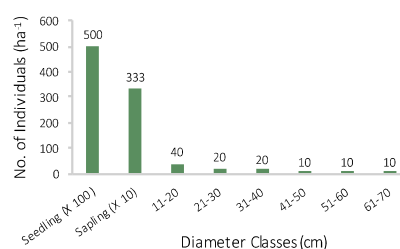
Forest Divisions

Champawat, Mussoorie, Pithoragarh, Terai East, Ramnagar, Bageshwar, Nainital, Narendranagar, Rudrapur, Tehri, Lansdowne and Dehra Dun.

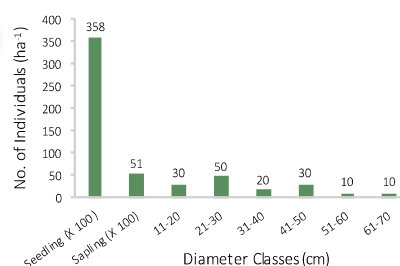
The species exhibited overall 'good' regeneration. Highest seedling density value observed was 5,000 ha⁻¹ in Moist Shiwalik Sal Forest, followed by 4,3200 ha⁻¹ in Dry Shiwalik Sal Forest, 4,100 ha⁻¹ in West Gangetic Moist Mixed Deciduous Forest and 3,5800 ha⁻¹ in Moist Terai Sal Forest. However, highest sapling density value recorded was 5,100 ha⁻¹ in Moist Terai Sal Forest indicating effective establishment. Highest adult trees density value of 150 ha⁻¹ was recorded in Moist Shiwalik Sal Forest and West Gangetic Moist Mixed Deciduous Forest while the lowest value of 100 ha⁻¹ was in Dry Shiwalik Sal Forest. Wild gene pool of species needs conservation.

Regeneration Status and Population Structure

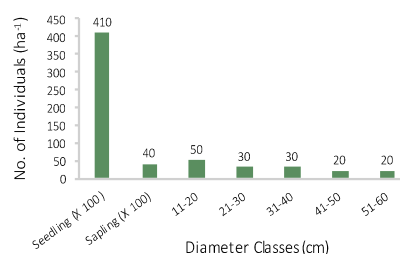
3C/C2a Moist Shiwalik Sal Forest (n=110)



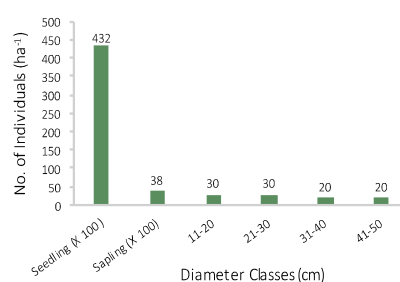
3C/C2c Moist Terai Sal Forest (n=150)



3C/C3a West Gangetic Moist Mixed Deciduous Forest (n=150)



5B/C1a Dry Shiwalik Sal Forest (n=100)



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

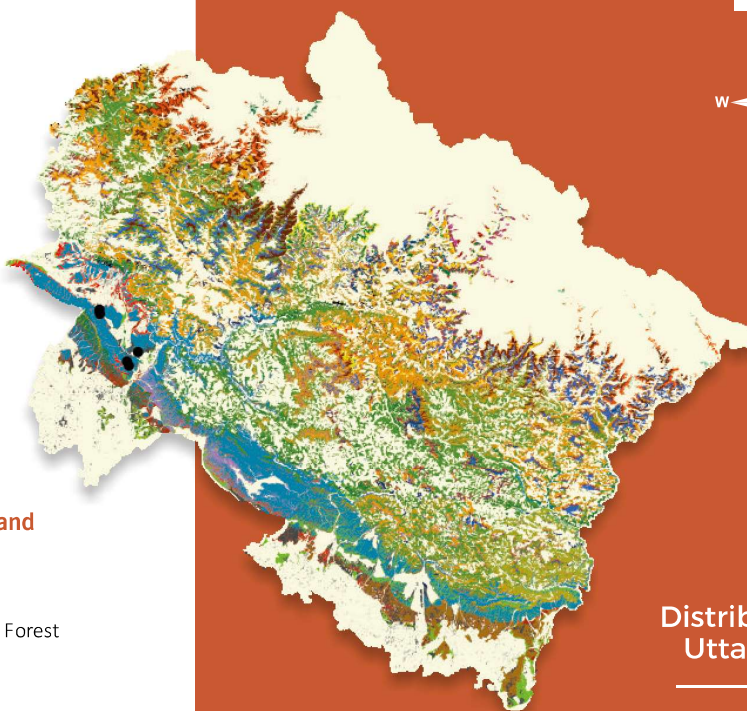
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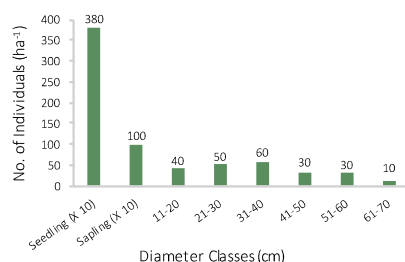
Syzygium nervosum

A. Cunn. ex DC.

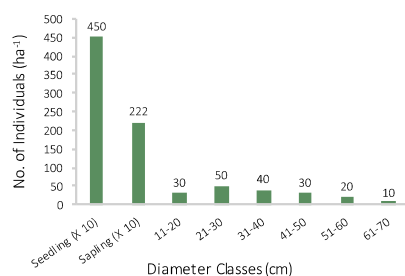


Regeneration Status and Population Structure

3C/C2a Moist Shivalik Sal Forest
(n=220)



3C/C2c Moist Terai Sal Forest (n=180)



Distribution in Uttarakhand

Species occurs ranges
up to 1,200 m. It is fairly
common in Sal Forest.

Occurrence in Forest Types 3C/C2a and 3C/C2c.

Forest Divisions
Terai East and Dehra Dun.

Overall 'good' regeneration was exhibited by the species. Seedling density values recorded were: 4,500 ha⁻¹ and 3,800 ha⁻¹ in Moist Terai Sal Forest and Moist Shivalik Sal Forest, respectively. However, higher sapling density of 2,220 ha⁻¹ was recorded in Moist Terai Sal Forest indicating adequate establishment. Total adult tree density value recorded was 220 ha⁻¹ in Moist Shivalik Sal Forest while it was 180 ha⁻¹ for Moist Terai Sal Forest. Higher density values of lower diameter classes indicated that species was in evolving stage. Wild gene pool of species need to be conserved and effective management strategies are required.



Taxus wallichiana

Zucc.



Distribution in Uttarakhand

Species occurs throughout the hills between 1,800-3,400 m. It is common on the inner ranges but scarce in central and outer ranges.

Occurrence in Forest Types

9/C1b, 9/DS2, 12/C1b, 12/C1d, 12/C2b, 12/C2c, 13/1S1, 14/C1b, 14/1S2, 15/C1 and 16/E1.

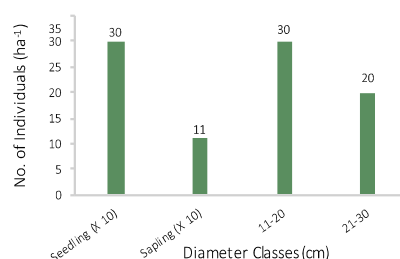
Forest Divisions

Pithoragarh, Uttarkashi, Bageshwar, Rudrapur, Kedarnath, Upper Yamuna, Narendranagar, Badrinath and Chakrata.

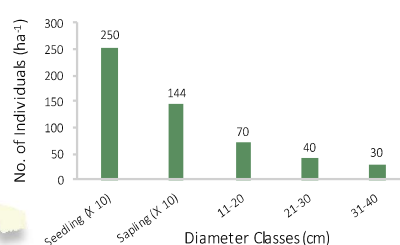
Species depicted overall 'good' regeneration in its natural range. Highest seedling density value observed was 2,500 ha⁻¹ in Western Mixed Coniferous Forest while the lowest value of 300 ha⁻¹ was in Dwarf Juniperus Scrub. Sapling density value of 1,440 ha⁻¹ was also highest in Western Mixed Coniferous Forest while the lowest value of 110 ha⁻¹ was recorded in Dwarf Juniperus Scrub. However, highest total adult tree density value recorded was 290 ha⁻¹ in Western Himalayan Upper Oak/ Fir Forest, followed by 140 ha⁻¹ in Western Mixed Coniferous Forest, 120 ha⁻¹ in Birch/ Rhododendron Scrub Forest, 80 ha⁻¹ West Himalayan Sub-alpine Birch/ Fir Forest and 30 ha⁻¹ in Dwarf Juniperus Scrub. Wild gene pool of species need effective conservation strategy for future improvement programs and species conservation.

Regeneration Status and Population Structure

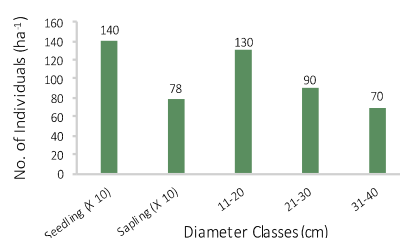
16/E1 Dwarf Juniper Scrub (n=50)



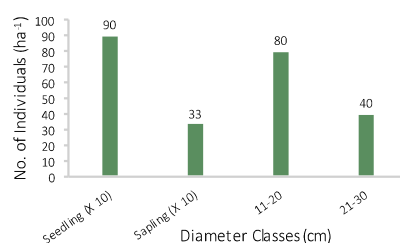
12/C1d Western Mixed Coniferous Forest (n=140)



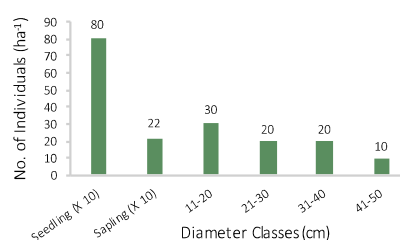
12/C2b West Himalayan Upper Oak/ Fir Forest (n=290)



15/C1 Birch/ Rhododendron Scrub Forest (n=120)



14/C1b West Himalayan Sub-alpine Birch /Fir Forest (n=80)



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

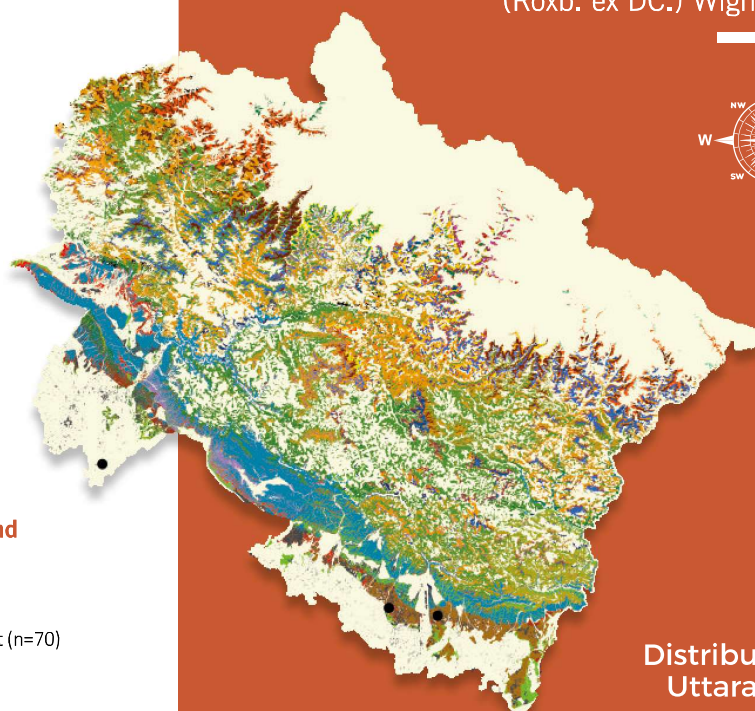
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Terminalia arjuna

(Roxb. ex DC.) Wight & Arn.



Distribution in Uttarakhand

Species found nearly Fatehpur on the Saharanpur Chakrata Road and on the Dehra Dun-Haridwar & Haridwar-Rishikesh roads and in the swampy areas of that place.

Occurrence in Forest Types

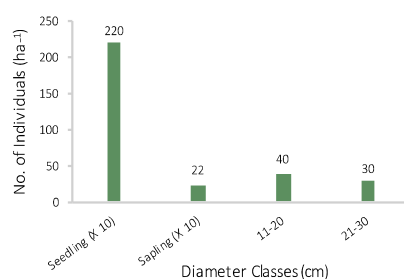
3C/C2c and Plantation.

Forest Divisions

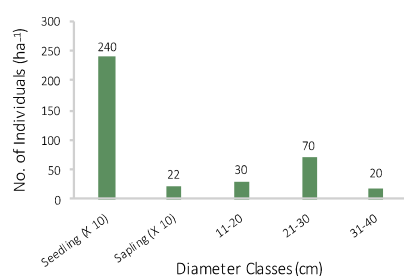
Terai East and Terai Central.

Regeneration Status and Population Structure

3C/C2c Moist Terai Sal Forest (n=70)



TOF/Plantation (n=120)

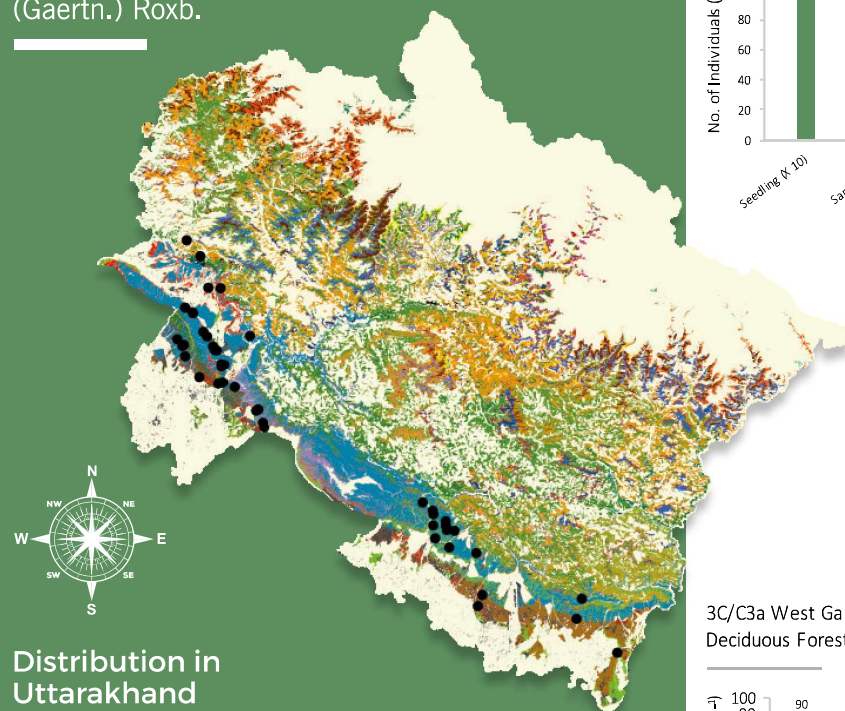


The species depicted 'good' regeneration in its natural distribution range. Seedling density values observed were 2,400 ha⁻¹ and 2,200 ha⁻¹ in Moist Terai Sal Forest and TOF/Plantation, respectively. Sapling density of 220 ha⁻¹ was recorded in both forest types. Higher adult tree density of 120 ha⁻¹ was recorded for TOF/Plantation than Moist Terai Sal Forest where in it was 70 ha⁻¹. Wild populations of the species were meagre. Hence, suitable strategies are required for its conservation and improvement.



Terminalia bellirica

(Gaertn.) Roxb.



Distribution in Uttarakhand

Species occurs throughout the sub-Himalayan tract and central & outer hills ranges up to 1,200 m. It is very common on open grazing ground below the hills.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C2, 5/DS1, 5/1S2, and 9/C1b.

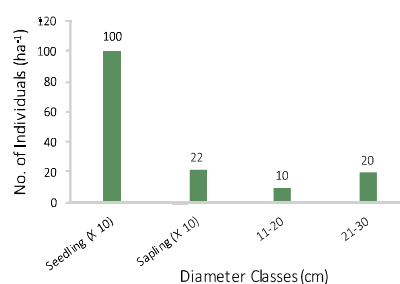
Forest Divisions

Ramnagar, Terai East, Mussoorie, Tehri, Haldwani, Lansdowne and Terai Central.

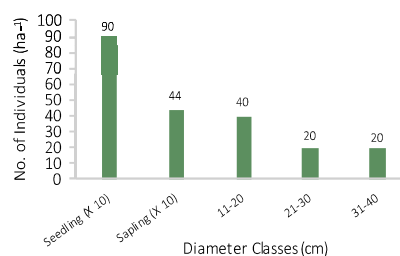
Overall regeneration of the species was 'good'. Highest seedling density value observed was 1,000 ha⁻¹ in Dry Deciduous Scrub, followed by 900 ha⁻¹ in West Gangetic Moist Mixed Deciduous Forest and 200 ha⁻¹ in Moist Shiwalik Sal Forest. However, highest sapling density value estimated was 440 ha⁻¹ in West Gangetic Moist Mixed Deciduous Forest, followed by 220 ha⁻¹ in Dry Deciduous Scrub and 110 ha⁻¹ in Moist Shiwalik Sal Forest. Highest adult tree density of 80 ha⁻¹ was also recorded in West Gangetic Moist Mixed Deciduous Forest indicating adequate establishment. Adult tree density of 30 ha⁻¹ was observed in Dry Scrub and Moist Shiwalik Sal Forest. Species is very important, being one of ingredients of 'Triphala', an Ayurvedic medicine. Species was scantily distributed in its natural range. Hence, suitable strategies are required for species conservation.

Regeneration Status and Population Structure

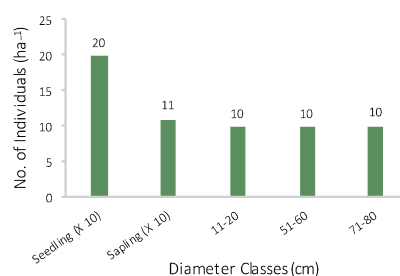
5/DS1 Dry Deciduous Scrub (n=30)



3C/C3a West Gangetic Moist Mixed Deciduous Forest (n=80)



3C/C2a Moist Shiwalik Sal Forest (n=30)



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

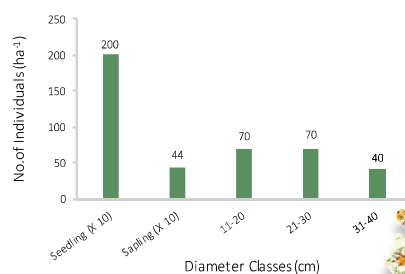
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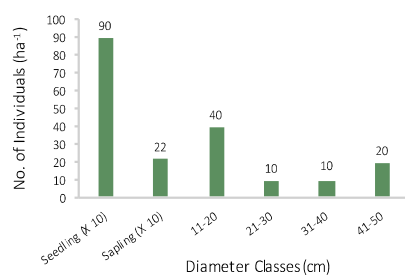


Regeneration Status and Population Structure

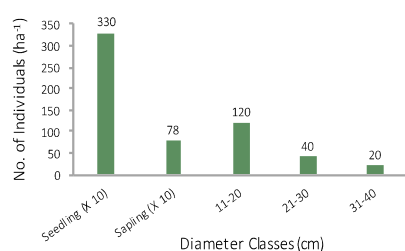
3C/C2c Moist Terai Sal Forest (n=180)



5B/C1b Dry Plain Sal Forest (n=80)

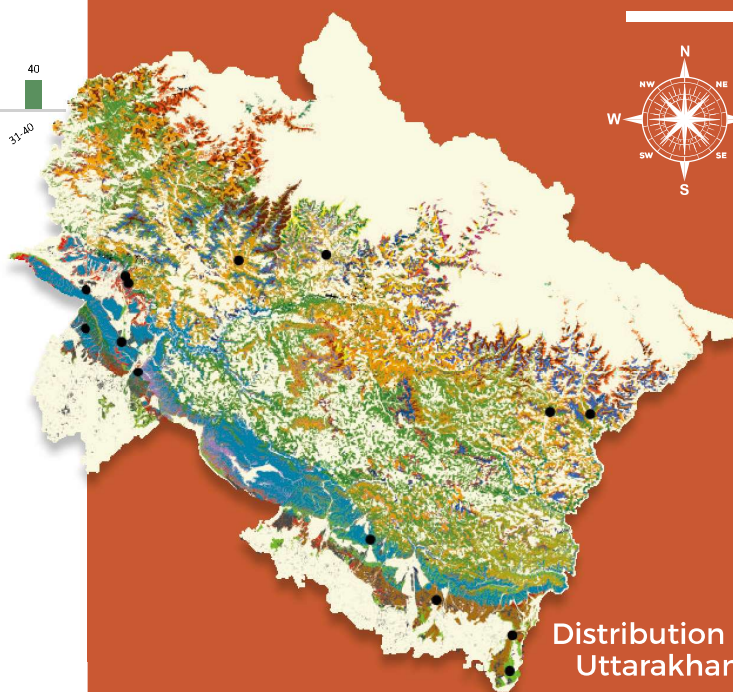


9/C1b Upper or Himalayan Chir Pine
Forest (n=180)



Terminalia chebula

Retz.



**Distribution in
Uttarakhand**

Species sparsely occurs
upto 1,200 m.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C1a, 5B/C1b, 5/DS1,
9/C1b, 12/C1a, 12/C2b and 12/1S1.

Forest Divisions

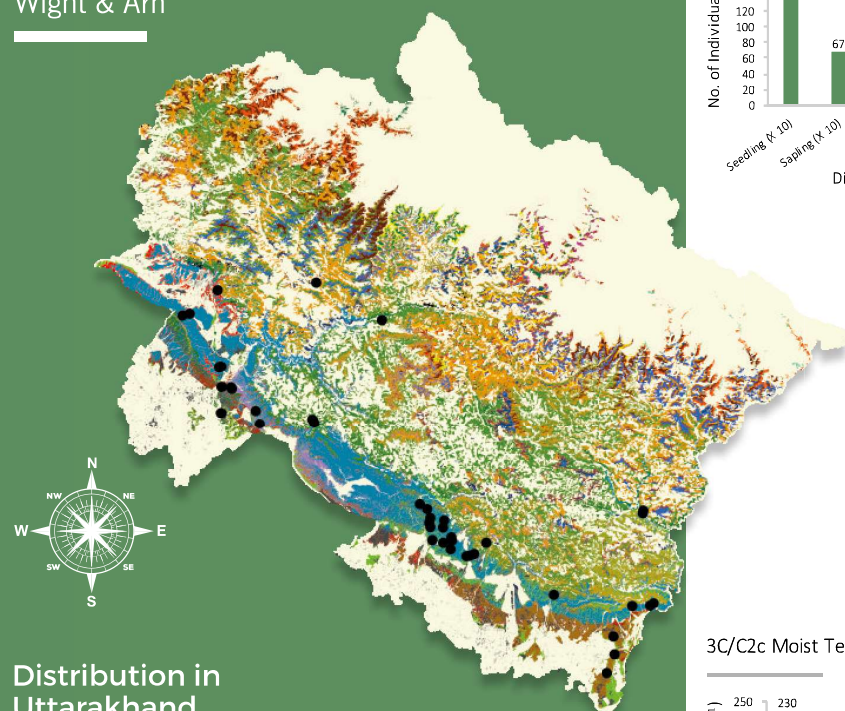
Terai East, Dehra Dun, Ramnagar, Rudraprayag
and Pithoragarh.

The species exhibited 'good' regeneration in its natural range. Seedling density values estimated were 3,300 ha⁻¹, 2,000 ha⁻¹ and 900 ha⁻¹ in Upper or Himalayan Chir Pine Forest, Moist Terai Forest and Dry Plain Sal Forest, respectively. Similar trend was observed in case of saplings with highest density of 780 ha⁻¹ in Upper or Himalayan Chir Pine Forest. Adult tree density was 180 ha⁻¹ in Upper or Himalayan Chir Pine Forest and Moist Terai Forest while 80 ha⁻¹ for Dry Plain Sal Forest. Species is very important being one of ingredients of 'Triphala' an Ayurvedic medicine. Wild gene pool of the species needs conservation for future improvement programs. Suitable strategies are required for species conservation.



Terminalia tomentosa

Wight & Arn



Distribution in Uttarakhand

Species found up to 1,600 m.

Occurrence in Forest Types

3C/C1c, 3C/C2a, 3C/C2b, 3C/C2c, 3C/C3a, 5B/C2, 5/DS1, 5/1S2 and 9/C1b.

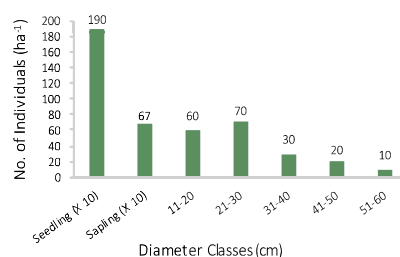
Forest Divisions

Dehra Dun, Haridwar, Champawat, Ramnagar, Rudrapur and Lansdowne.

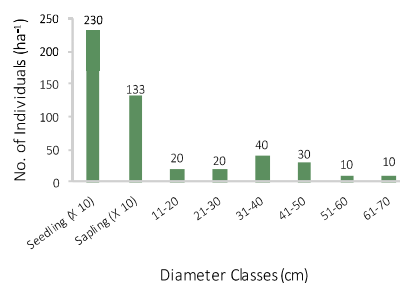
Species depicted overall 'good' regeneration. Highest seedling density value observed was 3,000 ha⁻¹ in West Gangetic Moist Mixed Deciduous Forest, followed by 1,900 ha⁻¹ in Moist Shiwalik Sal Forest and 2,330 ha⁻¹ in Moist Terai Sal Forest. However, highest sapling density value of 1,330 ha⁻¹ was recorded in Moist Terai Sal Forest indicating better establishment. Total adult tree density recorded were: 290 ha⁻¹, 190 ha⁻¹ and 130 ha⁻¹ in West Gangetic Moist Mixed Deciduous Forest, Moist Shiwalik Sal Forest, and Moist Terai Sal Forest, respectively. Wild gene pool of species needs conservation for future improvement program. Hence, suitable strategies are required for conservation of species.

Regeneration Status and Population Structure

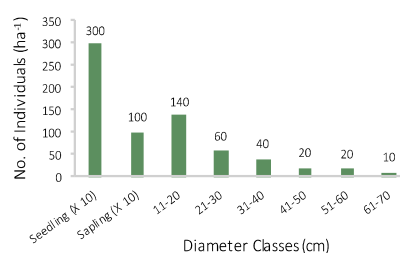
3C/C2a Moist Shiwalik Sal Forest (n=200)



3C/C2c Moist Terai Sal Forest (n=130)



3C/C3a West Gangetic Moist Mixed Deciduous Forest (n=290)



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

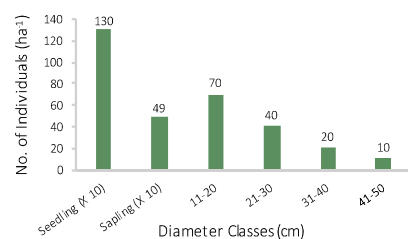
308

Pilot Project

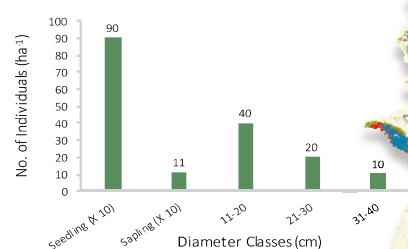


Regeneration Status and Population Structure

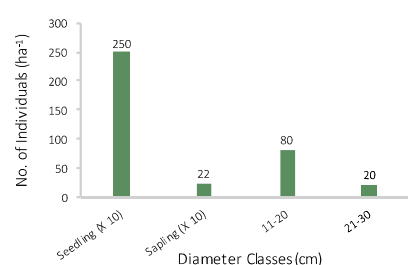
9/C1b Upper or Himalayan Chir Pine
Forest (n=140)



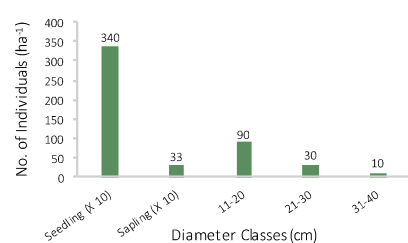
12/C1a Ban Oak Forest (n=70)



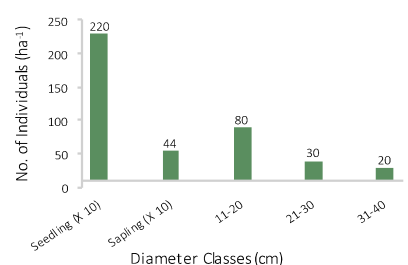
3C/C2c Moist Terai Sal Forest (n=100)



3C/C2a Moist Shivalik Sal Forest (n=130)

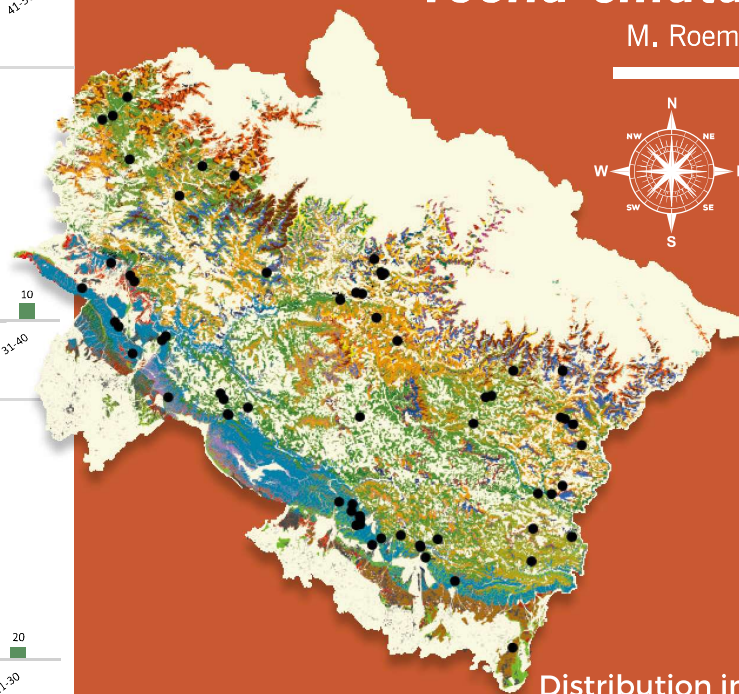


3C/C3a West Gangetic Moist Mixed
Deciduous Forest (n=130)



Toona ciliata

M. Roem.



Distribution in
Uttarakhand

Species occurs upto 2,000 m in
Garhwal and Kumaun region.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C1b, 5B/C2, 5/DS1, 9/C1a,
9/C1b, 9/DS1, 12/C1a and 12/C1b.

Forest Divisions

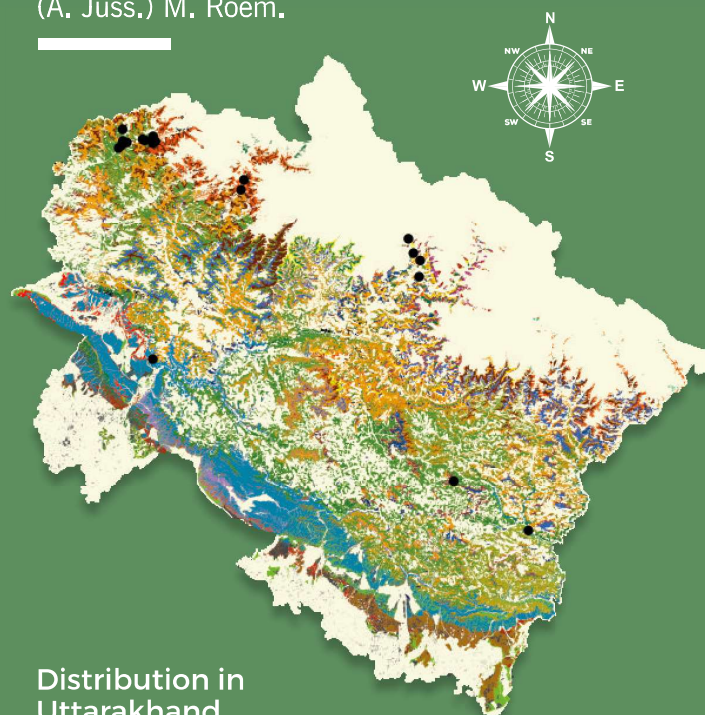
Champawat, Mussoorie, Tehri, Terai East, Pithoragarh,
Ramnagar, Chakrata, Uttarkashi, Bageshwar, Nainital,
Rudraprayag, Tehri Dam -I, Badrinath, Haldwani, Dehra
Dun, Lansdowne and Kedarnath Wildlife Sanctuary.

Species exhibited overall 'good' regeneration. Highest seedling density value observed was 3,500 ha⁻¹ in Moist Shivalik Sal Forest, followed by 2,500 in Moist Terai Sal Forest, 2,200 ha⁻¹ in West Gangetic Moist Mixed Deciduous Forest, 1,300 ha⁻¹ in Upper or Himalayan Chir Pine Forest, and 900 ha⁻¹ in Ban Oak Forest. However, highest sapling density of 490 ha⁻¹ was recorded in Upper or Himalayan Chir Pine Forest and the lowest value of 110 ha⁻¹ was in Ban Oak Forest. Highest adult tree density of 140 ha⁻¹ was also recorded in Upper or Himalayan Chir Pine Forest while the lowest value of 70 ha⁻¹ was in Ban Oak Forest. Wild gene pool of species require strategy for its conservation.



Toona sinensis

(A. Juss.) M. Roem.



Distribution in Uttarakhand

Species occurs in between 1,800-3,000 m.

Occurrence in Forest Types

3C/C2a, 5B/C2, 9/C1a, 9/C1b, 12/C1a, 12/C1b, 12/C1c and 14/C1b

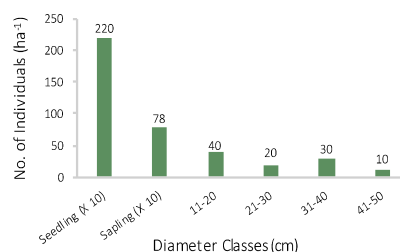
Forest Divisions

Pithoragarh, Uttarkashi, Almora, Chakrata, Tons, Govind Pashu Vihar and Chamoli.

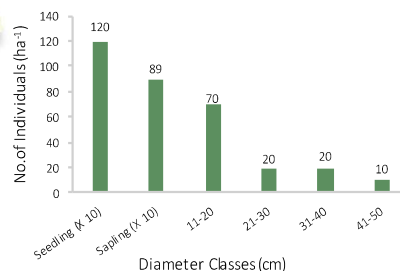
Species exhibited overall 'good' regeneration. Highest seedling density value recorded was 4,500 ha⁻¹ in Moist Deodar Forest followed by 2,200 ha⁻¹ in Moist Deodar Forest, 1,200 ha⁻¹ in Ban Oak Forest, and 1,000 ha⁻¹ in Northern Dry Mixed Deciduous Forest. However, highest sapling density value recorded was 890 ha⁻¹ in Ban Oak Forest indicating effective establishment. Highest adult tree density value recorded was 150 ha⁻¹ in Moist Deodar Forest while the lowest values of 70 ha⁻¹ was in Northern Dry Mixed Deciduous Forest. Wild gene pool of the species needs conservation for future improvement programs. Suitable strategies are also required for its conservation.

Regeneration Status and Population Structure

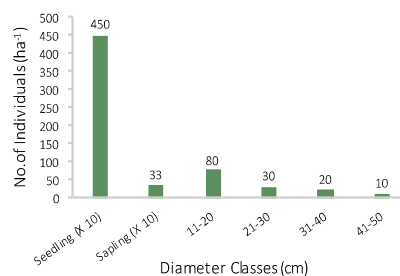
9/C1b Upper or Himalayan Chir Pine Forest (n=100)



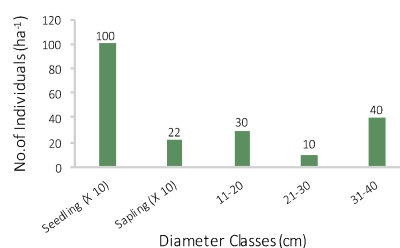
12/C1a Ban Oak Forest (n=120)



12/C1c Moist Deodar Forest (n=140)



5B/C2 Northern Dry Mixed Deciduous Forest (n=80)



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

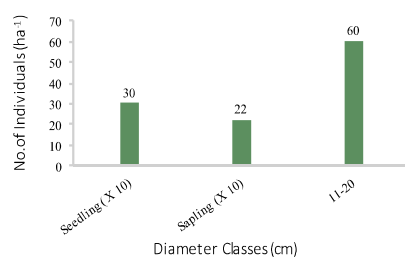
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Pilot Project

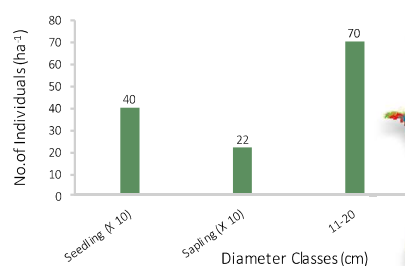


Regeneration Status and Population Structure

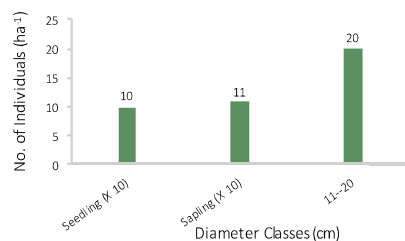
3C/C3a West Gangetic Moist Mixed
Deciduous Forest (n=60)



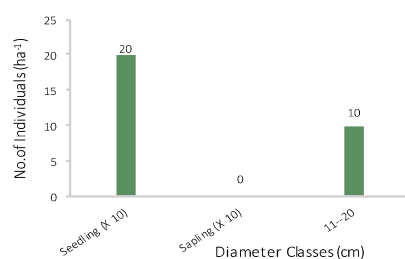
3C/C2a Moist Shivalik Sal Forest (n=70)



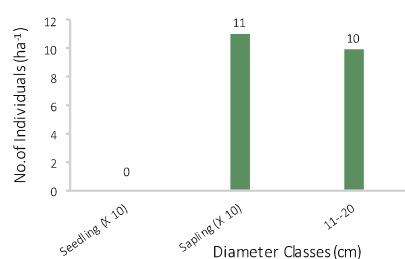
5B/C2 Northern Dry Mixed Deciduous
Forest (n=20)



5B/C1a Dry Shivalik Sal Forest (n=10)

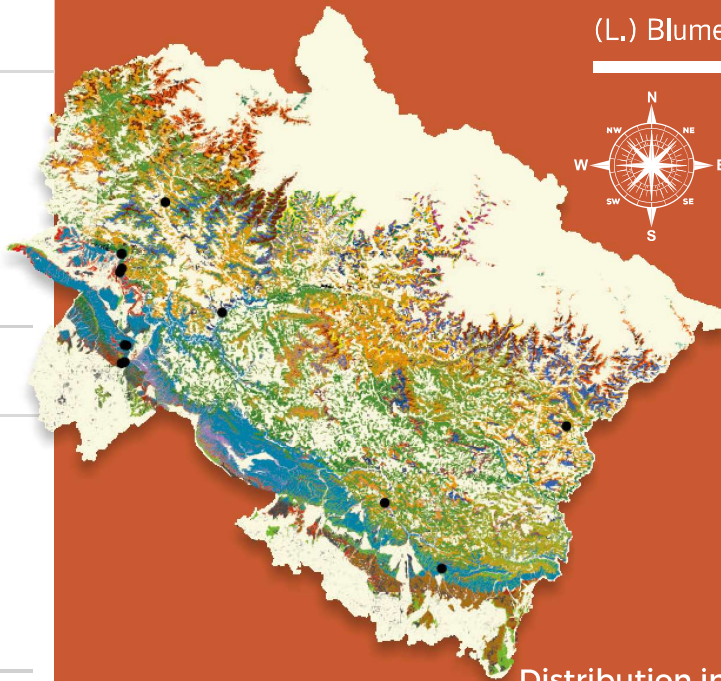


5/1S2 Khair-Sissoo Forest (n=10)



Trema orientalis

(L.) Blume



Distribution in
Uttarakhand

Fairly common in Gularghati,
Nakraunda and other swampy
places in the Dehra Dun.

Occurrence in Forest Types

3C/C2a, 3C/C3a, 5B/C1a, 5B/C2, 5/1S2, 9/C1b and 12/C1a.

Forest Divisions

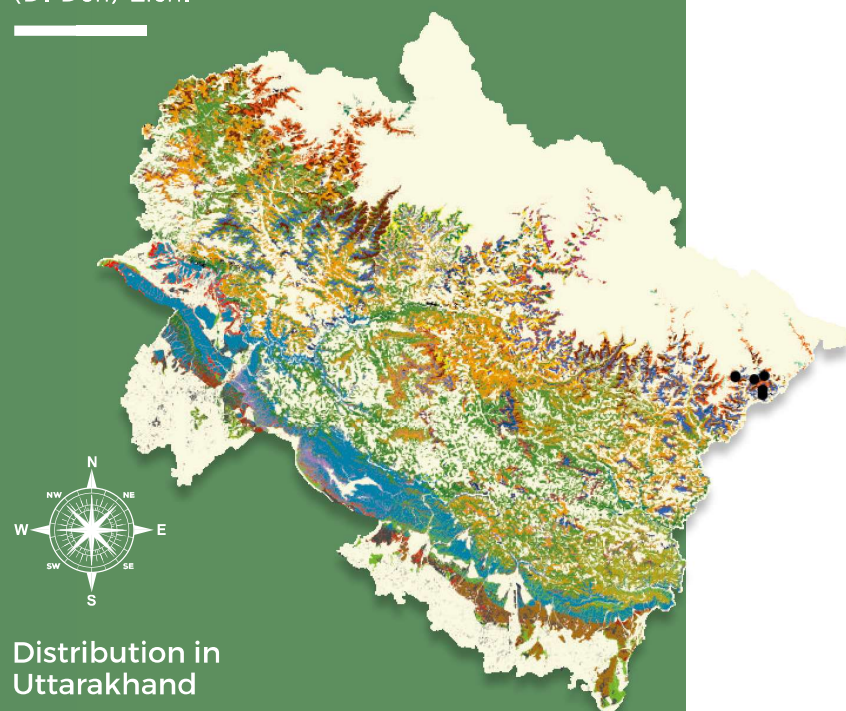
Champawat, Uttarkashi, Narendranagar, Mussoorie and Nainital.

The species exhibited 'good' regeneration in West Gangetic Moist Mixed Deciduous Forest, Moist Shivalik Sal Forest and Northern Dry Mixed Deciduous Forest while it was observed 'fair' in Dry Shivalik Sal Forest and 'poor' regeneration in Khair-Sissoo Forest. Highest seedling density value observed was 400 ha^{-1} in Moist Shivalik Sal Forest while Khair-Sissoo Forest was devoid of seedlings. In Shivalik Sal Forest, sapling not observed. Highest adult tree density value recorded was 70 ha^{-1} in Moist Shivalik Sal Forest while the lowest value of 10 ha^{-1} was observed in Dry Shivalik Sal Forest and Khair-Sissoo Forest. Wild gene pool of species requires management intervention for conservation. Suitable strategies are also required to for species conservation.



Tsuga dumosa

(D. Don) Eich.



Distribution in Uttarakhand

Native to the eastern Himalayas and restricted in Darma-Byans Valley of Uttarakhand in between 3,000-3,500 m.

Occurrence in Forest Types

12/C1d, 12/C2a and 14/C1b.

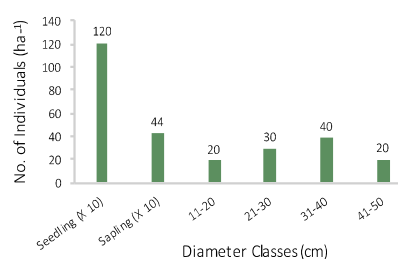
Forest Divisions

Pithoragarh.

The species exhibited 'good' regeneration in its natural range. Seedlings and saplings density values estimated were: 1,200 ha^{-1} and 440 ha^{-1} , respectively. Total adult tree density of 110 ha^{-1} was recorded. Low tree density values of 20 ha^{-1} in lower diameter class of 11-20 cm showed disturbance in forest. Population was scanty. Suitable management strategies are required for species conservation.

Regeneration Status and Population Structure

14/C1b West Himalayan Sub-alpine Birch/Fir Forest (n=110)



Conservation of
Forest Genetic
Resources



National
Program for
Conservation and
Development of
Forest Genetic
Resources

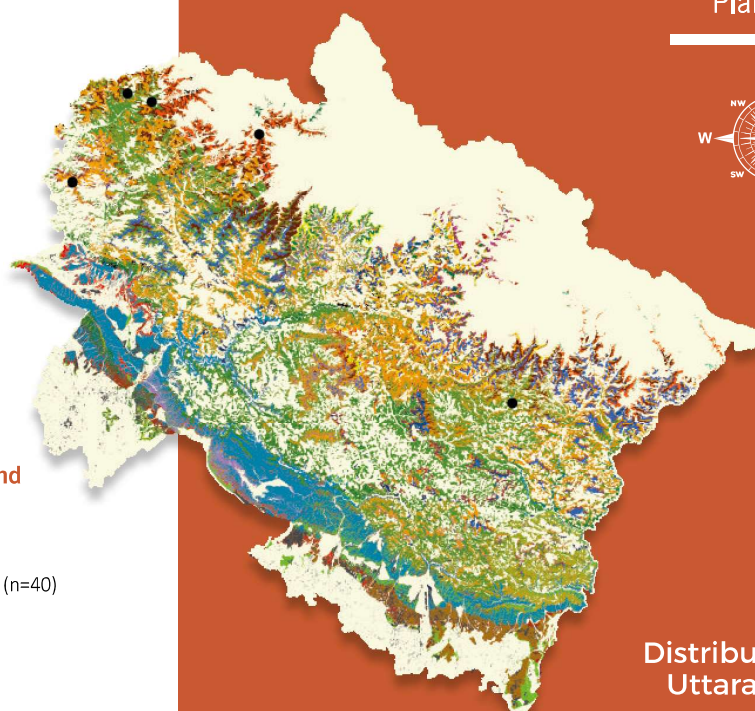
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Ulmus wallichiana

Planch.



Distribution in Uttarakhand

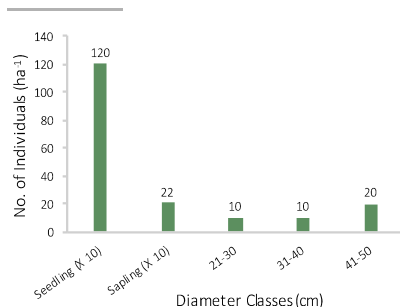
Species occurs in Jaunsar
and Tehri Garhwal,
between 1,000-4,000 m.

Occurrence in Forest Types
9/C1b and 12/C1c.

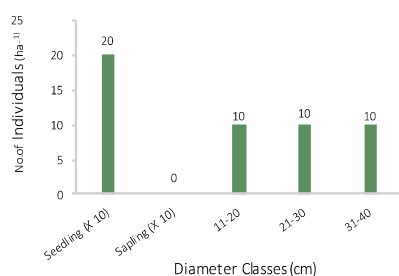
Forest Divisions
Govind Pashu Vihar, Bageshwar and Chakrata.

Regeneration Status and Population Structure

12/C1c Moist Deodar Forest (n=40)



9/C1b Upper or Himalayan Chir Pine
Forest (n=30)

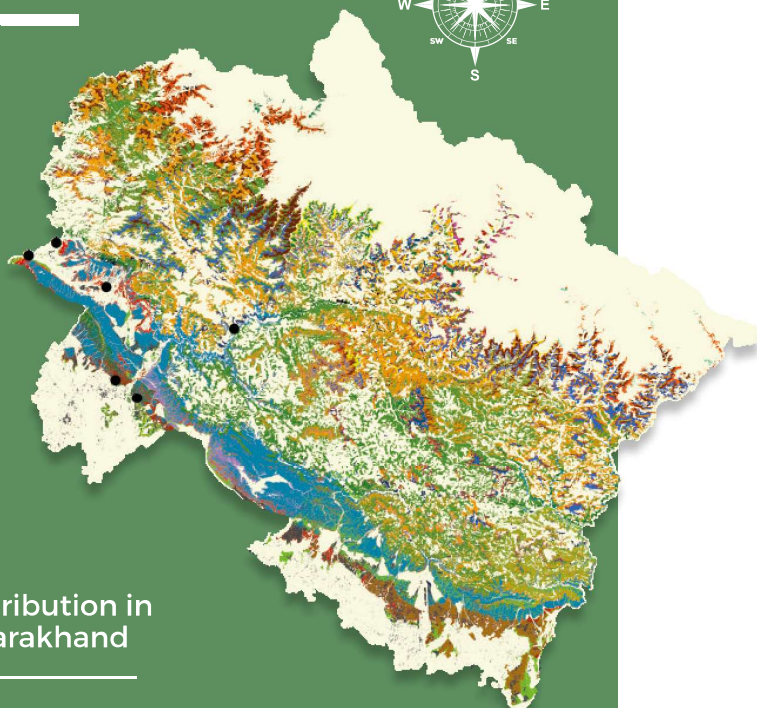


The species exhibited 'good' regeneration in Moist Deodar Forest while 'fair' regeneration in Upper or Himalayan Chir Pine Forest. Seedling density values recorded were: 1,200 ha⁻¹ and 200 ha⁻¹ in Moist Deodar Forest and Upper or Himalayan Chir Pine Forest, respectively. Sapling density value estimated was 220 ha⁻¹ in Moist Deodar Forest while in Upper or Himalayan Chir Pine Forest no sapling stage was recorded. Total adult tree density values of 30 ha⁻¹ and 20 ha⁻¹ were recorded in Moist Deodar Forest and Upper or Himalayan Chir Pine Forest, respectively. Population of species was very low and sparsely distributed. Hence, suitable management strategies are required for its conservation and improvement.



Vachellia nilotica

(L.) P.J.H. Hurter & Mabb.
Subsp. *indica* (Benth.) Kyal.



Distribution in Uttarakhand

Species occurs in Sub-Himalayan tract and central & outer hill range up to 200-700 m.

Occurrence in Forest Types

5/1S2.

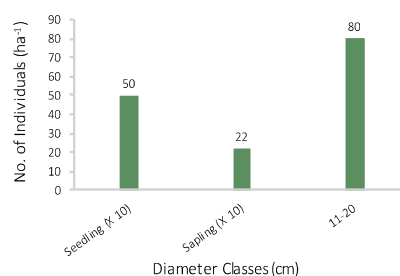
Forest Divisions

Narendernagar, Chakrata, Dehra Dun, Banganga Conservation Reserve and Haridwar.

The species depicted 'good' regeneration in its natural range. Densities values of seedlings, saplings and adult trees recorded were 500 ha^{-1} , 220 ha^{-1} and 80 ha^{-1} , respectively. Species is economically important, therefore, wild population should be conserved for future improvement programme. Suitable strategies considering aesthetic value are also required for the tree improvement program.

Regeneration Status and Population Structure

5/1S2 Khair Sissoo Forest (n=80)



Conservation of
Forest Genetic
Resources



National
Program for
Conservation and
Development of
Forest Genetic
Resources

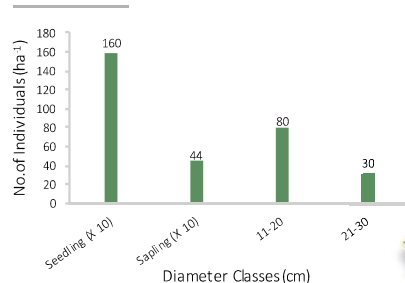
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Pilot Project

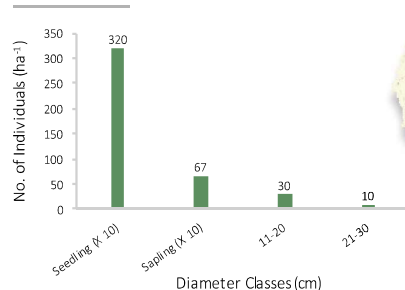


Regeneration Status and Population Structure

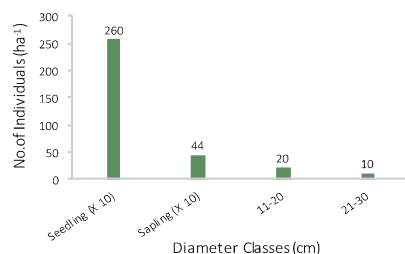
9/C1b Upper or Himalayan Chir Pine
Forest (n=110)



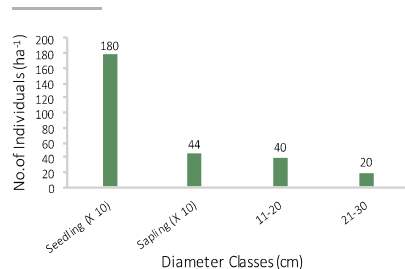
12/C1a Ban Oak Forest (n=40)



3C/C2a Moist Shiwali Sal Forest (n=30)

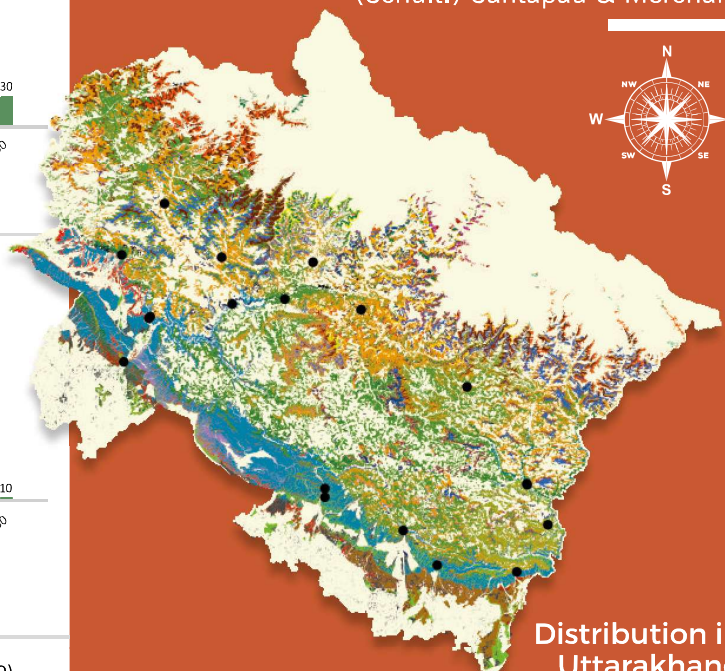


3C/C3a West Gangetic Moist Mixed
Deciduous Forest (n=60)



Wendlandia heynei

(Schult.) Santapau & Merchant



Distribution in
Uttarakhand

Species common in the
Himalayan region upto 2,000 m.

Occurrence in Forest Types
3C/C2a, 3C/C3a, 5B/C2, 9/C1b, and 12/C1a.

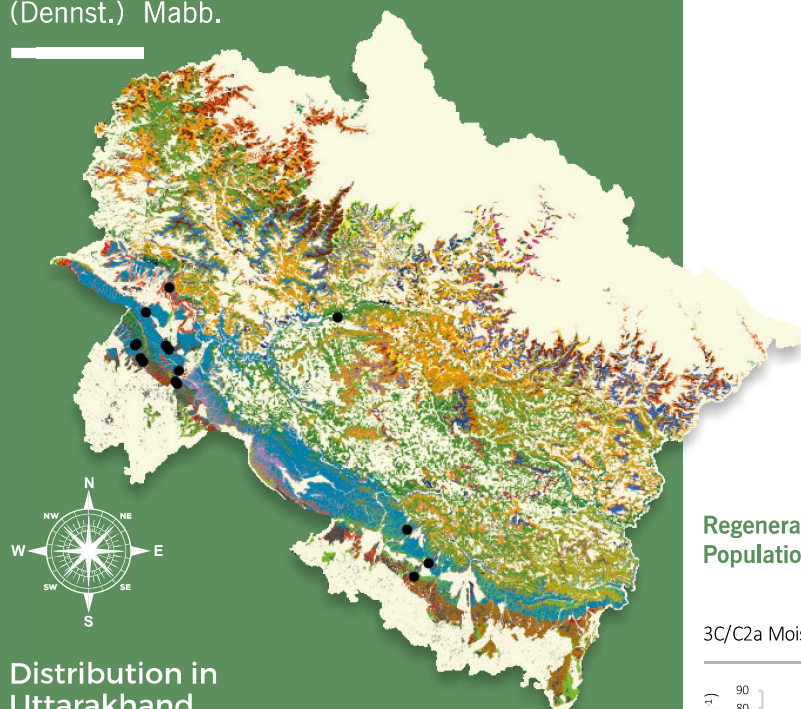
Forest Divisions
Mussoorie, Ramnagar, Uttarkashi, Bageshwar, Nainital,
Narendranagar, Rudrapur, Badrinath, Tehri and Champawat.

Species depicted overall 'good' regeneration. Highest seedling density value observed was 3,200 ha⁻¹ in Ban Oak Forest, followed by 260 ha⁻¹, 230 ha⁻¹ and 160 ha⁻¹ in Moist Shiwali Sal Forest, West Gangetic Moist Mixed Deciduous Forest and Upper or Himalayan Pine Forest, respectively. Sapling density value recorded was 670 ha⁻¹ in Ban Oak Forest and 440 ha⁻¹ in other assessed forest types. However, highest total adult tree density value estimated was 110 ha⁻¹ in Upper or Himalayan Chir Pine Forest indicating effective recruitment from saplings to adults. Overall population size was low. Suitable strategies are required for species conservation.



Wrightia arborea

(Dennst.) Mabb.



Distribution in Uttarakhand

Fairly common in the Dehra Dun and Saharanpur forest and also found in the lower valleys in Jaunsar. Also in outer Himalayan open valley up to 1,300 m. in Tehri Garhwal.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 5B/C2 and 5/1S2.

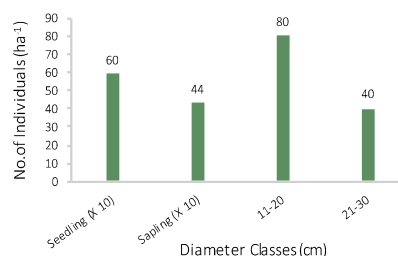
Forest Divisions

Ramnagar, Rudrapur, Mussoorie and Terai Central.

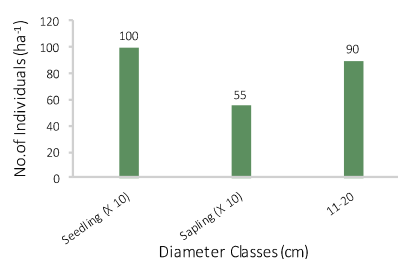
'Good' regeneration by species depicted in its natural distribution range. Seedling density value was observed $1,000 \text{ ha}^{-1}$ and 600 ha^{-1} in Northern Dry Mixed Deciduous Forest and Moist Shiwalik Sal Forest, respectively. Similar trend was observed in case of sapling stage with densities of 550 ha^{-1} and 440 ha^{-1} in Northern Dry Mixed Deciduous Forest and Moist Shiwalik Sal Forest, respectively. However, higher adult tree density of 120 ha^{-1} was in Moist Shiwalik Sal Forest than Northern Dry Mixed Deciduous Forest. Wild population size of the species was meagre. Suitable strategies are required for species conservation.

Regeneration Status and Population Structure

3C/C2a Moist Shiwalik Sal Forest (n=120)



5B/C2 Northern Dry Mixed Deciduous Forest (n=90)



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

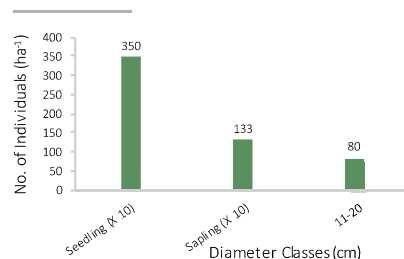
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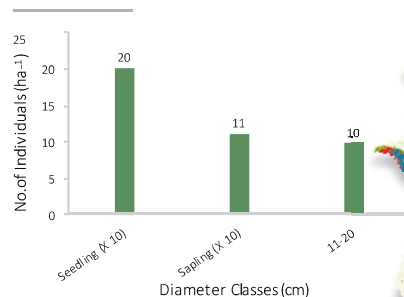


Regeneration Status and Population Structure

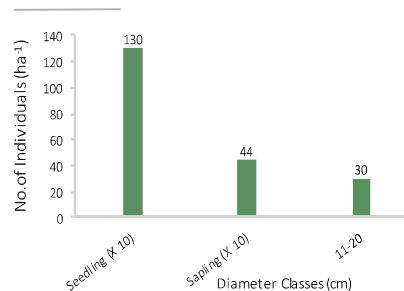
3C/C3a West Gangetic Moist Mixed
Deciduous Forest (n=80)



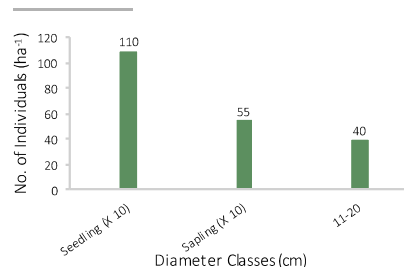
3C/C2a Moist Shiwalik Sal Forest (n=10)



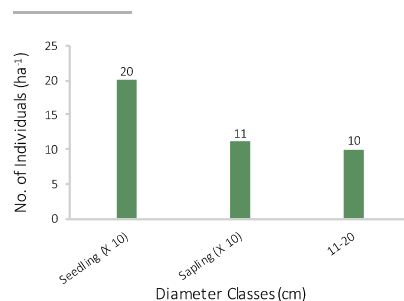
5/1S2 Khair Sissoo Forest (n=30)



5B/C2 Northern Dry Mixed Deciduous
Forest (n=40)

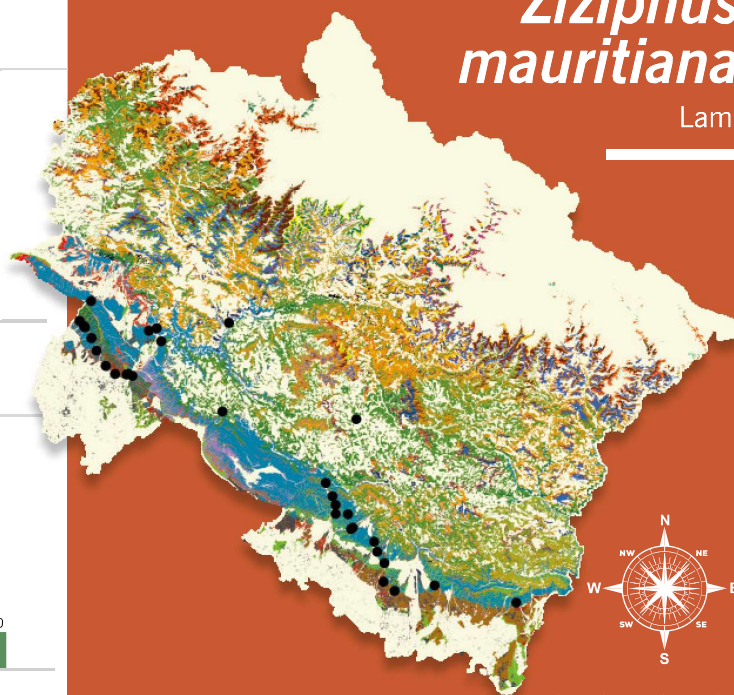


3C/C2c Moist Terai Sal Forest (n=10)



Ziziphus mauritiana

Lam.



Distribution in Uttarakhand

Species occurs throughout the Sub-Himalayan tract and the outer hill ranges up to 200-700 m.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C2 and 5/1S2.

Forest Divisions

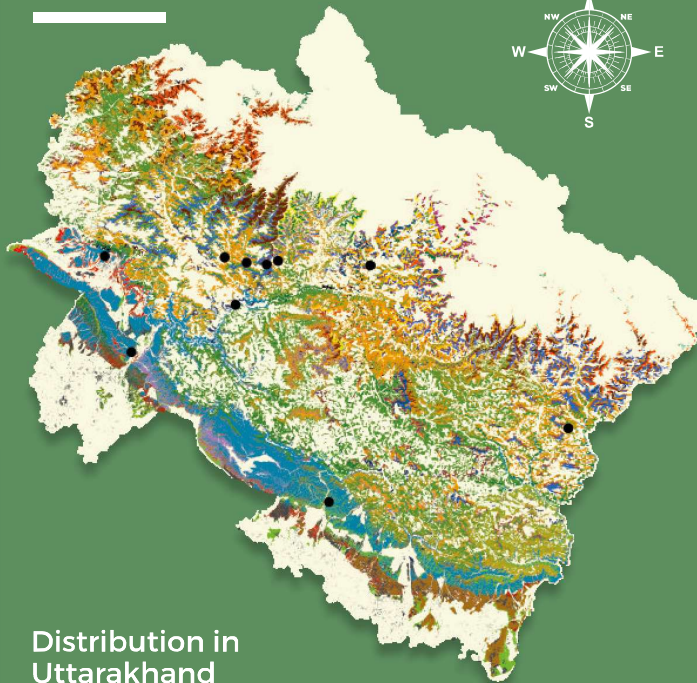
Ramnagar, Rajaji National Park, Lansdowne, Haldwani and Narendranagar.

Species exhibited overall 'good' regeneration. Highest seedling density value recorded was 3,500 ha⁻¹ in West Gangetic Moist Mixed Deciduous Forest while the lowest value of 200 ha⁻¹ was in Moist Shiwalik Sal Forest and Moist Terai Sal Forest. Highest sapling density of 1,330 ha⁻¹ was also recorded in West Gangetic Moist Mixed Deciduous Forest and the lowest value of 110 ha⁻¹ was in Moist Shiwalik Sal Forest and Moist Terai Sal Forest. Highest adult tree density value of 80 ha⁻¹ was also recorded in West Gangetic Moist Mixed Deciduous Forest. Overall population size was very small, therefore, wild gene pool of the species needs to be conserved for future improvement programs. Suitable strategies are also required for species conservation.



Asparagus adscendens

Roxb.



Distribution in Uttarakhand

Species commonly found up to 1,800 m especially in Sal Forests.

Occurrence in Forest Types

5B/C1a, 5B/C2, 9/C1a, 9/C1b, 12/C1a, and 16/E1.

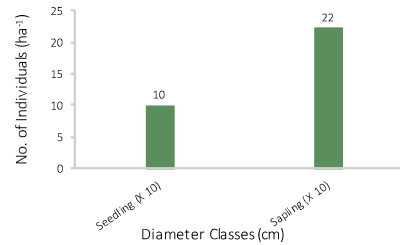
Forest Divisions

Ramnagar, Champawat, Dehra Dun, Narendranagar, Alaknanda Soil Conservation, Rudraprayag, Tehri Dam-I, Tehri, and Mussoorie.

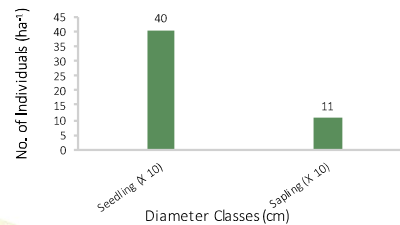
The species exhibited 'good' regeneration in Upper or Himalayan Chir Pine Forest, Lower or Shivalik Chir Pine Forest, Ban Oak Forest and Northern Dry Mixed Deciduous Forest while 'fair' regeneration was exhibited in Dry Shivalik Forest. Highest seedling density value of 700 ha⁻¹ was observed in Ban Oak Forest while the lowest value of 100 ha⁻¹ was in Dry Shivalik Sal Forest. Sapling density of 220 ha⁻¹ was recorded in Dry Shivalik Sal Forest and Lower or Shivalik Chir Pine Forest while density of 110 ha⁻¹ was recorded in Upper or Himalayan Chir Pine Forest, Ban Oak Forest and Northern Dry Mixed Deciduous Forest. This species is economically important, therefore, wild gene pool needs to conserve for future. Suitable strategies are advocated for its conservation.

Regeneration Status and Population Structure

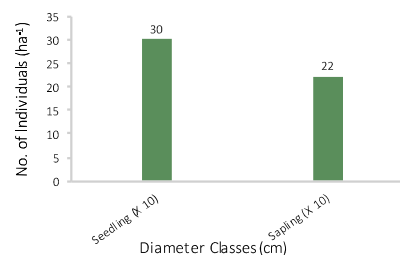
5B/C1a Dry Shivalik Sal Forest



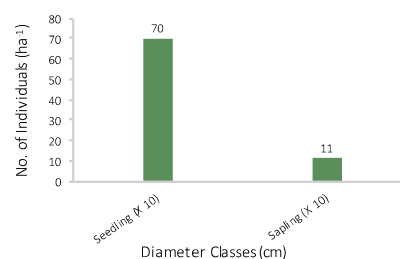
9/C1b Upper or Himalayan Chir Pine Forest



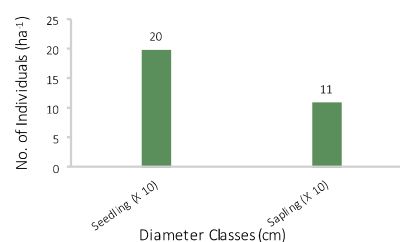
9/C1a Lower or Shivalik Chir Pine Forest



12/C1a Ban Oak Forest



5B/C2 Northern Dry Mixed Deciduous Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

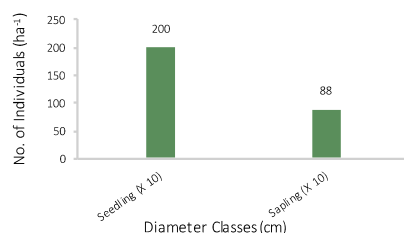
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Pilot Project

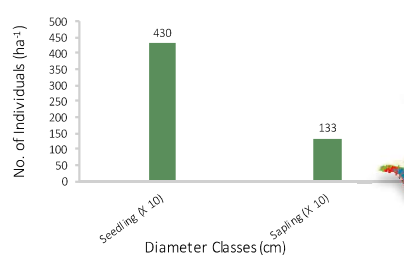


Regeneration Status and Population Structure

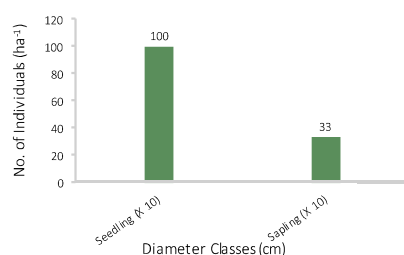
9/C1b Upper or Himalayan Chir Pine Forest



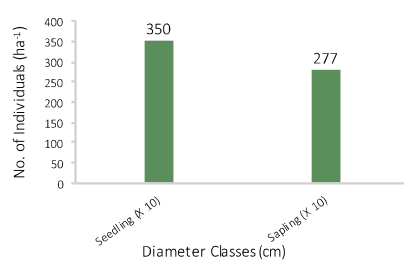
9/C1a Lower or Shiwalik Chir Pine Forest



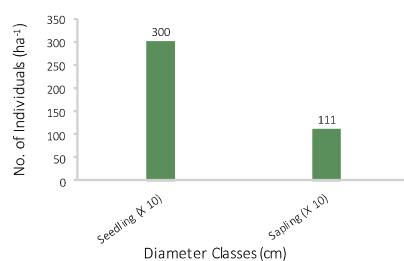
12/C1a Ban Oak Forest



12/1S1 Alder Forest

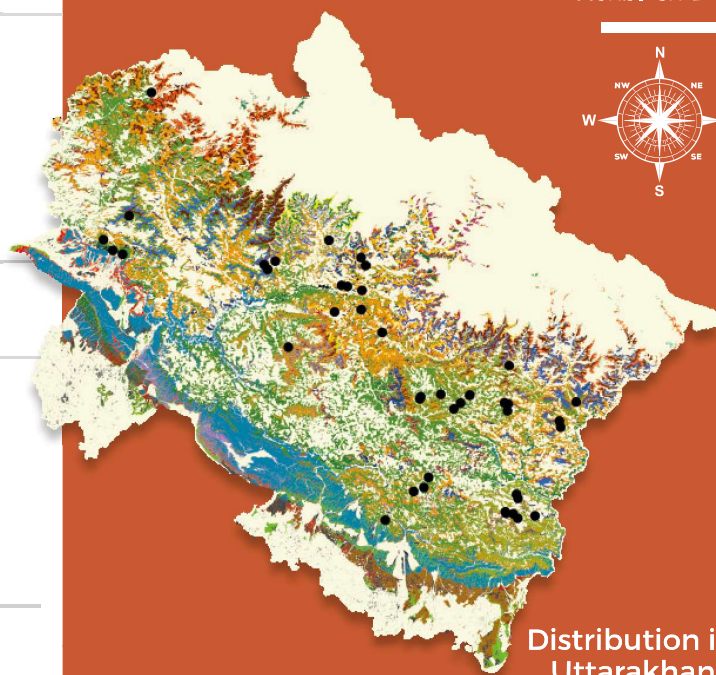


12/C1c Moist Deodar Forest



Berberis asiatica

Roxb. ex DC.



Distribution in Uttarakhand

Species found up to 900-
1,500 m in the lower hills.

Occurrence in Forest Types

5B/C2, 9/C1a, 9/C1b, 9/DS1, 9/DS2, 12/C1a, 12/C1b, 12/C1c,
12/C1f, 12/1S1, 13/C2b, 14/C1a, 14/C1b, and 16/C1.

Forest Divisions

Champawat, Kedarnath, Bageshwar, Pithoragarh, Nainital,
Govind Pashu Vihar, Mussoorie, Rudrapur and Badrinath.

Overall species depicted 'good' regeneration. Highest seedling density value observed was 4,300 ha⁻¹ in Lower or Shiwalik Chir Pine Forest and lowest value 1,000 ha⁻¹. However, highest sapling density was observed in Alder Forest which indicated better establishment of sapling. Lowest sapling density was also recorded in Ban Oak Forest. This species is economically important and is exploited for its roots. Therefore, suitable strategies are required for its conservation.



Berberis chitria

Buch.-Ham. ex Lindl.



Distribution in Uttarakhand

Species commonly found in Garhwal and Kumaon region in between 1,800-3,000 m.

Occurrence in Forest Types

3C/C2a, 5B/C2, 9/C1b, 9/DS1, 12/C1a, 12/C1b, 12/C1d, 12/C1e, 12/C2c, 12/C1/DS1, 13/1S1, 14/1S2, and 16/C1.

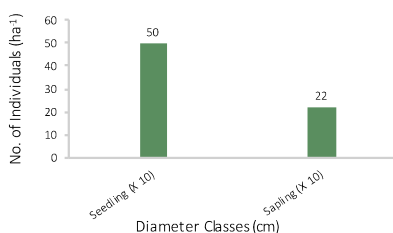
Forest Divisions

Mussoorie, Pithoragarh, Nainital, Bageshwar, Govind Pashu Vihar, Uttarkashi, Kedarnath, Rudraprayag, Tehri, Chakrata and Badrinath.

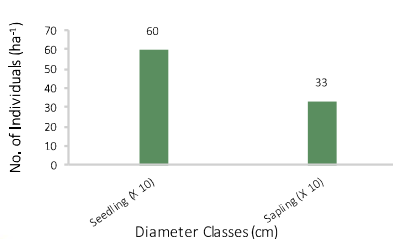
Species exhibited overall 'good' regeneration. Highest density value of seedling and sapling recorded were: 900 ha^{-1} and 560 ha^{-1} in Western Mixed Coniferous Forest, respectively. This species is economically important and is exploited for its roots. Therefore, suitable strategies are required for its conservation.

Regeneration Status and Population Structure

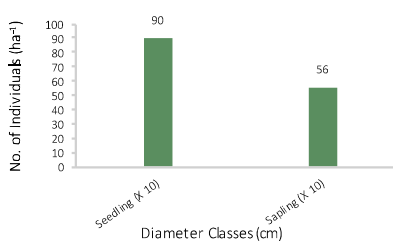
9/C1b Upper or Himalayan Chir Pine Forest



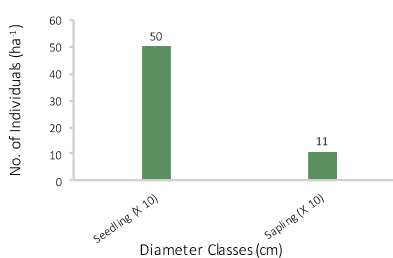
12/C1e Moist Temperate Deciduous Forest



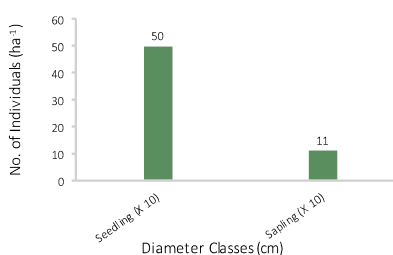
12/C1d Western Mixed Coniferous Forest



12/C1b Moru Oak Forest



9/DS1 Himalayan Subtropical Scrub



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

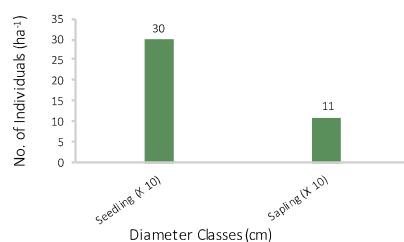
320

Pilot Project

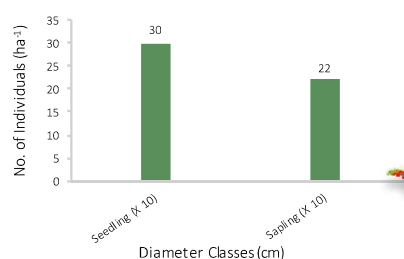


Regeneration Status and Population Structure

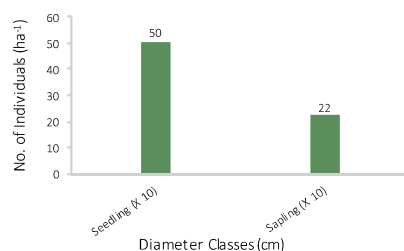
12/C1e Moist Temperate Deciduous Forest



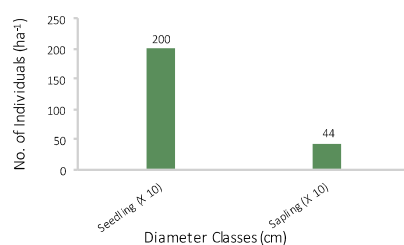
12/C1a Ban Oak Forest



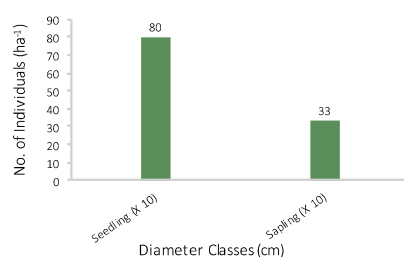
9/C1b Upper or Himalayan Chir Pine Forest



12/C2b West Himalayan Upper Oak/Fir Forest

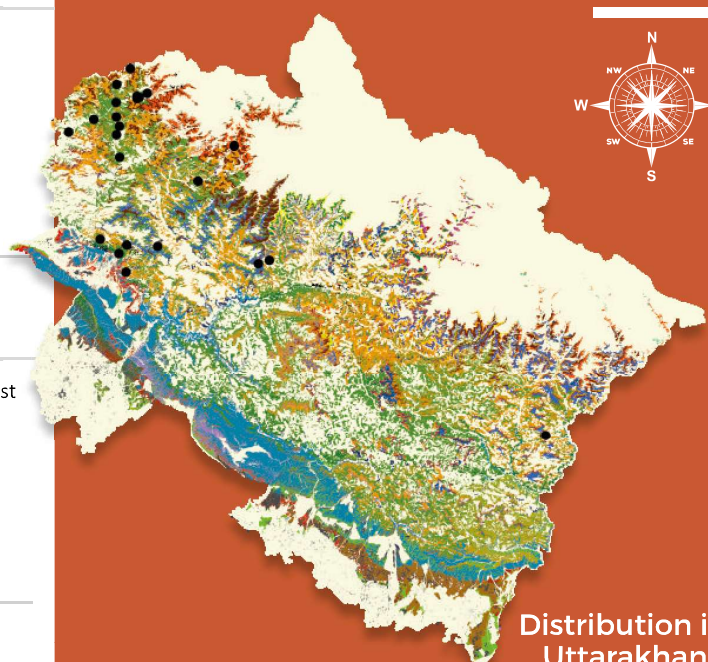


9/C1a Lower or Shiwalik Chir Pine Forest



Berberis lycium

Royle



Distribution in Uttarakhand

Almost always found growing on
the banks of streams, or less
frequently on landslips.

Occurrence in Forest Types

9/C1a, 9/C1b, 12/C1a, 12/C1b, 12/C1e and
12/C2b.

Forest Divisions

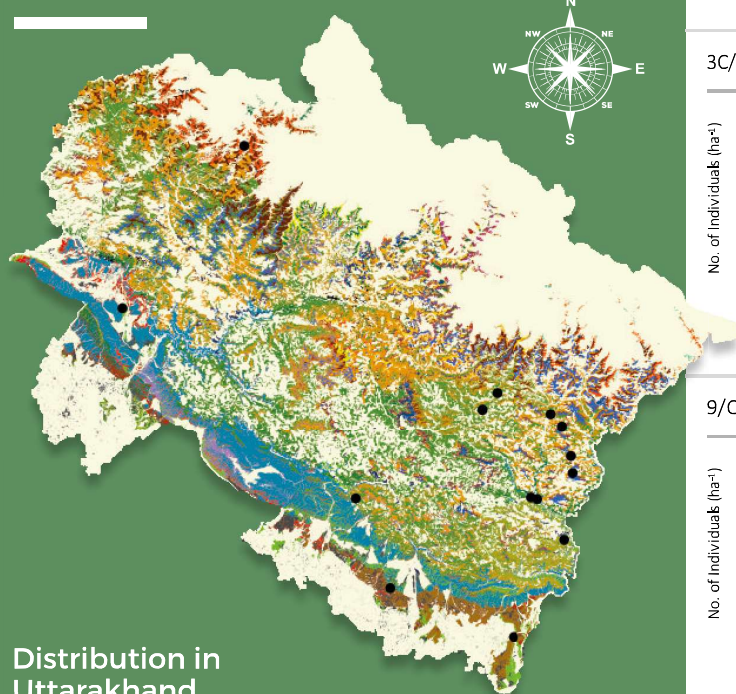
Narendranagar, Pithoragarh, Mussoorie,
Chakrata and Uttarkashi.

Species exhibited 'good' regeneration. Highest seedling density value observed was $2,000 \text{ ha}^{-1}$ in West Himalayan Upper Oak /Fir Forest while the lowest value of 300 ha^{-1} was recorded in Moist Temperate Deciduous Forest and Ban Oak Forest. Highest sapling density of 440 ha^{-1} was also recorded in West Himalayan Upper Oak /Fir Forest while the lowest value of 110 ha^{-1} was in Moist Temperate Deciduous Forest. This species is economically important and is exploited for its roots. Therefore, suitable strategies are required for its conservation.



Callicarpa macrophylla

Vahl.



Distribution in Uttarakhand

Species found in Swampy localities.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 9/C1a, 9/C1b, 12/C1a, 12/C2b, 14/C1b, 14/1S1, and 16/E1.

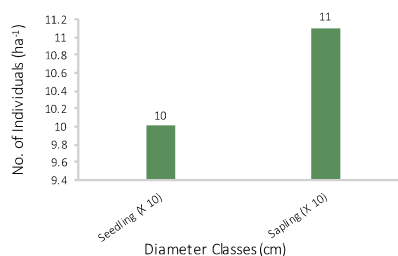
Forest Divisions

Bageshwar, Terai Central, Dehra Dun, Champawat, Ramnagar, Uttarkashi, Terai East and Pithoragarh.

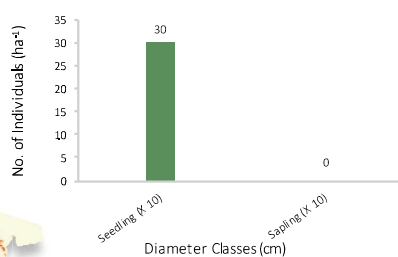
The species exhibited 'good' regeneration in Lower or Shiwalik Chir Pine Forest, while fair' regeneration was recorded in Ban Oak Forest, Upper or Himalayan Chir Pine Forest and Moist Shiwalik Sal Forest. 'New' regeneration was observed in Moist Terai Sal Forest. Highest seedling density value 300 ha^{-1} was in Moist Terai Sal Forest and Lower or Shiwalik Chir Pine Forest. Wild gene pool of species needs conservation. Suitable management strategies are advocated for species conservation.

Regeneration Status and Population Structure

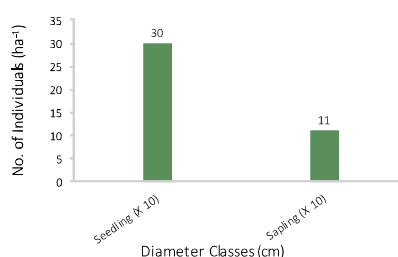
12/C1a Ban Oak Forest



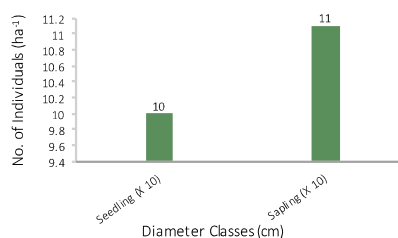
3C/C2c Moist Terai Sal Forest



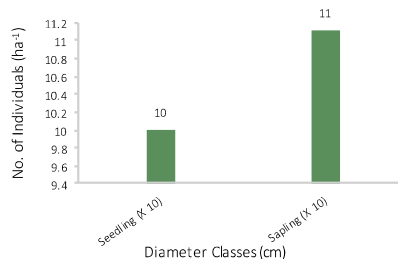
9/C1a Lower or Shiwalik Chir Pine Forest



9/C1b Upper or Himalayan Chir Pine Forest



3C/C2a Moist Shiwalik Sal Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

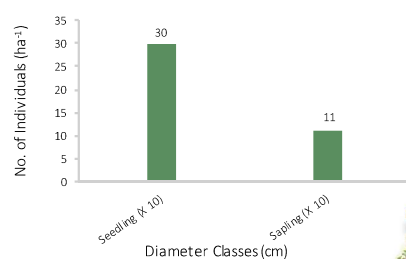
322

Pilot Project

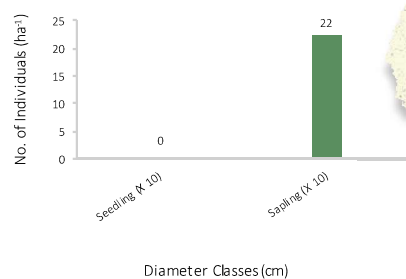


Regeneration Status and Population Structure

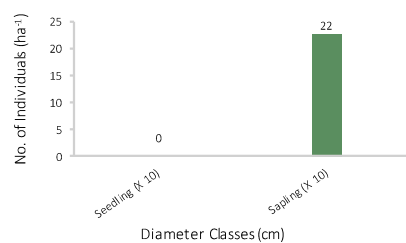
3C/C2c Moist Terai Sal Forest



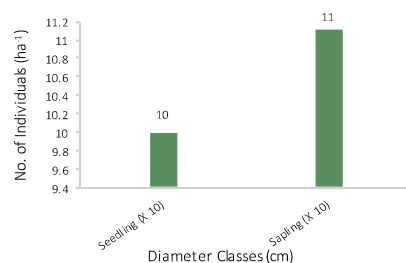
3C/C3a West Gangetic Moist Mixed Deciduous Forest



5B/C2 Northern Dry Mixed Deciduous Forest

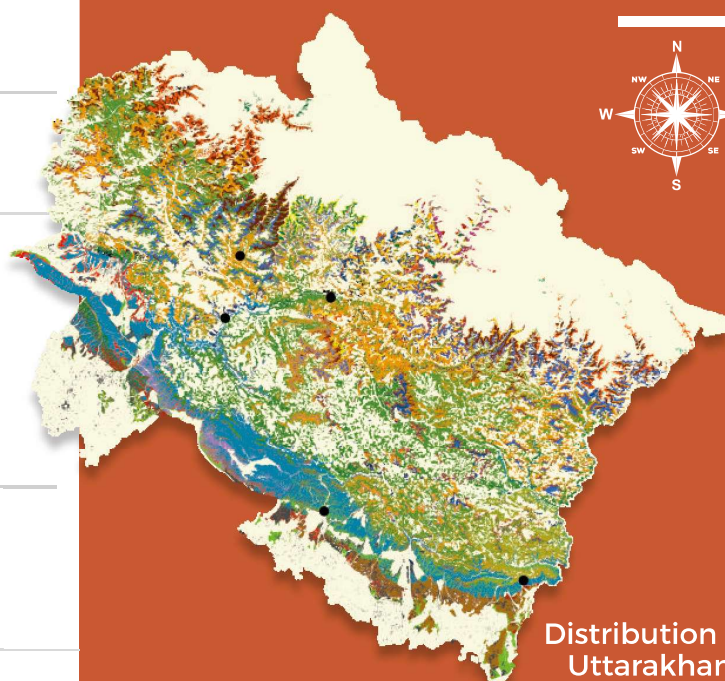


3C/C2a Moist Shiwalik Sal Forest



Calotropis gigantea

(L.) W. T. Aiton



Distribution in Uttarakhand

Species found in the dry places.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C2 and 12/C1a.

Forest Divisions

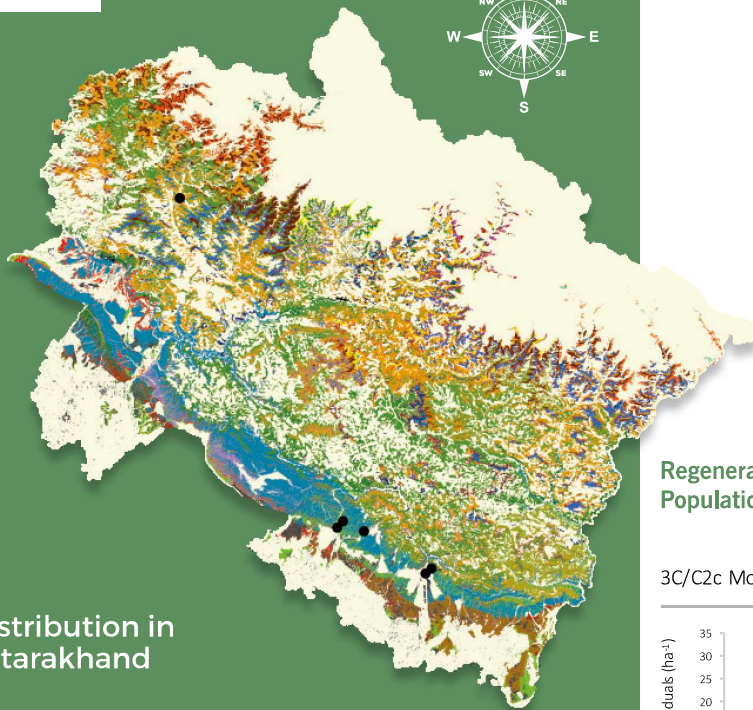
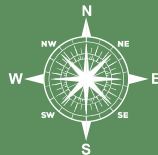
Narendranagar, Champawat, Dehra Dun,
Ramnagar and Tehri.

The species showed 'good' regeneration in Moist Terai Sal Forest, 'fair' regeneration in Moist Shiwalik Sal Forest while 'poor' regeneration in West Gangetic Moist Mixed Deciduous Forest and Northern Dry Mixed Deciduous Forest. Highest seedling density value estimated was 300 ha⁻¹ in Moist Terai Sal Forest. No seedling was observed in West Gangetic Moist Mixed Deciduous Forest and Northern Dry Mixed Deciduous Forest. However, West Gangetic Moist Mixed Deciduous Forest and Northern Dry Mixed Deciduous Forest showed highest sapling density of 220 ha⁻¹ indicating disturbances in forest. Hence, suitable strategies are required for its conservation.



Calotropis procera

(Aiton) W.T. Aiton



Distribution in Uttarakhand

Species commonly found in fallow lands or near edges of forest.

Occurrence in Forest Types

3C/C2c, 3C/C3a, and 9/C1b.

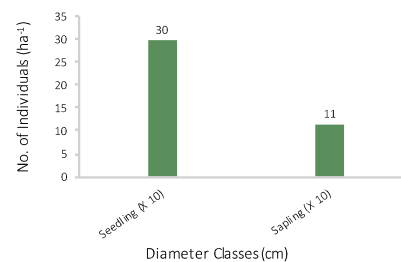
Forest Divisions

Ramnagar, Haldwani, Dehra Dun and Uttarkashi.

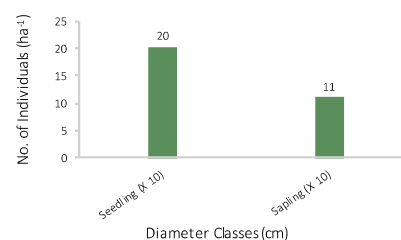
The species depicted 'good' regeneration in Moist Terai Sal Forest and West Gangetic Moist Mixed Deciduous Forest. Highest seedling density value estimated was 300 ha⁻¹ in Moist Terai Sal Forest. Sapling density value observed was 110 ha⁻¹ in West Gangetic Moist Mixed Deciduous Forest and Moist Terai Sal Forest. Hence, suitable strategies are required for its conservation.

Regeneration Status and Population Structure

3C/C2c Moist Terai Sal Forest



3C/C3a West Gangetic Moist Mixed Deciduous Forest



Conservation of Forest Genetic Resources



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Conservation of
Forest Genetic
Resources



Establishment
of Center of
Excellence on
Forest Genetic
Resources
(CoE-FGR)

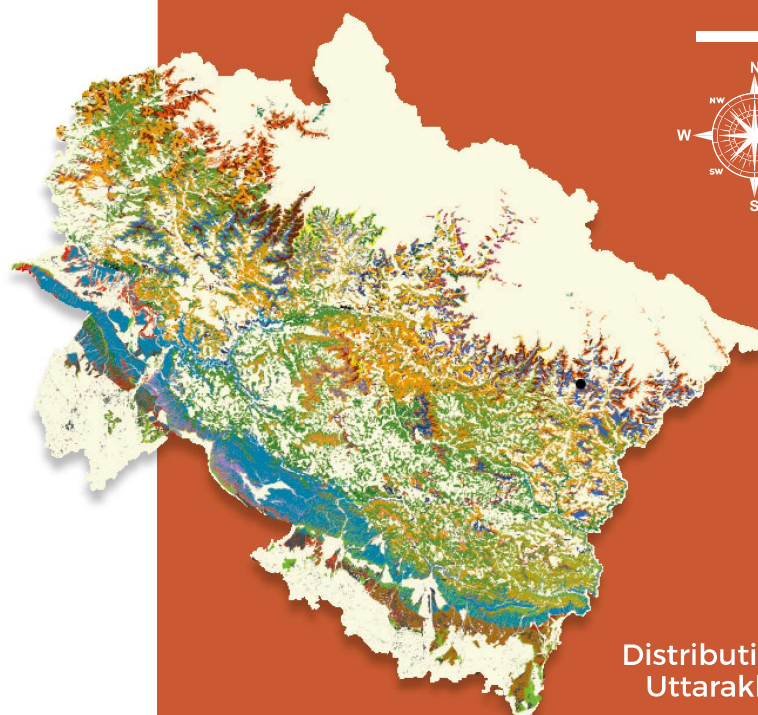
325

Uttarakhand State



Caragana gerardiana

Benth



Distribution in
Uttarakhand

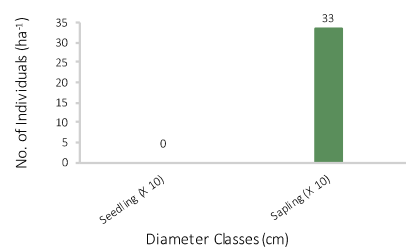
Species found up to
2,700-3,600 m.

Occurrence in Forest Type
12/C1d.

Forest Division
Pithoragarh.

Regeneration Status and Population Structure

12/C1d Western Mixed Coniferous
Forest

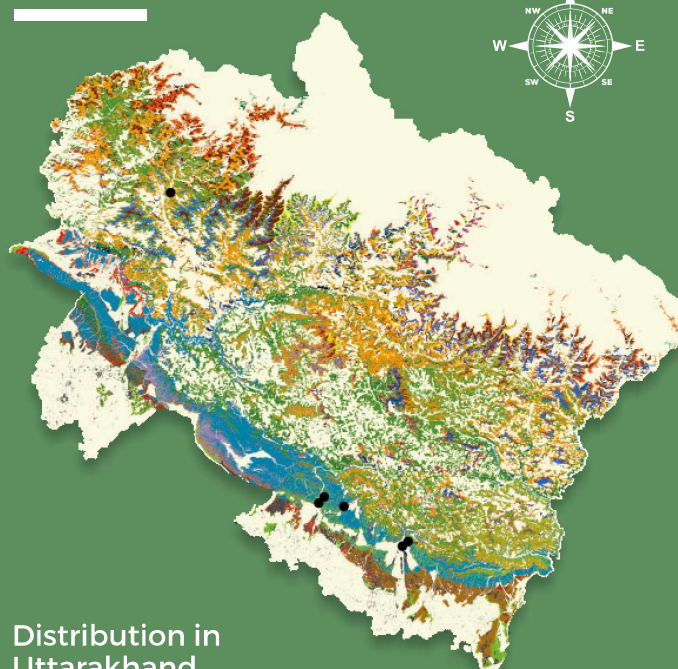


The species was devoid of regeneration. Only sapling population observed with density value of 330 ha⁻¹. Hence, suitable strategies are required for its conservation.



Catunaregam spinosa

Thunb. Tirveng.



Distribution in Uttarakhand

Species occurs up to 500-1,300 m.

Occurrence in Forest Types

3C/C2a, 3C/C3a, 5B/C1a, 5B/C2, 9/C1a and 9/C1b.

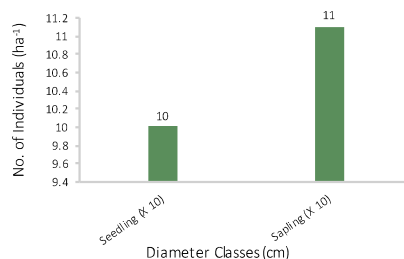
Forest Divisions

Pithoragarh, Mussoorie, Haridwar, Govind Pashu Vihar, Nainital, Uttarkashi, Ramnagar and Terai East

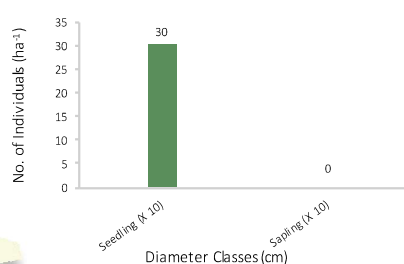
The species exhibited 'fair' regeneration in Upper or Himalayan Chir Pine Forest, Moist Shiwalik Sal Forest and Northern Dry Mixed Deciduous Forest while 'no' regeneration was observed in Lower or Shiwalik Chir Pine Forest and West Gangetic Moist Mixed Deciduous Forest. Highest seedling density value recorded was 200 ha^{-1} in Northern Dry Mixed Deciduous Forest and 100 ha^{-1} in Upper or Himalayan Chir Pine Forest, Moist Shiwalik Sal Forest and Dry Shiwalik Sal Forest. Wild gene pool should be conserved for future. Hence, suitable strategies are required for its conservation.

Regeneration Status and Population Structure

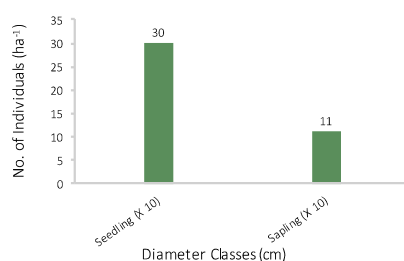
12/C1a Ban Oak Forest



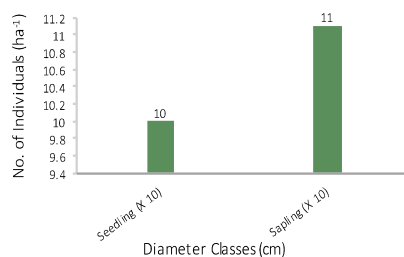
3C/C2c Moist Terai Sal Forest



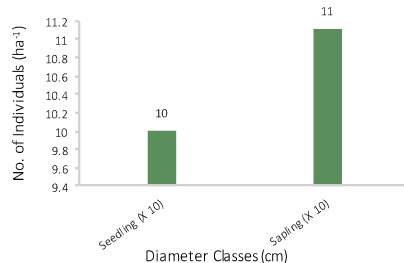
9/C1a Lower or Shiwalik Chir Pine Forest



9/C1b Upper or Himalayan Chir Pine Forest



3C/C2a Moist Shiwalik Sal Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

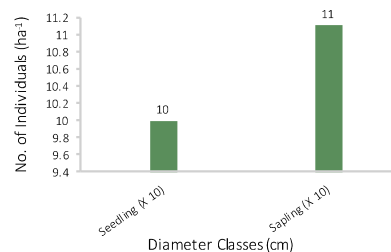
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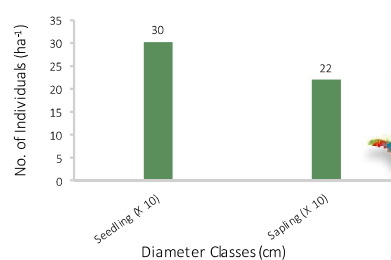


Regeneration Status and Population Structure

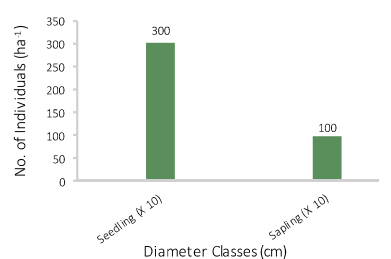
5B/C2 Northern Dry Mixed Deciduous Forest



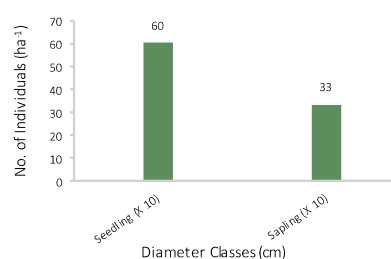
9/C1a Lower or Shiwalik Chir Pine Forest



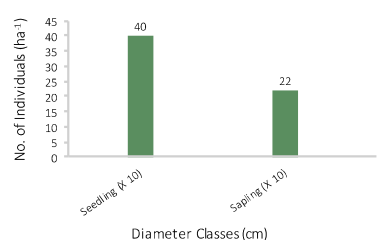
12/C1a Ban Oak Forest



12/C1b Moru Oak Forest

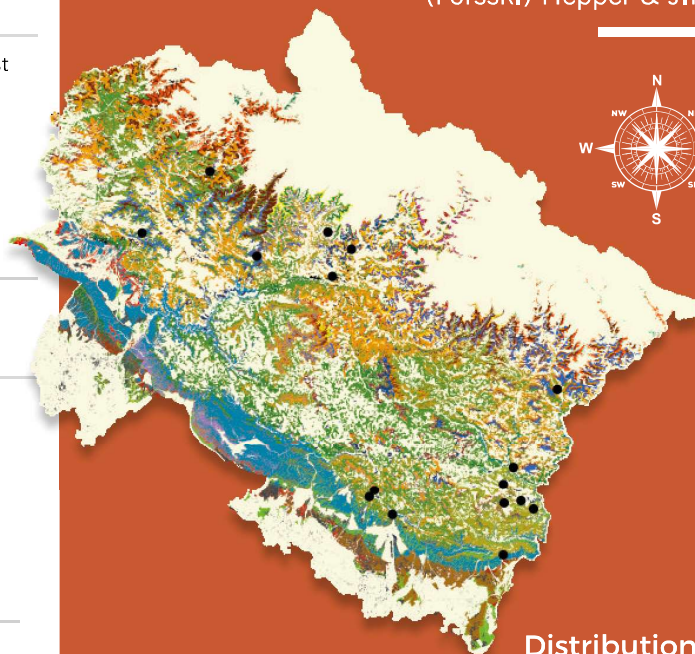


9/C1b Upper or Himalayan Chir Pine Forest



Debregeasia saeneb

(Forssk.) Hepper & J.R.I.



Distribution in Uttarakhand

Species found up
to 600-1,500 m.

Occurrence in Forest Types

3C/C2a, 5B/C2, 9/C1a, 9/C1b, 12/C1a, 12/C1b, 12/C1c,
14/1S2, 16/C1.

Forest Divisions

Champawat, Tons, Uttarkashi, Nainital, Chakrata,
Govind Pashu Vihar, Tehri Dam-I, Mussoorie, Pithoragarh
and Kedarnath Wildlife Division.

Species depicted overall 'good' regeneration, except in Northern Dry Mixed Deciduous Forest wherein it was observed 'fair'. Highest seedling density value observed was $3,000 \text{ ha}^{-1}$ in Ban Oak Forest while the lowest value of 100 ha^{-1} was in Northern Dry Mixed Deciduous Forest. Highest sapling density was also recorded in Ban Oak Forest and the lowest value of 110 ha^{-1} was recorded in Northern Dry Mixed Deciduous Forest. Wild gene pool needs conservation. Therefore, suitable strategies are required for species conservation.



Elaeagnus conferta

Roxb.



Distribution in Uttarakhand

Species occurs up to 2,100 m.

Occurrence in Forest Types

9/C1b, 12/C1a, 12/C1b and 12/C1c.

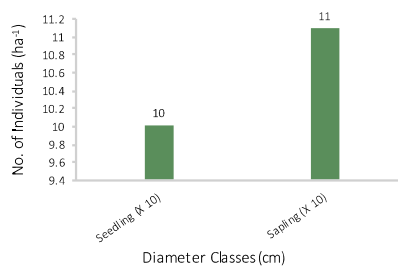
Forest Divisions

Kedarnath, Pithoragarh and Govind Pashu Vihar.

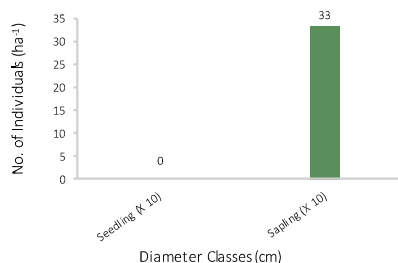
The species exhibited 'fair' regeneration in Ban Oak Forest while 'new' regeneration in Moist Deodar Forest and Upper or Himalayan Chir Pine Forest was observed. 'No' regeneration was recorded in Moru Oak Forest. Highest densities value of seedling and sapling observed were: 200 ha⁻¹ and 330 ha⁻¹ in Moist Deodar Forest and Moru Oak Forest, respectively. Sapling population was low. Hence, suitable strategies are required of species conservation.

Regeneration Status and Population Structure

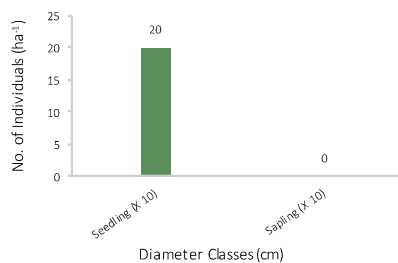
12/C1a Ban Oak Forest



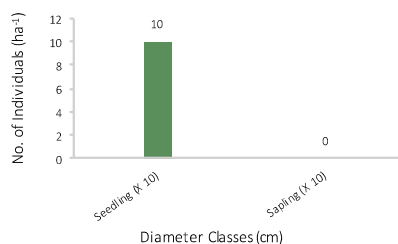
12/C1b Moru Oak Forest



12/C1c Moist Deodar Forest



9/C1b Upper or Himalayan Chir Pine Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

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Forest Genetic
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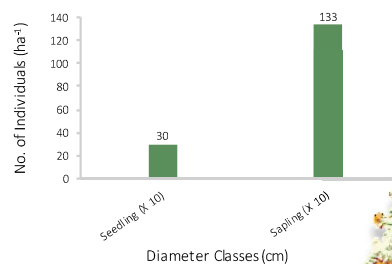
Establishment
of Center of
Excellence on
Forest Genetic
Resources
(CoE-FGR)

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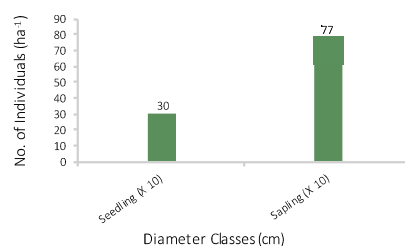
Uttarakhand State

Regeneration Status and Population Structure

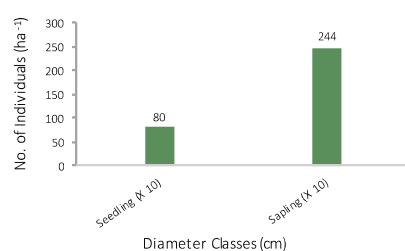
13/C2b Dry Deodar Forest



14/C1b West Himalayan Sub-alpine Birch/fir Forest

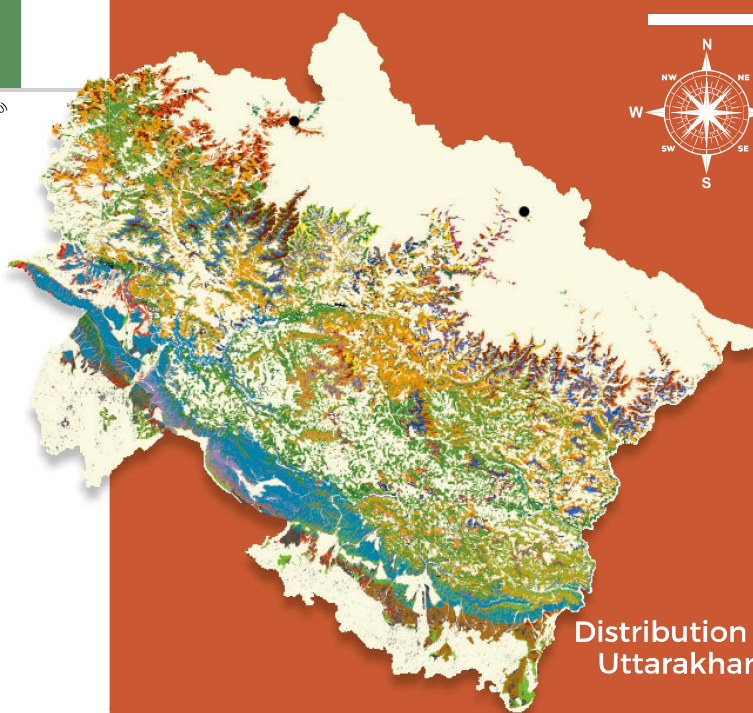


14/C1a West Himalayan Sub-alpine Fir Forest



Ephedra gerardiana

Wall. Ex Stapf



Distribution in Uttarakhand

Species found up
to 2,400-3,500 m.

Occurrence in Forest Types
13/C2b, 14/C1a and 14/C1b.

Forest Divisions
Chamoli, Nanda Devi Biosphere Reserve and
Gangotri National Park.

Species exhibited overall 'fair' regeneration. Highest density values of seedling and sapling were: 800 ha⁻¹ and 2,400 ha⁻¹ respectively. Wild gene pool needs conservation for future. Hence, suitable strategies are required for species conservation.



Helicteres isora

L.



Distribution in Uttarakhand

Species is a very common shrub found in mostly Sal and Mixed forest

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C1a, 5B/C2, 5/1S2, 9/C1a, 12/C1d, and 15/E1.

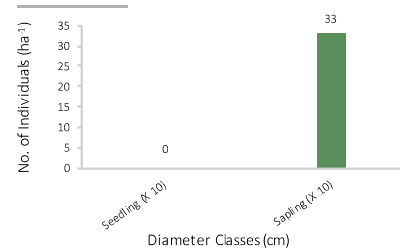
Forest Divisions

East Terai, Haldwani, Terai Central, Haridwar, Pithoragarh, Ramnagar, Lansdowne and Champawat.

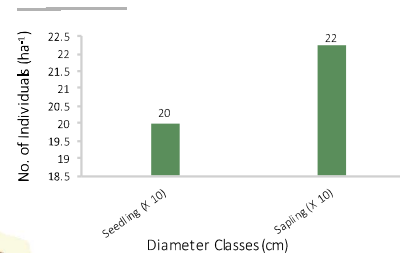
The species depicted 'good' regeneration in Dry Shiwalik Sal Forest, 'fair' in Northern Dry Mixed Deciduous Forest, Dry Plains Sal Forest and Moist Terai Sal Forest while 'poor' regeneration in West Gangetic Moist Mixed Deciduous Forest. Highest seedling density value observed was 200 ha^{-1} in Northern Dry Mixed Deciduous Forest, Dry Shiwalik Sal Forest and Moist Terai Sal Forest. Highest sapling density value recorded was 330 ha^{-1} in West Gangetic Moist Mixed Deciduous Forest and Moist Terai Sal Forest. Wild gene pool should be conserved for future. Suitable strategies are advocated for species conservation.

Regeneration Status and Population Structure

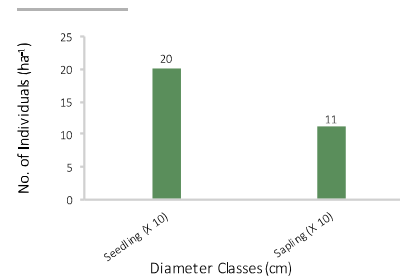
3C/C3a West Gangetic Moist Mixed Deciduous Forest



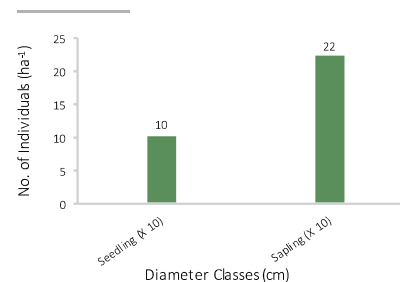
5B/C2 Northern Dry Mixed Deciduous Forest



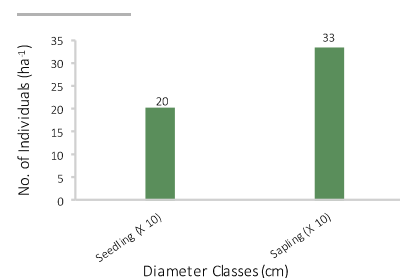
5B/C1a Dry Shiwalik Sal Forest



5B/C1b Dry Plains Sal Forest



3C/C2c Moist Terai Sal Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

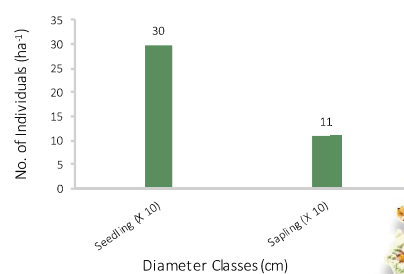
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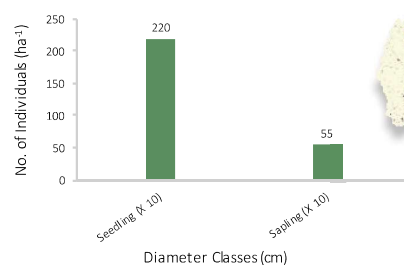


Regeneration Status and Population Structure

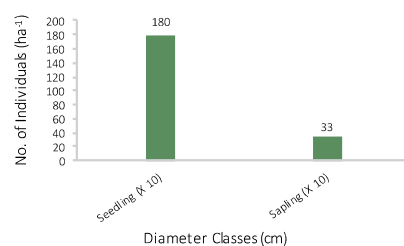
16/E1 Dwarf Juniper Scrub



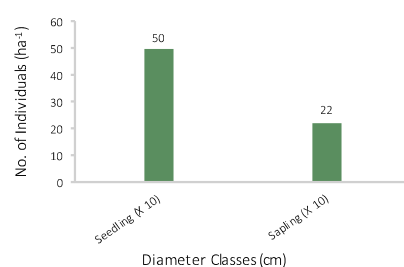
12/C2a Kharsu Oak Forest



14/C1b West Himalayan Sub-alpine Birch/Fir Forest



14/1S2 Deciduous Sub-alpine Scrub



Hippophae salicifolia

D. Don



Distribution in Uttarakhand

Species found up
to 1,500-3,200 m.

Occurrence in Forest Types

12/C2a, 14/C1a, 14/C1b, 14/1S2, and 16/E1.

Forest Divisions

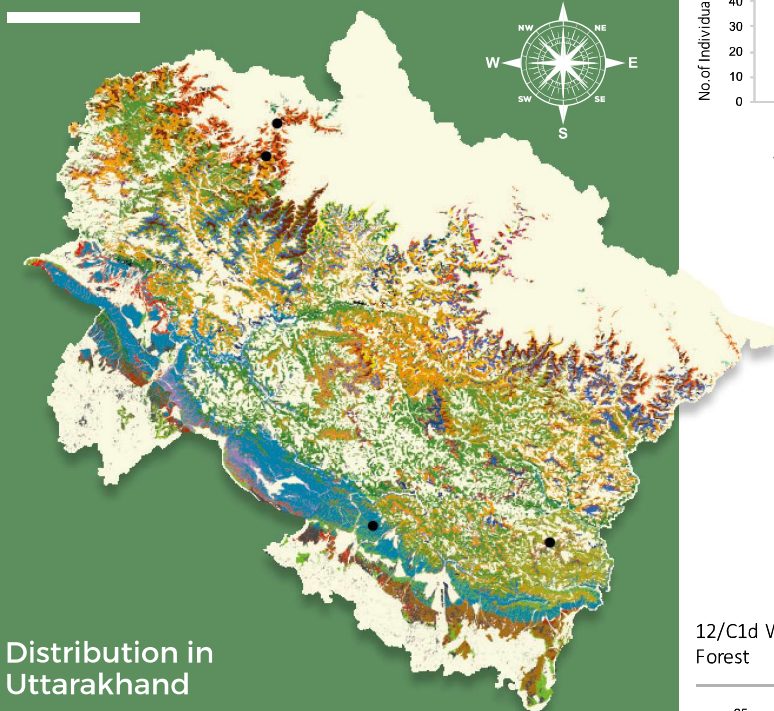
Uttarkashi, Badrinath, Upper Yamuna and
Kedarnath.

Species depicted 'good' regeneration. Highest seedling density value observed was $2,200 \text{ ha}^{-1}$ in Kharsu Oak Forest while lowest value of 300 ha^{-1} was in Dwarf Juniper Scrub, respectively. Similar trend was observed in sapling with highest and lowest densities values of 550 ha^{-1} and 110 ha^{-1} in Kharsu Oak Forest and Dwarf Juniper Scrub, respectively. This species is economically important and is exploited for its fruits. Therefore, suitable strategies was required for its conservation.



Indigofera cassioides

Rottler ex DC.



Distribution in Uttarakhand

Species found up to 2,700 m.

Occurrence in Forest Types

3C/C2a, 5B/C2, 12/C1a and 12/C1d.

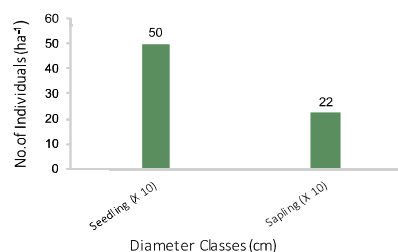
Forest Divisions

Champawat, Ramnagar and Uttarkashi.

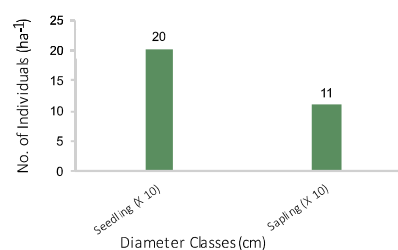
The species showed 'good' regeneration in Northern Dry Mixed Deciduous Forest, Western Mixed Coniferous Forest and Ban Oak Forest. Highest seedling density value estimated was 500 ha^{-1} in Northern Dry Mixed Deciduous Forest. Highest sapling density value estimated was 220 ha^{-1} in Northern Dry Mixed Deciduous Forest. Hence, suitable strategies are required for its conservation.

Regeneration Status and Population Structure

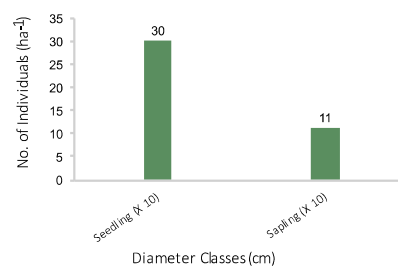
5B/C2 Northern Dry Mixed Deciduous Forest



12/C1d Western Mixed Coniferous Forest



12/C1a Ban Oak Forest



Conservation of Forest Genetic Resources



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Forest Genetic
Resources



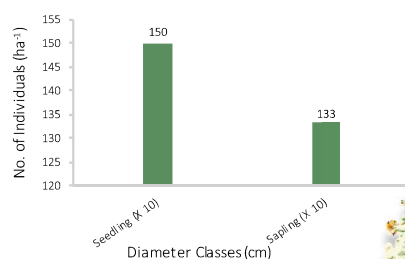
Establishment
of Center of
Excellence on
Forest Genetic
Resources
(CoE-FGR)

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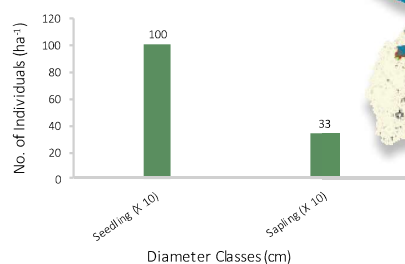
Uttarakhand State

Regeneration Status and Population Structure

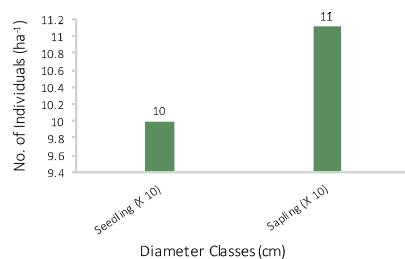
5B/C2 Northern Dry Mixed Deciduous Forest



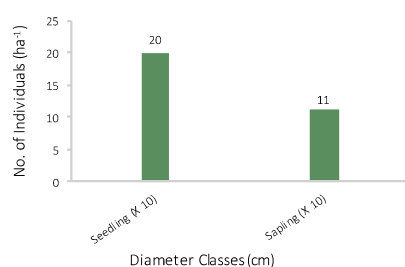
3C/C2a Moist Shiwalik Sal Forest



9/C1b Upper or Himalayan Chir Pine Forest

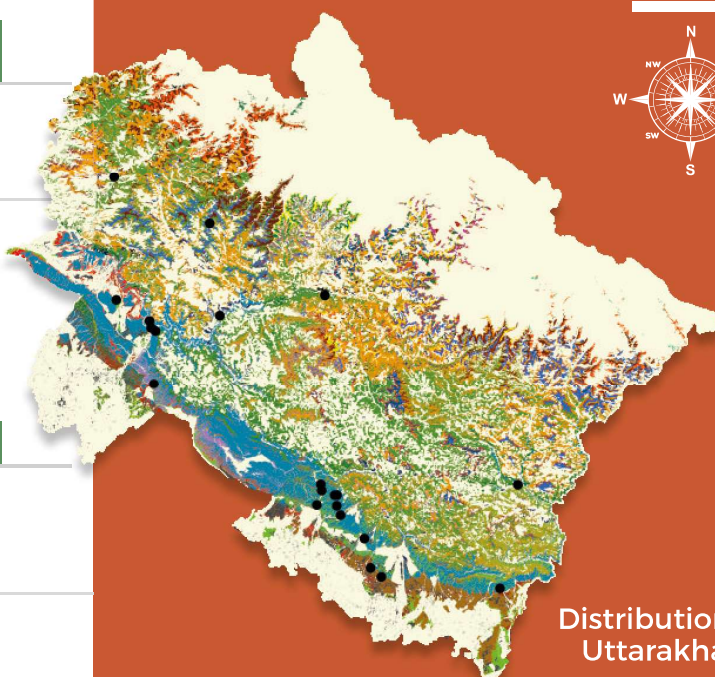


9/C1a Lower or Shiwalik Chir Pine Forest



Justicia adhatoda

L.



Distribution in Uttarakhand

Species found up to 1,200 m.

Occurrence in Forest Types

3C/C2a, 3C/C3a, 5B/C1b, 5B/C2, 9/C1a, 9/C1b
and 12/C2b.

Forest Divisions

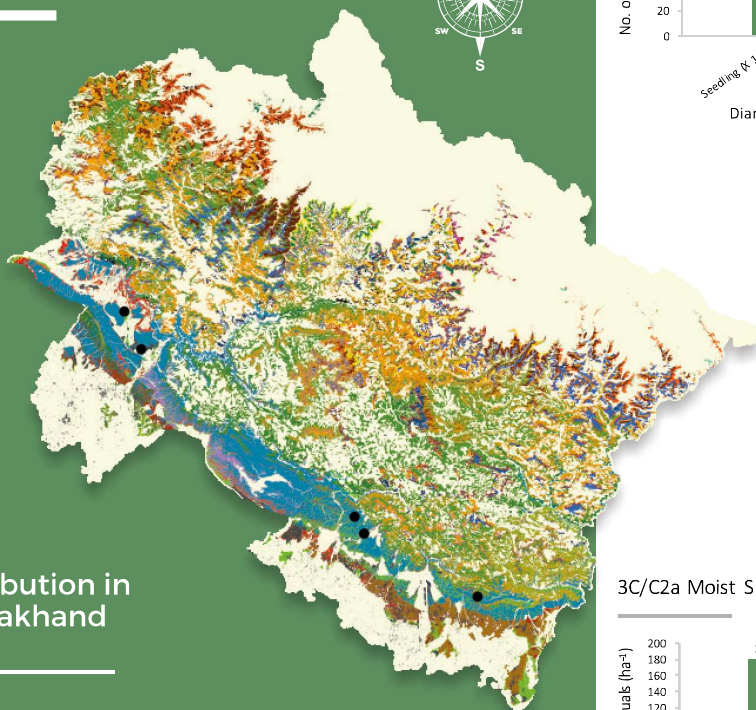
Pithoragarh, Lansdowne, Narendranagar, Dehra
Dun and Tehri

Species depicted overall 'good' regeneration, except in Upper or Himalayan Chir Pine Forest wherein 'fair' regeneration was observed. Highest seedling density value observed was $1,500 \text{ ha}^{-1}$ in Northern Dry Mixed Deciduous Forest while the lowest value of 110 ha^{-1} was in Upper or Himalayan Chir Pine Forest. Highest sapling density value of $1,330 \text{ ha}^{-1}$ was also recorded in Northern Dry Mixed Deciduous Forest. Wild gene pool of the species need conservation. Suitable strategies are required for species conservation.



Phlogacanthus thyrsoformis

(Roxb. ex Hardw.) Mabb.



Distribution in Uttarakhand

Species found up to 1,200 m.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a and 5B/C2.

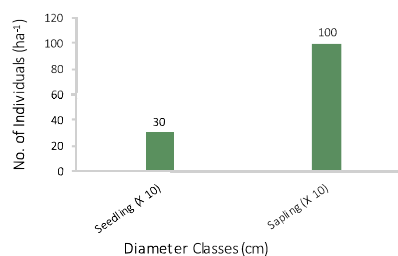
Forest Divisions

Ramnagar, Dehra Dun and Nandhaur Wildlife Sanctuary.

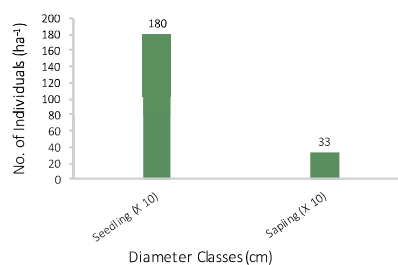
The species exhibited 'good' regeneration in Moist Shiwalik Sal Forest and Moist Terai Sal Forest while 'fair' regeneration was observed in Northern Dry Mixed Deciduous Forest. Highest seedling density value recorded was 2,200 ha⁻¹ in Moist Terai Sal Forest while the lowest value of 300 ha⁻¹ was in Northern Dry Mixed Deciduous Forest. Highest sapling density value estimated was 1,330 ha⁻¹ in Moist Terai Sal Forest. Wild gene pool of species need conservation.

Regeneration Status and Population Structure

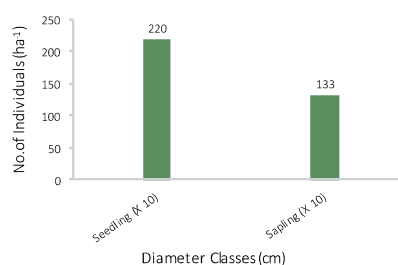
5B/C2 Northern Dry Mixed Deciduous Forest



3C/C2a Moist Shiwalik Sal Forest



3C/C2c Moist Terai Sal Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

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Forest Genetic
Resources



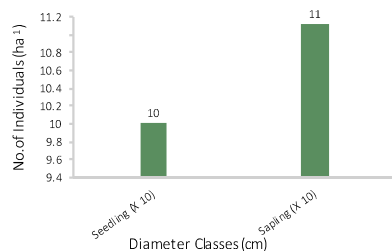
Establishment
of Center of
Excellence on
Forest Genetic
Resources
(CoE-FGR)

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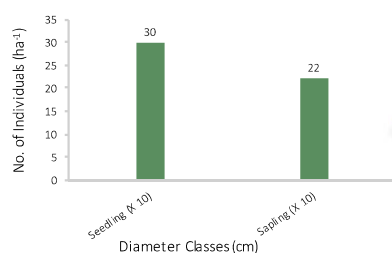
Uttarakhand State

Regeneration Status and Population Structure

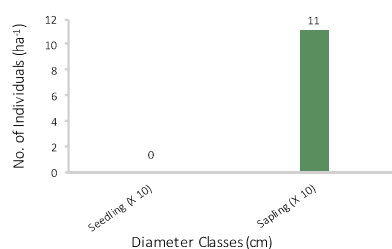
9/DS1 Himalayan Subtropical Scrub



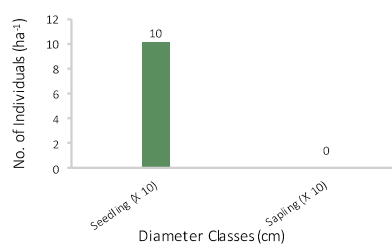
12/C1a Ban Oak Forest



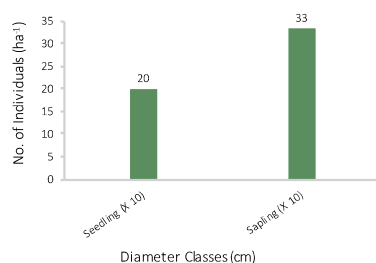
5B/C2 Northern Dry Mixed Deciduous Forest



3C/C3a West Gangetic Moist Mixed Deciduous Forest

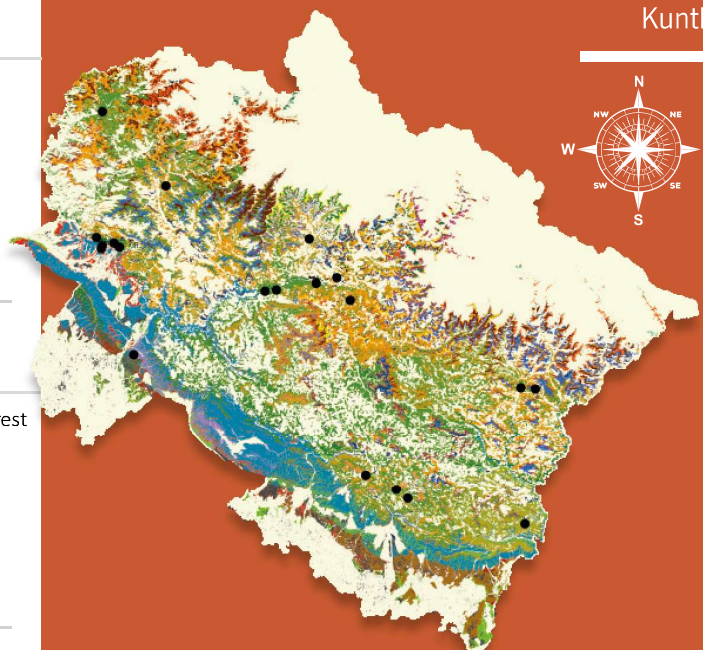


9/C1a Lower or Shiwalik Chir Pine Forest



Phoenix loureiroi

Kunth



Distribution in Uttarakhand

Species found in the Chir forest of
Garhwal and Kumaon region.

Occurrence in Forest Types

3C/C2a, 3C/C3a, 5B/C2, 9/C1a, 9/C1b, 9/DS2 and 12/C1a.

Forest Divisions

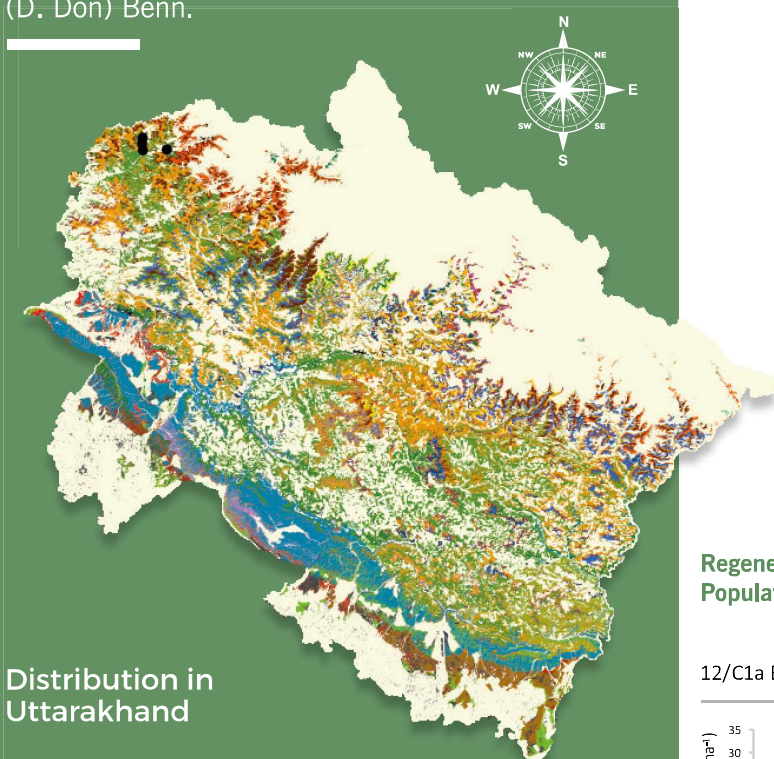
Uttarkashi, Rudraprayag, Nandprayag, Tons, Mussoorie,
Champawat, Pithoragarh, Dehra Dun, Haridwar, Nainital
and Kedarnath Wildlife Sanctuary.

The species exhibited 'good' regeneration in Ban Oak Forest while 'fair' regeneration was observed in Lower or Shiwalik Chir Pine Forest and Himalayan Sub-tropical Forest. 'New' regeneration was recorded in West Gangetic Moist Mixed Deciduous Forest and Northern Dry Mixed Deciduous Forest was devoid of any regeneration of this species. Highest seedling and sapling densities values recorded were: 300 ha⁻¹ and 330 ha⁻¹ in Ban Oak Forest and Lower or Shiwalik Chir Pine Forest, respectively. Wild gene pool need conservation. Suitable strategies are required for species management.



Picrasma quassioides

(D. Don) Benn.



Distribution in Uttarakhand

Species found up to 1,500-2,400 m in ravines.

Occurrence in Forest Types

9/C1b, and 12/C1a.

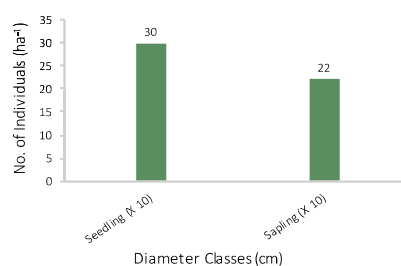
Forest Divisions

Joshimath, Govind Pashu Vihar and Uttarkashi.

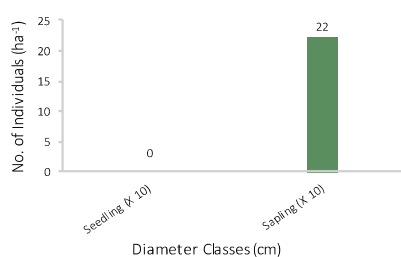
The species depicted 'good' regeneration in Ban Oak Forest while 'no' regeneration was observed in Upper or Himalayan Chir Pine Forest. Seedling density value observed was 300 ha^{-1} in Ban Oak Forest and sapling density value recorded was 220 ha^{-1} in both forest types. Wild gene pool of the species should be conserved for future. Suitable management strategies are required.

Regeneration Status and Population Structure

12/C1a Ban Oak Forest



9/C1b Upper or Himalayan Chir Pine Forest



Conservation of Forest Genetic Resources



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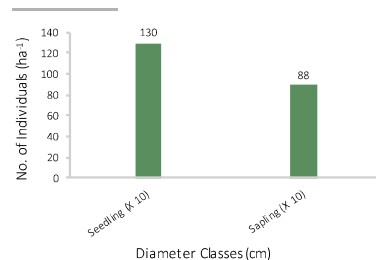
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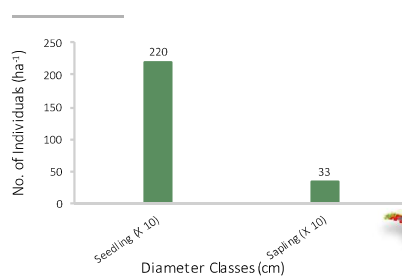


Regeneration Status and Population Structure

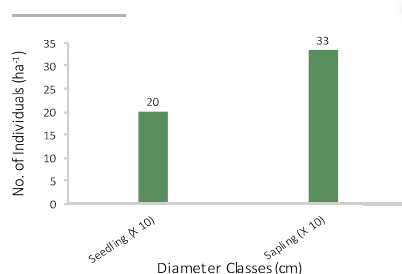
9/C1b Upper or Himalayan Chir Pine Forest



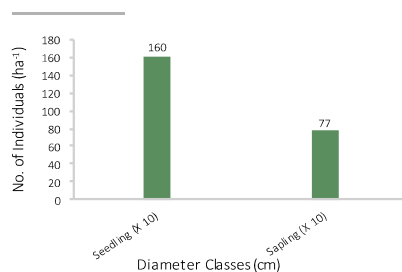
12/C1a Ban Oak Forest



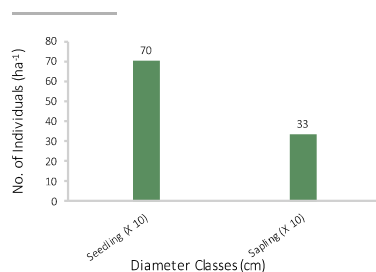
12/C1b Moru Oak Forest



12/C1c Moist Deodar Forest



9/DS1 Himalayan Subtropical Scrub



Prinsepia utilis

Royle



Distribution in
Uttarakhand

Species found up to
1,200-2,400 m.

Occurrence in Forest Types

5B/C1a, 9/C1b, 9/DS1, 12/C1a, 12/C1b, 12/C1c, 12/C2b, 12/C2c, 14/C1a, 14/C1b, 14/1S1, and 14/1S2

Forest Divisions

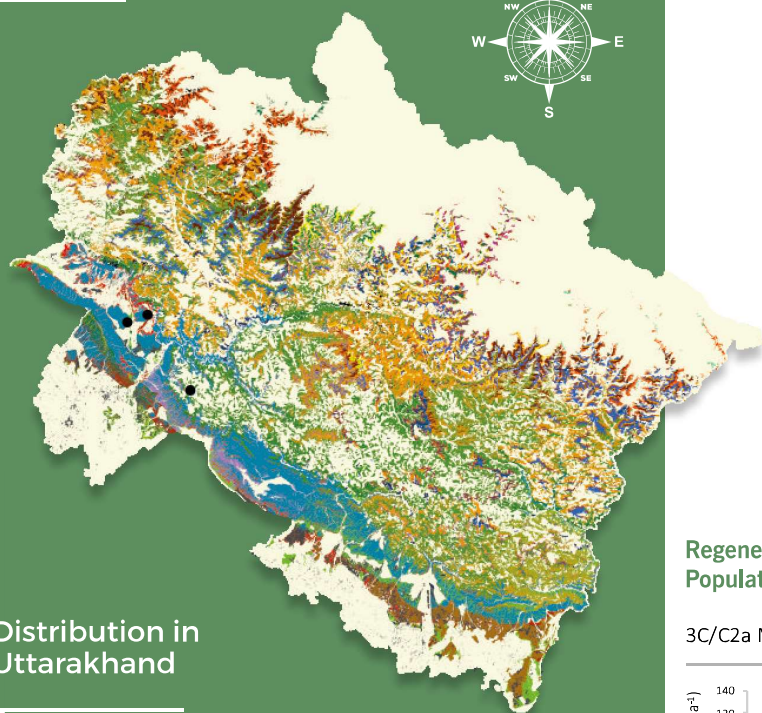
Joshimath, Govind Pashu Vihar and Uttarkashi.

The species exhibited 'good' regeneration in all assessed forest types except in Moru Oak Forest where 'fair' regeneration was observed. Highest seedling density value recorded was 2,200 ha⁻¹ in Ban Oak Forest and lowest value observed was 200 ha⁻¹ in Moru Oak Forest. However, highest sapling density value 770 ha⁻¹ was recorded in Moist Deodar Forest indicates better establishment. Wild gene pool is required to be conserved for future.



Rauvolfia serpentina

(L.) Benth. ex Kurz



Distribution in Uttarakhand

Species widely distributed in Sub-Himalayan Region upto 1,000 m.

Occurrence in Forest Types

3C/C2a, and 5B/C1a

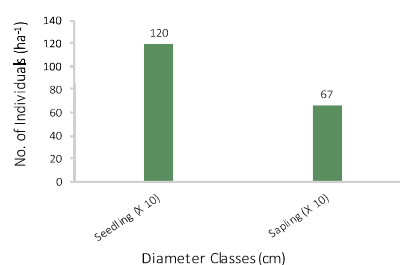
Forest Divisions

Dehra Dun and Lansdowne.

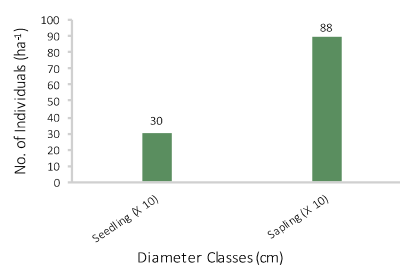
The species exhibited 'good' regeneration in Moist Shivalik Sal Forest and 'fair' regeneration was observed in Dry Shivalik Sal Forest. Seedling densities value observed were $1,200 \text{ ha}^{-1}$ and 300 ha^{-1} in Moist Shivalik Sal Forest and Dry Shivalik Sal Forest respectively. However, high sapling density value 890 ha^{-1} was observed in Dry Shivalik Sal Forest indicate better establishment. This species is economically important, hence, suitable management strategies are required for its conservation.

Regeneration Status and Population Structure

3C/C2a Moist Shivalik Sal Forest



5B/C1a Dry Shivalik Sal Forest



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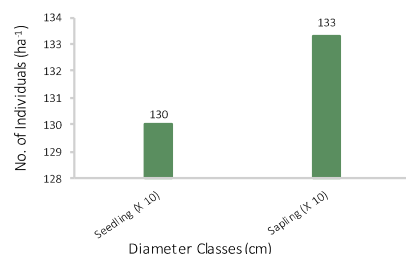
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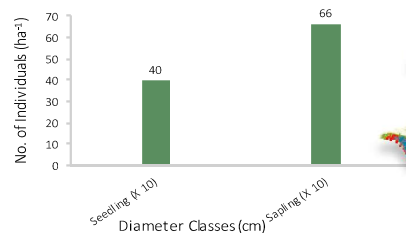


Regeneration Status and Population Structure

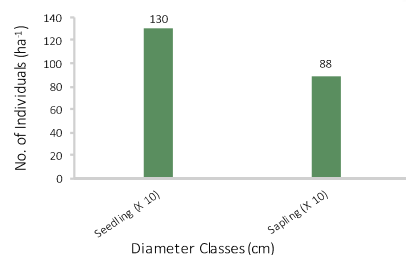
9/C1a Lower or Shiwalik Chir Pine Forest



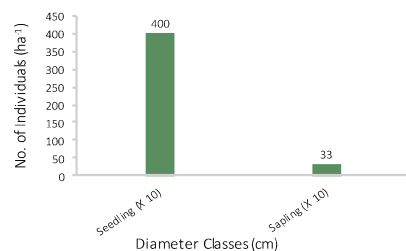
5B/C2 Northern Dry Mixed Deciduous Forest



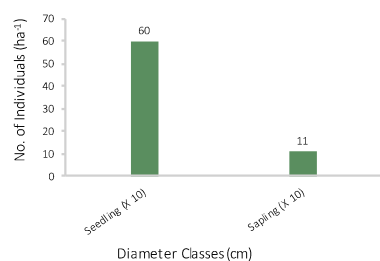
12/C1a Ban Oak Forest



12/C1b Moru Oak Forest

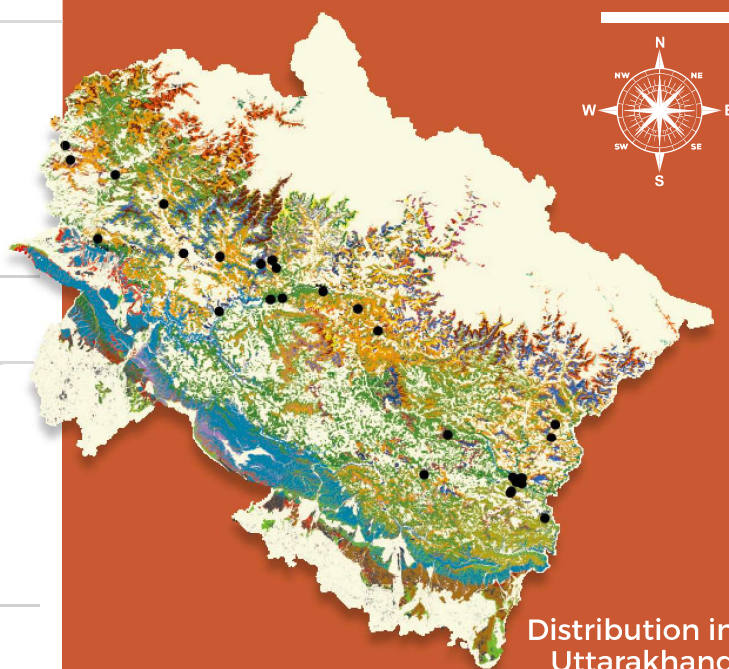


12/C1c Moist Deodar Forest



Rhus parviflora

Roxb.



Distribution in Uttarakhand

Species found up to 600-1,500 m.

Occurrence in Forest Types

3C/C3a, 5B/C2, 5/1S2, 9/C1a, 9/C1b, 12/C1a, 12/C1b, 12/C1c and 12/1S1.

Forest Divisions

Tons, Chakrata, Nainital, Mussoorie, Champawat, Pithoragarh, Uttarkashi, Almora, Narendranagar, Rudrapur, Tehri, Badrinath and Tehri Dam-I.

The species exhibited 'good' regeneration in all assessed forest types except in Northern Dry Mixed Deciduous Forest where 'fair' regeneration was observed. Highest seedling density value recorded was 4,000 ha⁻¹ in Moru Oak Forest and lowest value observed was 200 ha⁻¹ in Northern Dry Mixed Deciduous Forest. However, highest sapling density value 1,300 ha⁻¹ was recorded in Lower or Shiwalik Chir Pine Forest indicates better establishment. Wild gene pool is required to be conserved for future.



Skimmia anquetilia

N.P. Taylor & Airy Shaw



Distribution in Uttarakhand

Species found up to 1,800-3,000 m in shaded localities.

Occurrence in Forest Types

12/C1a, 12/C1b, 12/C1d, 12/C2b, 14/C1a, 14/C1b and 14/1S1.

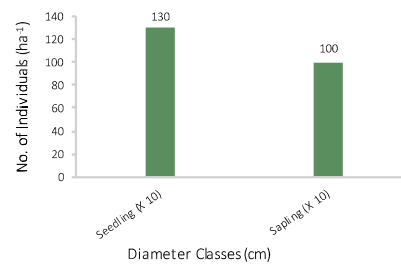
Forest Divisions

Uttarkashi, Rudraprayag and Govind Pashu Vihar.

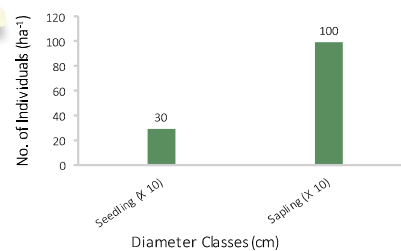
The species depicted 'good' generation in Hippophae/ Myricaria Brakers, 'fair' regeneration in West Himalayan Upper Oak/ Fir Forest and West Himalayan Sub-alpine Birch/ Fir Forest while 'no' regeneration in West Himalayan Sub-alpine Fir Forest. Highest seedling and sapling densities value observed were 1,300 ha⁻¹ and 1,330 ha⁻¹ in Hippophae/ Myricaria Brakers and West Himalayan Sub-alpine Fir Forest, respectively. Wild gene pool of the species should be conserved. Hence, suitable strategies are required for its conservation.

Regeneration Status and Population Structure

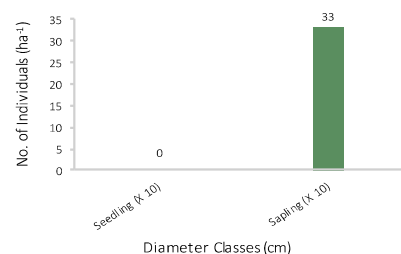
14/1S1 Hippophae/Myricaria Brakers



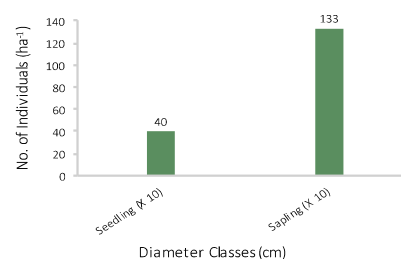
12/C2b West Himalayan Upper Oak/fir Forest



14/C1a West Himalayan Sub-alpine Fir Forest



14/C1b West Himalayan Sub-alpine Birch/Fir Forest



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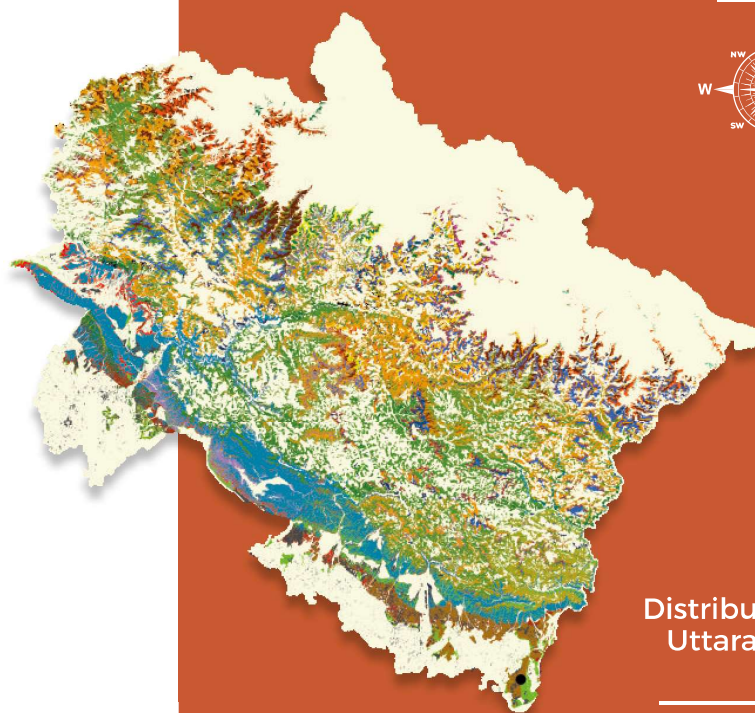
Establishment
of Center of
Excellence on
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Resources
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Uraria picta (jacq.) Desv. ex DC., Prodr.



Distribution in Uttarakhand

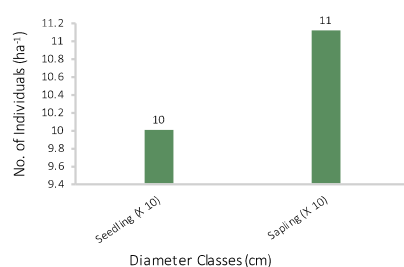
Species found in Terai
areas of Uttarakhand.

Occurrence in Forest Type
3C/C2c.

Forest Divisions
Terai East and Dehra Dun.

Regeneration Status and Population Structure

3C/C2c Moist Terai Sal Forest

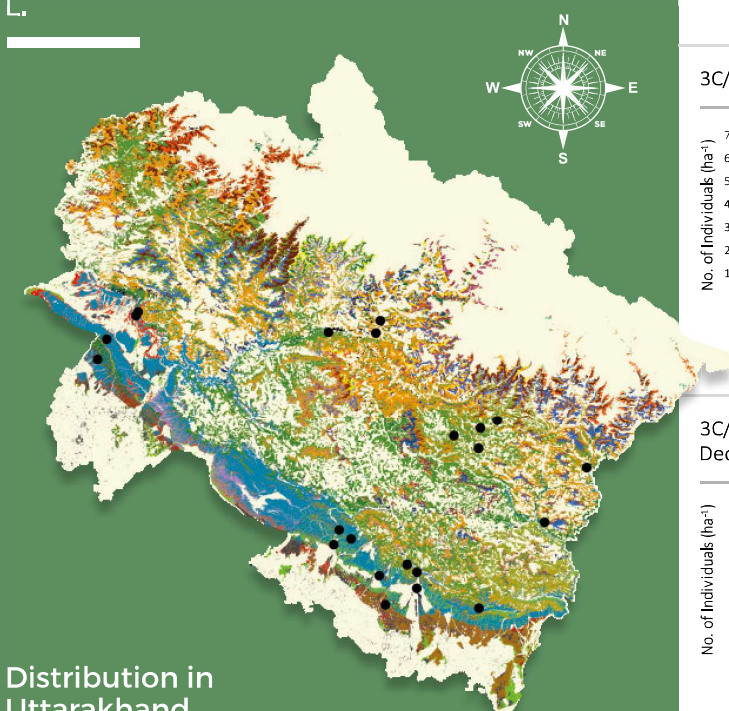


The species exhibited 'fair' regeneration. Seedling and sapling densities value observed were 100 ha⁻¹ and 110 ha⁻¹, respectively. Wild population is low. Hence, suitable strategies are required for its conservation.



Vitex negundo

L.



Distribution in Uttarakhand

Species commonly found up to 1,500m.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C2d, 3C/C3a, 5B/C1a, 5B/C2, 5/1S2, 9/C1b, 9/DS1, and 12/C1a.

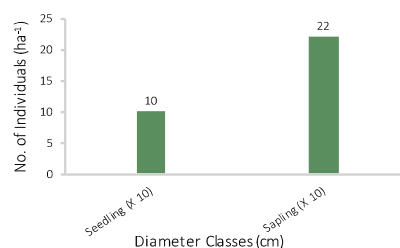
Forest Divisions

Pithoragarh, Haldwani, Ramnagar, Terai Central, Bageshwar, Nainital, Alaknanda Soil Conservation, Tehri Dam-I, Mussoorie, Badrinath, Rudraprayag, Dehra Dun and Haridwar.

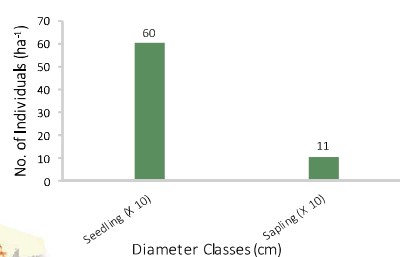
Species depicted 'good' regeneration in Moist Terai Sal Forest, 'fair' regeneration in Khair Sissoo forest, West Gangetic Moist Mixed Deciduous Forest and Northern Dry Mixed Deciduous Forest while 'no' regeneration was observed in Western Light Alluvium Plain Sal. Highest seedling and sapling densities value observed were 1,000 ha^{-1} and 1,440 ha^{-1} in Northern Dry Mixed Deciduous Forest. Wild gene pool of the species should be conserved. Hence, suitable strategies are required for its conservation.

Regeneration Status and Population Structure

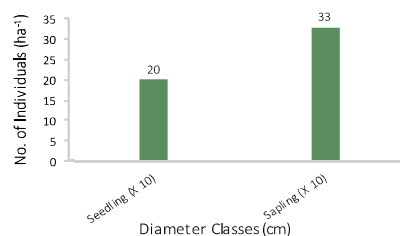
5/1S2 Khair Sissoo Forest



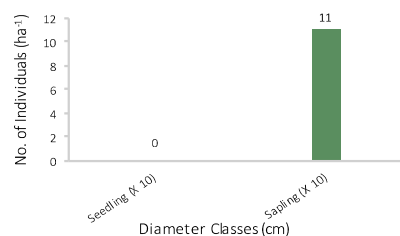
3C/C2c Moist Terai Sal Forest



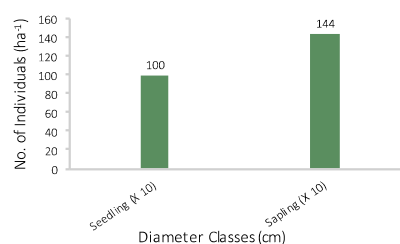
3C/C3a West Gangetic Moist Mixed Deciduous Forest



3C/C2d (I) Western Light Alluvium Plain Sal



5B/C2 Northern Dry Mixed Deciduous Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

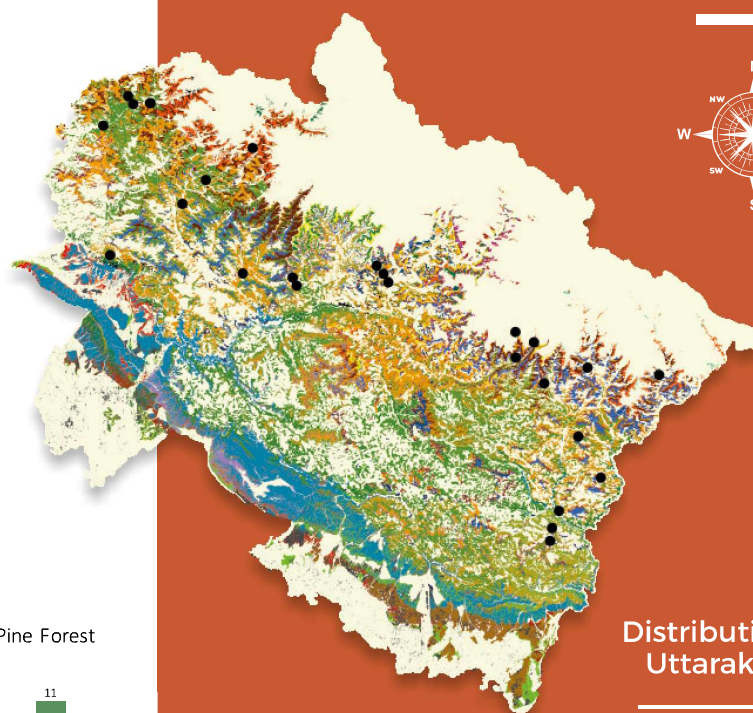
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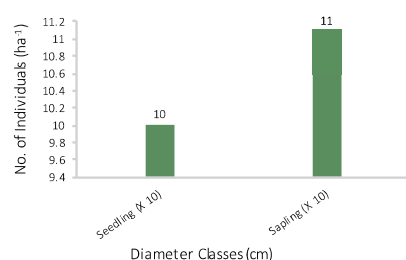
Zanthoxylum armatum

DC.

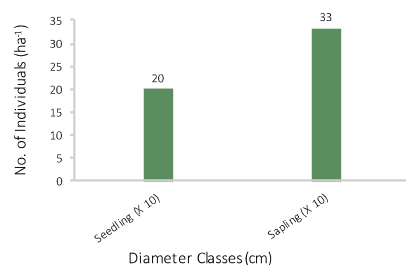


Regeneration Status and Population Structure

9/C1a Lower or Shiwalik Chir Pine Forest



3C/C2a Moist Shiwalik Sal Forest



Distribution in Uttarakhand

Species found
up to 1,800 m.

Occurrence in Forest Types

3C/C2a, 9/C1a, 9/C1b, 9/DS2, 12/C1a,
12/C1b, 12/C2b, and 13/1S1.

Forest Divisions

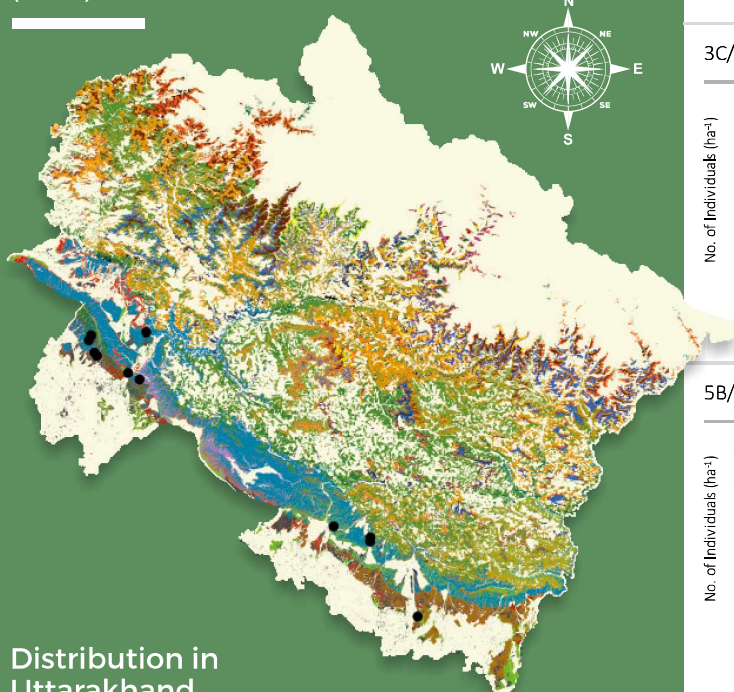
Champawat, Pithoragarh, Uttarkashi,
Bageshwar, Rudraprayag, Tehri Dam-I,
Chakrata and Mussoorie.

The species exhibited 'fair' regeneration in both assessed forest types. Seedling densities value observed were 200 ha⁻¹ and 100 ha⁻¹ in Moist Shiwalik Sal Forest and Lower or Shiwalik Chir Pine Forest respectively. Similar trend was observed in case of sapling. Population of species is low. Hence, suitable management strategies are required for its conservation.



Ziziphus xylopyrus

(Retz.) Willd.



Distribution in Uttarakhand

Species common in the Shivalik and Terai region of Uttarakhand.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C1a, 5B/C2, 5/1S2, 9/DS1, and 12/C1d.

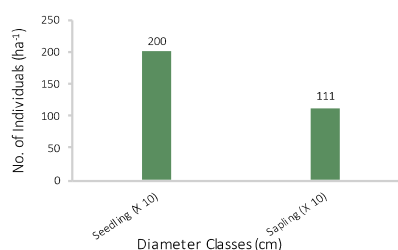
Forest Divisions

Terai East, Ramnagar and Dehra Dun.

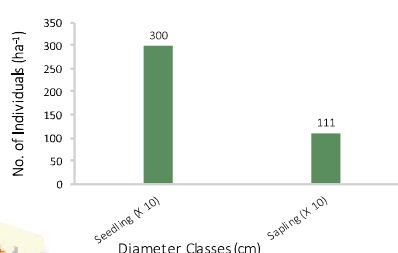
Overall species exhibited 'good' regeneration except in West Gangetic Moist Mixed Deciduous Forest where 'new' regeneration was observed. Highest seedling density value recorded was 3000 ha^{-1} in Moist Shivalik Sal Forest and lowest value 100 ha^{-1} in West Gangetic Moist Mixed Deciduous Forest. Highest sapling density value recorded was 1,110 ha^{-1} in Moist Terai Sal Forest and Moist Shivalik Sal Forest. Wild gene pool should be conserved for future. Hence, suitable strategies are required for its conservation.

Regeneration Status and Population Structure

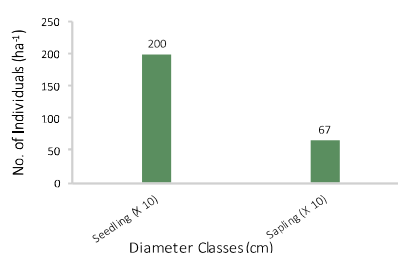
3C/C2c Moist Terai Sal Forest



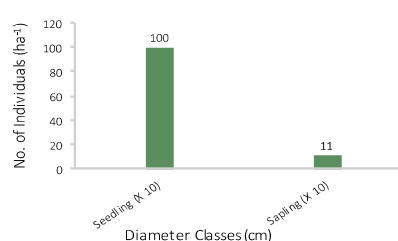
3C/C2a Moist Shivalik Sal Forest



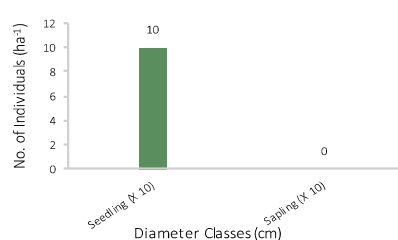
5B/C1a Dry Shivalik Sal Forest



5B/C2 Northern Dry Mixed Deciduous Forest



3C/C3a West Gangetic Moist Mixed Deciduous Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

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Conservation of
Forest Genetic
Resources



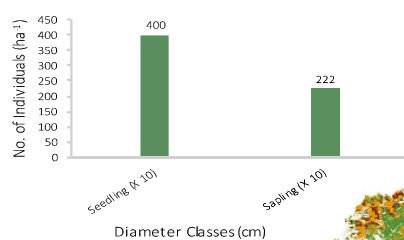
Establishment
of Center of
Excellence on
Forest Genetic
Resources
(CoE-FGR)

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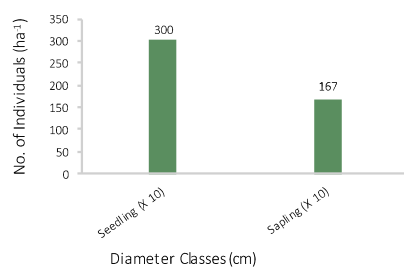
Uttarakhand State

Regeneration Status and Population Structure

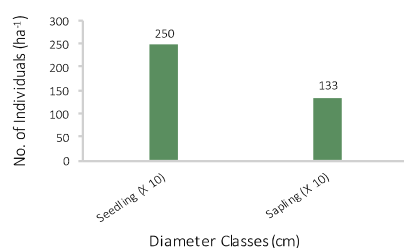
3C/C2a Moist Shiwalik Sal Forest



5B/C1a Dry Shiwalik Sal Forest

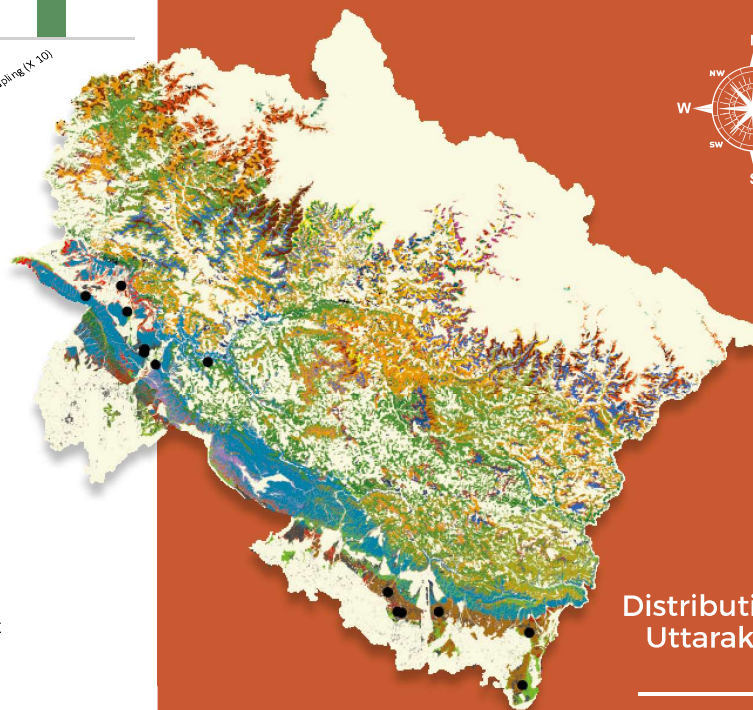


3C/C3a West Gangetic Moist Mixed Deciduous Forest



Calamus tenuis

Roxb.



Distribution in Uttarakhand

Species occurs in Marshy
places in the Shiwalik and
Terai Region.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C1a, 9/C1b, and
12/C1c.

Forest Divisions

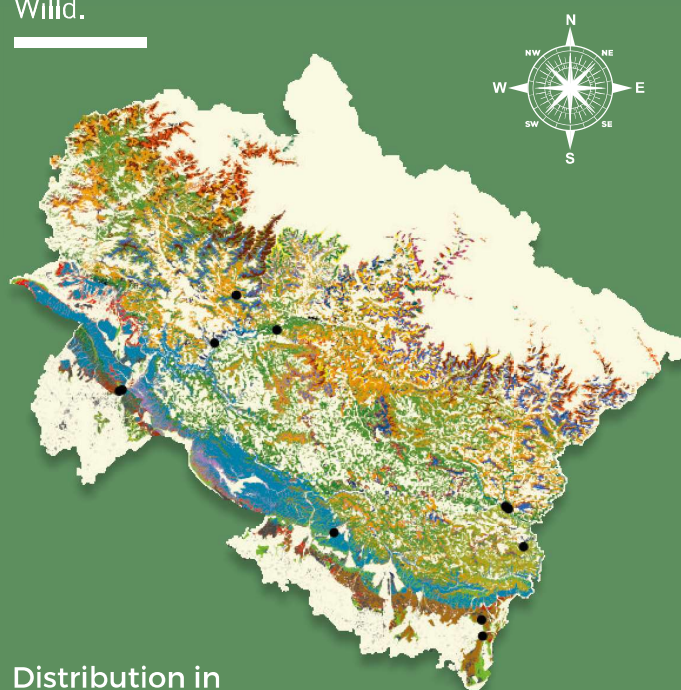
Dehra Dun, Terai Central, East Terai and Mussoorie.

Overall species exhibited 'good' regeneration in its
natural range. Highest seedling and sampling
density values observed were: 4,000 ha⁻¹ and 2,220
ha⁻¹ in Moist Shiwalik Sal Forest. Wild gene pool of
species should be conserved. Hence, suitable
strategies are required of its conservation.



Celastrus paniculatus

Willd.



Distribution in Uttarakhand

Species occurs up to 1,500m.

Occurrence in Forest Types

3C/C2c, 3C/C3a, 5B/C2, 5/1S2, 9/DS1, 12/C1a and 12/C2b.

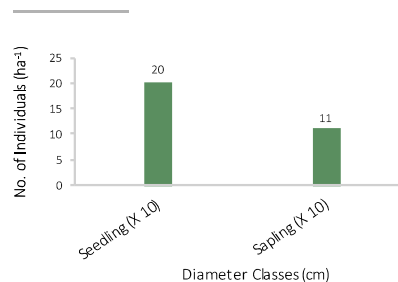
Forest Divisions

Champawat, Ramnagar, East Terai, Narendranagar, Tehri and Rudrapur.

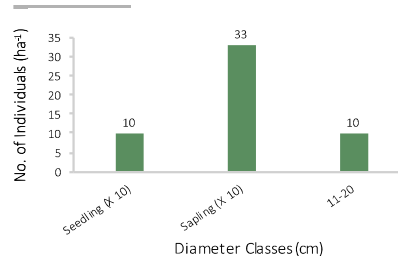
The species depicted 'good' regeneration in WestGangetic Moist Mixed Deciduous Forest and Moist Terai Sal Forest while 'fair' regeneration was observed in Northern Dry Mixed Deciduous Forest and Ban Oak Forest. Highest seedling density value recorded was 600 ha⁻¹ in Moist Terai Sal Forest. Highest sapling density value observed was 330 ha⁻¹ in Northern Dry Mixed Deciduous Forest. Population of species was low in size. Therefore, suitable strategies are required for species conservation.

Regeneration Status and Population Structure

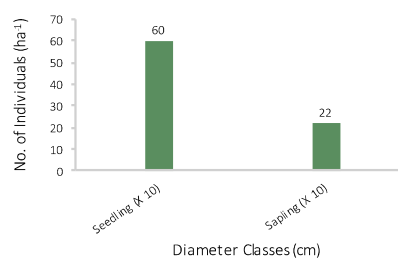
3C/C3a West Gangetic Moist Mixed Deciduous Forest



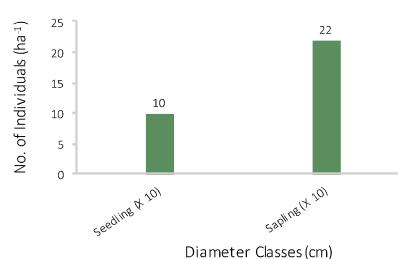
5B/C2 Northern Dry Mixed Deciduous Forest



3C/C2c Moist Terai Sal Forest



12/C1a Ban Oak Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

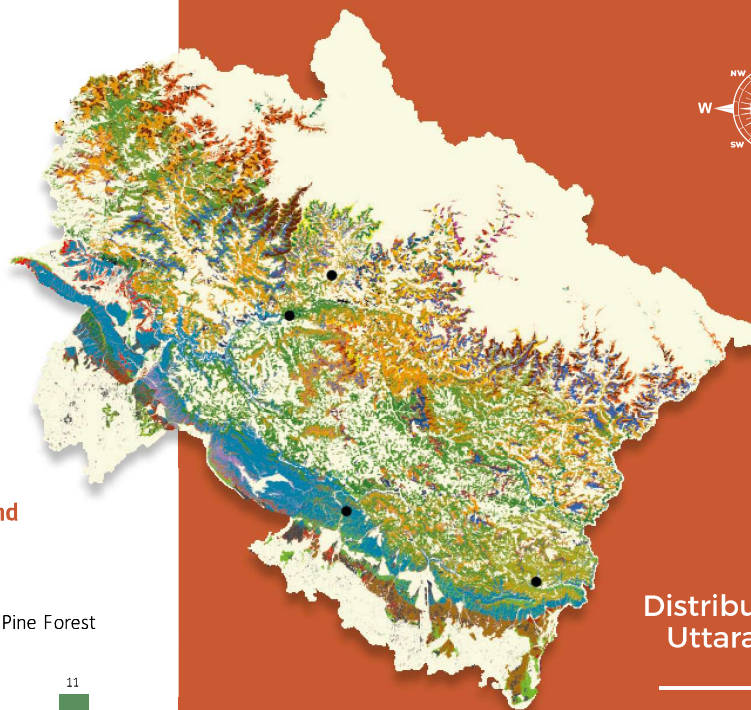
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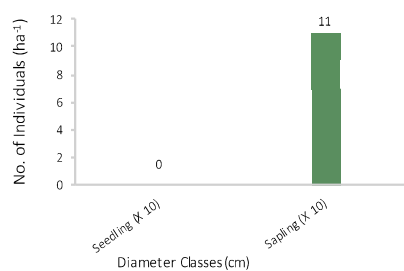
Chonemorpha fragrans

(Moon) Alston

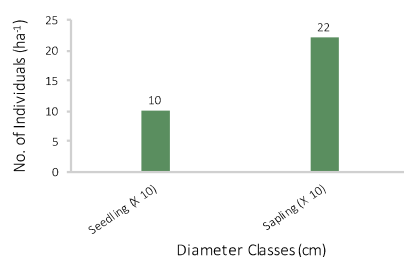


Regeneration Status and Population Structure

9/C1a Lower or Shiwalik Chir Pine Forest



3C/C2a Moist Shiwalik Sal Forest



Distribution in Uttarakhand

Species occurs in
shady ravines up to
1,500m.

Occurrence in Forest Types
3C/C2a and 9/C1a

Forest Divisions
Dehra Dun, Terai Central,
East Terai and Mussoorie.

The species depicted 'fair' regeneration in Moist Shiwalik Sal Forest while 'no' regeneration was observed in Lower or Shiwalik Chir Pine Forest. Population of species was very low in size. Hence, suitable management strategies are required for its conservation.



Clematis gouriana

Roxb. ex Dc.



Distribution in Uttarakhand

Species occurs up to 1,200 m.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 5B/C1a, 5B/C2 and 9/C1a.

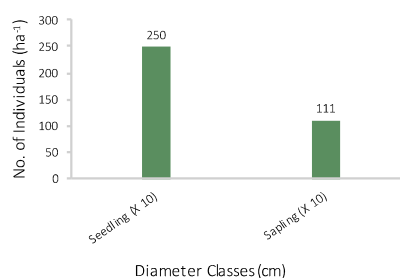
Forest Divisions

Mussoorie and Ramnagar.

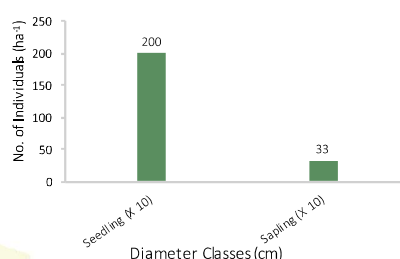
Species depicted overall 'good' regeneration. Highest seedling density value observed was 2,500 ha^{-1} in Moist Shiwalik Sal Forest and the lowest value of 300 ha^{-1} was in Northern Dry Mixed Deciduous Forest. Highest sapling density value of 1,100 ha^{-1} was also recorded in Moist Shiwalik Sal Forest. Wild gene pool of the species needs to be conserved. Hence, suitable management strategies are required.

Regeneration Status and Population Structure

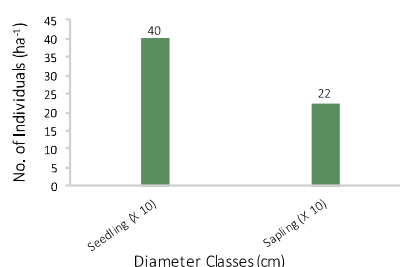
3C/C2a Moist Shiwalik Sal Forest



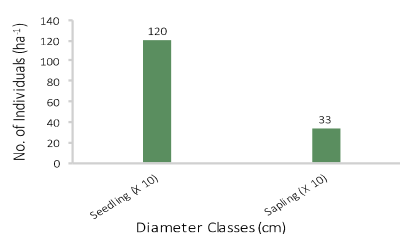
3C/C2c Moist Terai Sal Forest



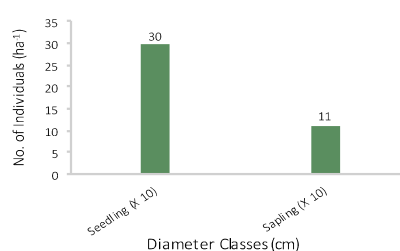
9/C1a Lower or Shiwalik Chir Pine Forest



5B/C1a Dry Shiwalik Sal Forest



5B/C2 Northern Dry Mixed Deciduous Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

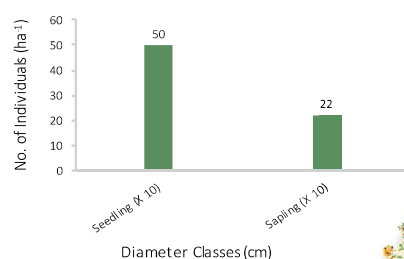
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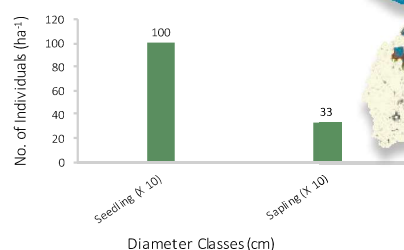


Regeneration Status and Population Structure

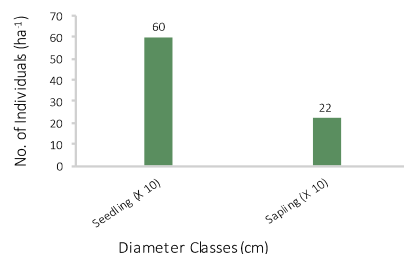
16/E1 Dwarf Juniper Scrub



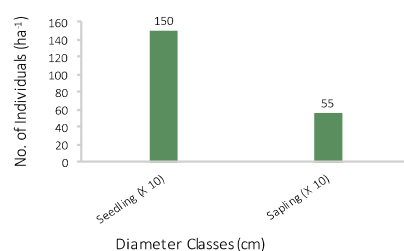
14/C1a West Himalayan Sub-alpine Fir Forest



13/C2b Dry Deodar Forest

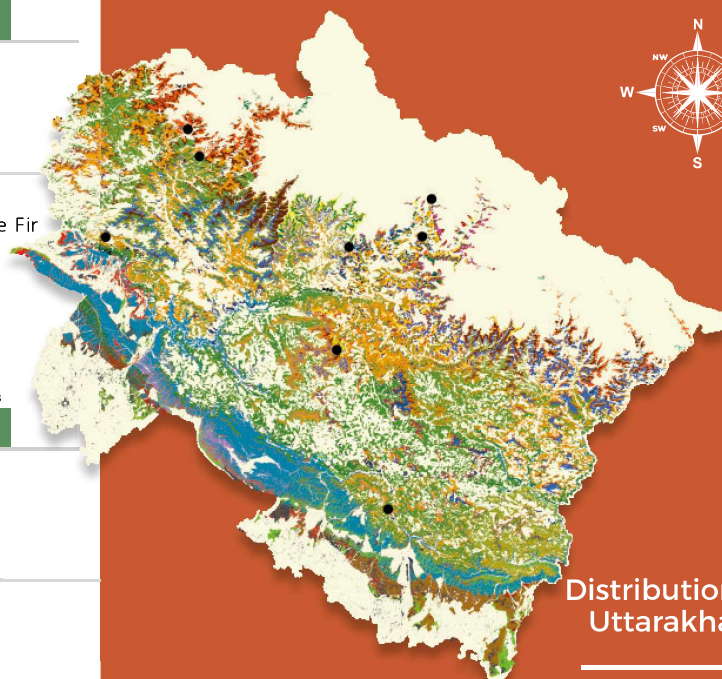


12/C2c Moist Temperate Deciduous Forest



Clematis montana

Buch.-Ham. ex DC.



Distribution in Uttarakhand

Species occurs up
to 1,800 to 2,400 m.

Occurrence in Forest Types

12/C1a, 12/C1/DS2, 12/C2c, 13/C2b, 14/C1a and 16/E1.

Forest Divisions

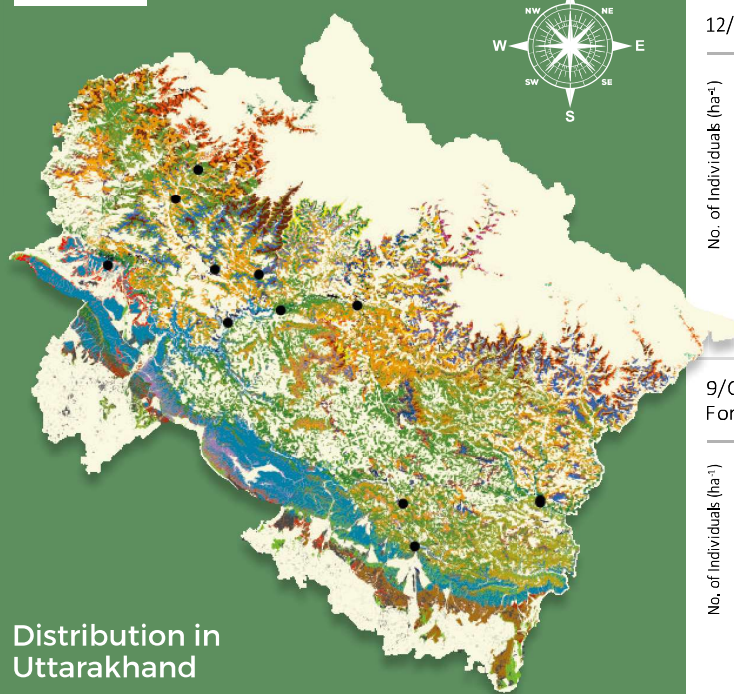
Kedarnath Wildlife Sanctuary, Uttarkashi and Mussoorie.

The species depicted 'good' regeneration in all assessed forest types. Highest seedling density value observed was $1,500 \text{ ha}^{-1}$ in Moist Temperate Deciduous Forest while lowest value of 500 ha^{-1} was in Dwarf Juniper Scrub. Highest sapling density value 550 ha^{-1} was recorded in Moist Temperate Deciduous Forest while the lowest value of 220 ha^{-1} was observed in Dwarf Juniper Scrub and Dry Deodar Forest. Wild gene pool needs to be conserved. Suitable strategies are required for species conservation.



Cryptolepis dubia

(Burm.f.) M.R. Almeida



Distribution in Uttarakhand

Species occurs up to 1,200 m in the hills.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 5B/C2, 9/C1b, 12/C1a, and 16/E1.

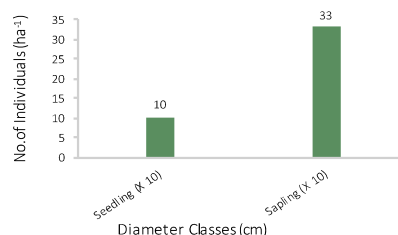
Forest Divisions

Champawat, Pithoragarh, Uttarkashi, Ramnagar, Mussoorie, Chakrata, Narendranagar, Rudrapur, Badrinath, Tehri Dam –I and Nainital.

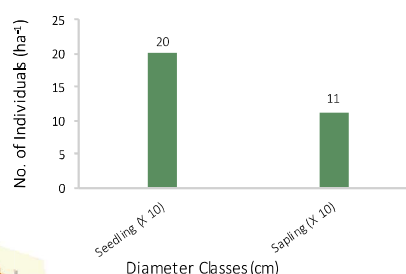
The species exhibited 'good' regeneration in Ban Oak Forest, Upper or Himalayan Chir Pine Forest and Moist Terai Forest while 'fair' regeneration was recorded in Northern Dry Mixed Deciduous Forest and Moist Shiwalik Sal Forest. Highest seedling density value of 400 ha⁻¹ was recorded in Upper or Himalayan Chir Pine Forest and Moist Terai Forest while the lowest value of 100 ha⁻¹ was in Northern Dry Mixed Deciduous Forest and Moist Shiwalik Sal Forest. Wild gene pool is required to be conserved. Suitable management strategies are required for species conservation.

Regeneration Status and Population Structure

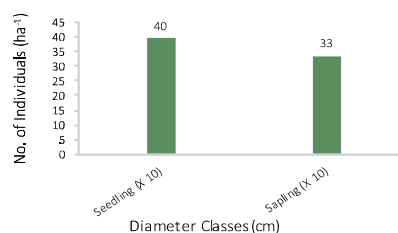
5B/C2 Northern Dry Mixed Deciduous Forest



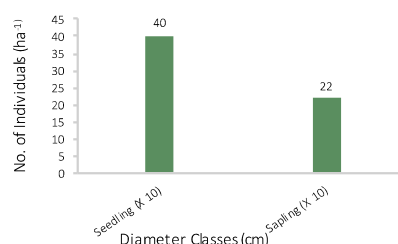
12/C1a Ban Oak Forest



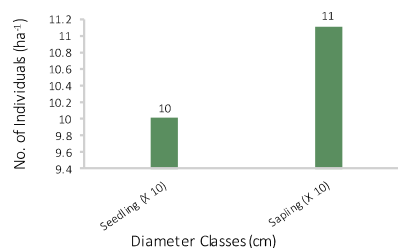
9/C1b Upper or Himalayan Chir Pine Forest



3C/C2c Moist Terai Sal Forest



3C/C2a Moist Shiwalik Sal Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

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Conservation of
Forest Genetic
Resources



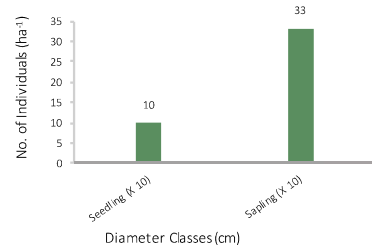
Establishment
of Center of
Excellence on
Forest Genetic
Resources
(CoE-FGR)

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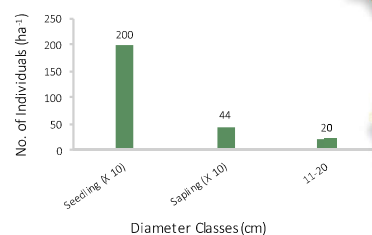
Uttarakhand State

Regeneration Status and Population Structure

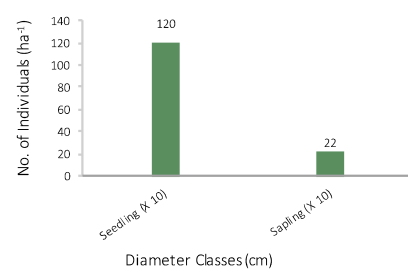
5B/C1a Dry Shiwalik Sal Forest



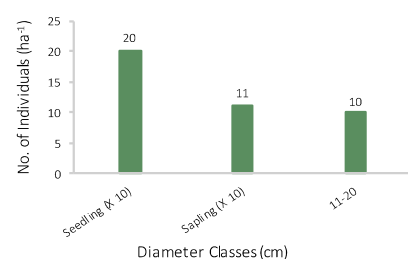
5B/C2 Northern Dry Mixed Deciduous Forest



9/C1a Lower or Shiwalik Chir Pine Forest

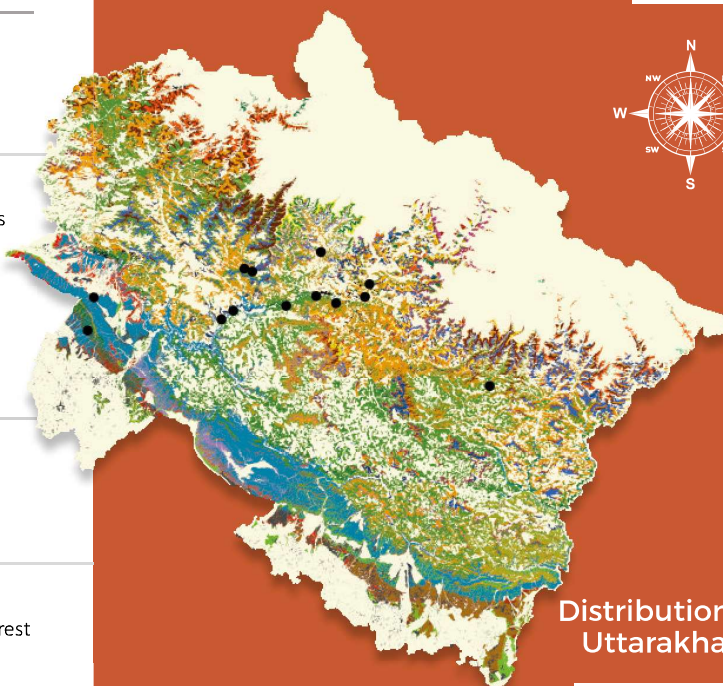


3C/C2a Moist Shiwalik Sal Forest



Hiptage benghalensis

(L.) Kurz



Distribution in
Uttarakhand

Species occurs from
200-1,900 m

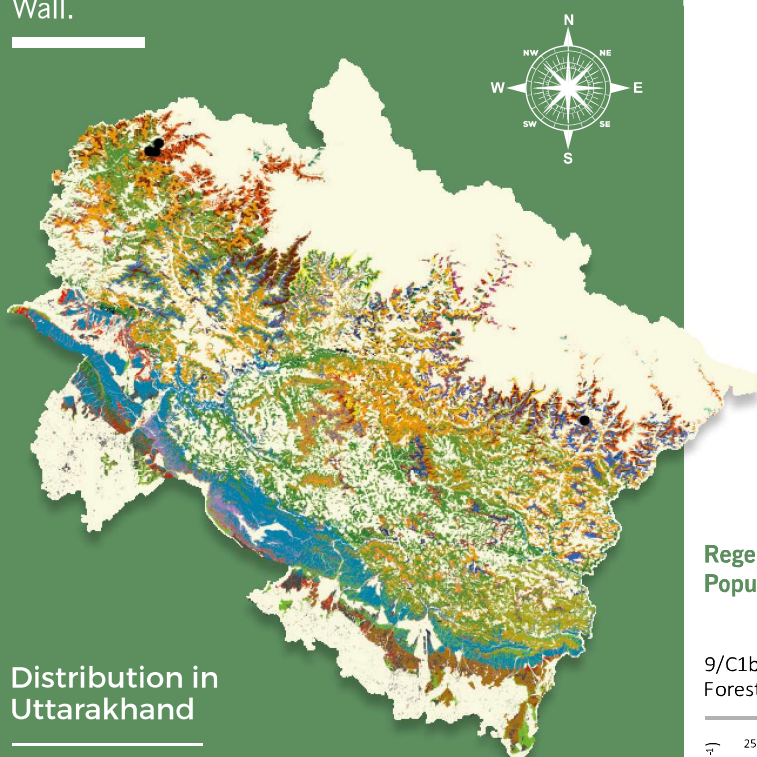
Occurrence in Forest Types
3C/C2a, 5B/C1a, 5B/C2, and 9/C1a.

Forest Divisions
Narendranagar, Rudraprayag, Alaknanda Soil
Conservation, Badrinath, Bageshwar and Tehri Dam -I.



Holboellia latifolia

Wall.



Distribution in Uttarakhand

Species occurs up to 1,600 m in shaded ravines.

Occurrence in Forest Types

9/C1b, 9/DS1 and 12/C1a.

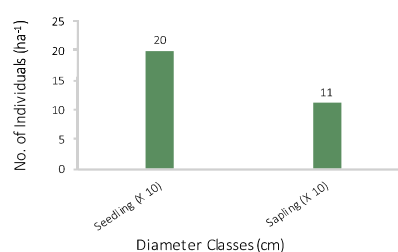
Forest Divisions

Pithoragarh and Govind Pashu Vihar.

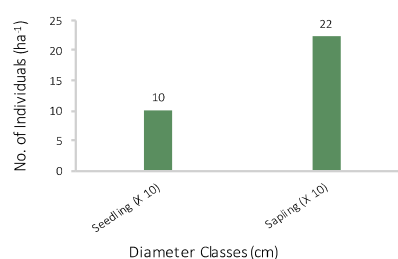
The species exhibited 'good' regeneration in Upper or Himalayan Chir Pine Forest and 'fair' regeneration was observed in Himalayan Sub-tropical Scrub. Seedling density values observed were: 200 ha^{-1} and 100 ha^{-1} in Upper or Himalayan Chir Pine Forest and Himalayan Sub-tropical Scrub. However, high sapling density value of 220 ha^{-1} was observed in Himalayan Sub-tropical Scrub indicating adequate establishment of seedlings to saplings. Population of species was very low in size. Suitable management strategies are proposed for species conservation.

Regeneration Status and Population Structure

9/C1b Upper or Himalayan Chir Pine Forest



9/DS1 Himalayan Sub-tropical Scrub



Conservation of Forest Genetic Resources



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Resources



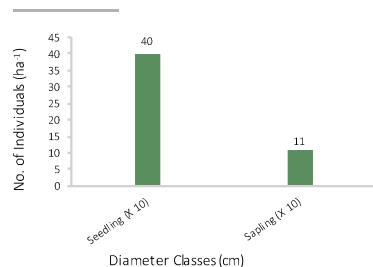
Establishment
of Center of
Excellence on
Forest Genetic
Resources
(CoE-FGR)

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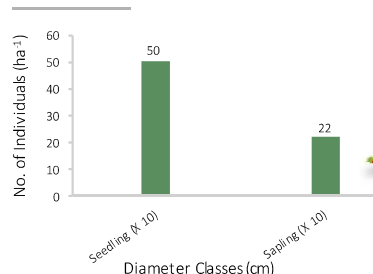
Uttarakhand State

Regeneration Status and Population Structure

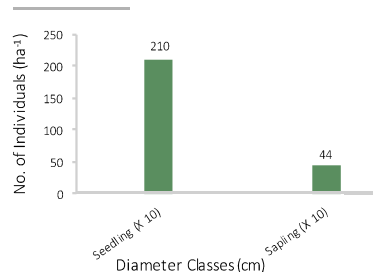
12/C1a Ban Oak Forest



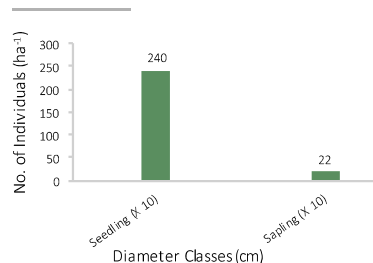
5B/C1a Dry Shiwalik Sal Forest



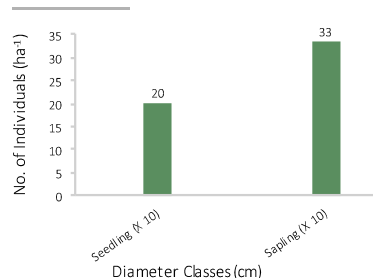
3C/C2c Moist Terai Sal Forest



3C/C3a West Gangetic Moist Mixed Deciduous Forest

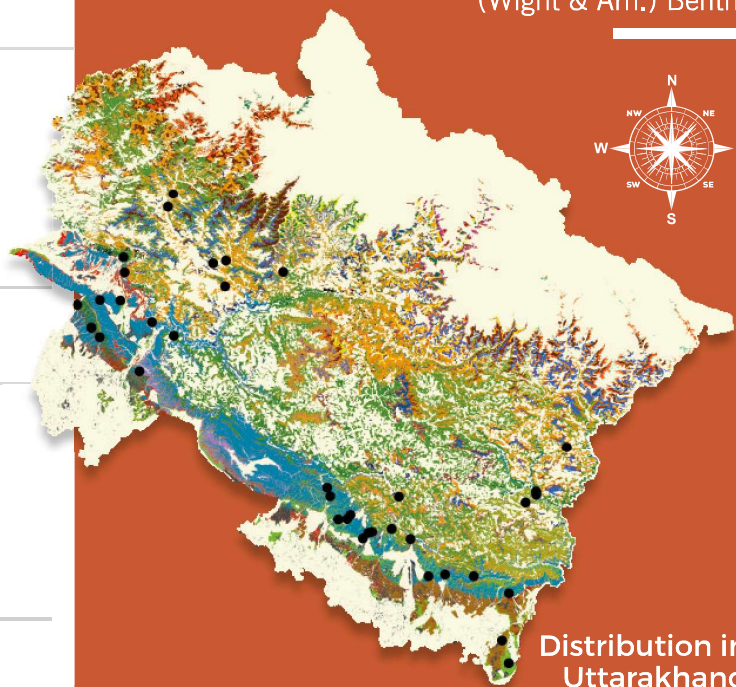


9/C1a Lower or Shiwalik Chir Pine Forest



Phanera vahlii

(Wight & Arn.) Benth.



Distribution in
Uttarakhand

Species occurs in drier part of
Uttarakhand up to 2,000 m.

Occurrence in Forest Types

3C/C2a, 3C/C3a, 5B/C1a, 5B/C2, 9/C1a, 9/C1b, and 12/C1a.

Forest Divisions

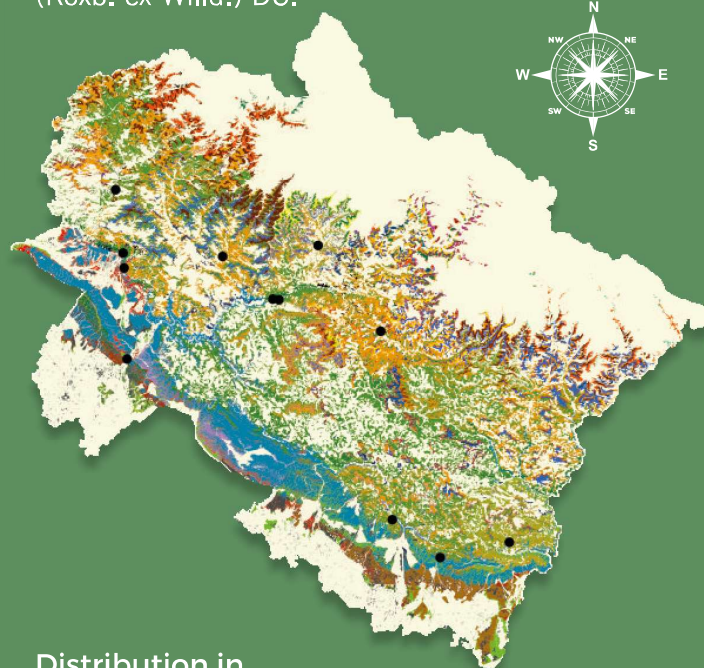
Ramnagar, Champawat, Narendranagar, Alaknanda Soil
Conservation, Rudraprayag, Tehri Dam-I, Tehri, and Mussoorie.

Overall species depicted 'good' regeneration except in Lower or Shiwalik Chir Pine Forest where 'fair' regeneration was observed. Highest seedling density value observed was 2,400 ha⁻¹ in West Gangetic Moist Mixed Deciduous Forest and lowest of 200 ha⁻¹ in Lower or Shiwalik Chir Pine Forest. However, highest sapling density value of 440 ha⁻¹ was observed in Moist Terai Sal Forest. This species is economically important and is being exploited for its leaves, therefore, suitable strategies are required for its conservation.



Pueraria tuberosa

(Roxb. ex Willd.) DC.



Distribution in Uttarakhand

Species occurs up to 1,800 m.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 5B/C1a, 5/1S2, 9/C1a, 9/C1b, and 12/C1a.

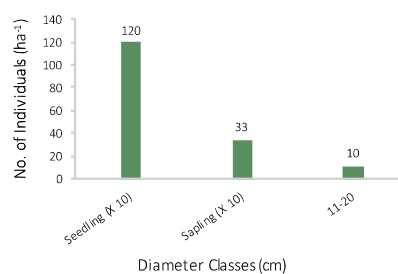
Forest Divisions

Dehra Dun, Nainital, Mussoorie, Rudrapur, Tehri, Tons, Champawat and Badrinath.

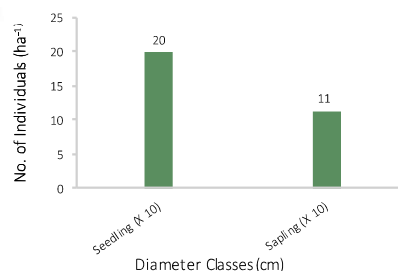
Species depicted overall 'good' regeneration. Highest seedling density value observed was 1,200 ha^{-1} in Dry Shiwalik Sal Forest and Moist Terai Sal Forest. Highest sapling density value of 330 ha^{-1} was recorded in Dry Shiwalik Sal Forest. Adult tree density value recorded was 10 ha^{-1} in Dry Shiwalik Sal Forest and Moist Terai Sal Forest. This species is economically important and is being exploited for its roots. Therefore, suitable strategies are required for species conservation.

Regeneration Status and Population Structure

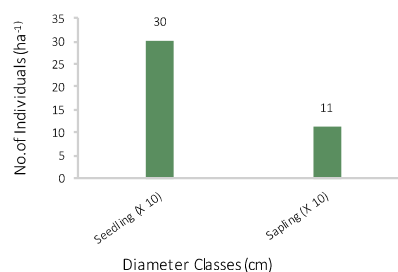
5B/C1a Dry Shiwalik Sal Forest



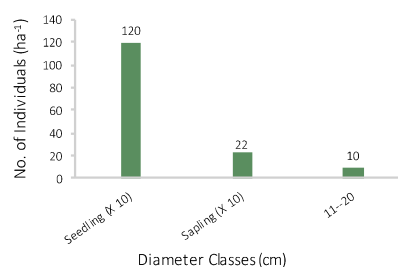
12/C1a Ban Oak Forest



9/C1a Lower or Shiwalik Chir Pine Forest



3C/C2c Moist Terai Sal Forest



Conservation of Forest Genetic Resources



National Program for Conservation and Development of Forest Genetic Resources

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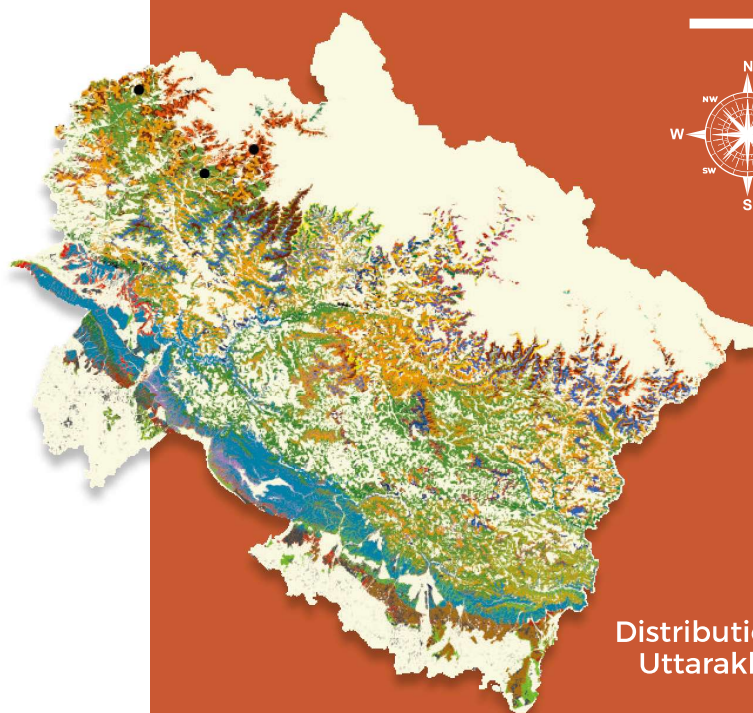
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Uttarakhand State



Smilax ovalifolia

Roxb.

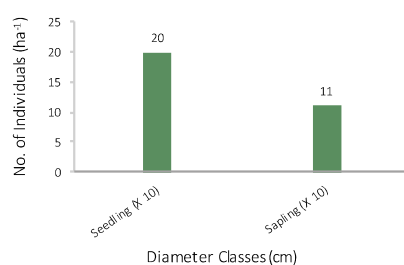


Distribution in
Uttarakhand

Species occurs in dry places.

Regeneration Status and Population Structure

12/C1a Ban Oak Forest



Occurrence in Forest Type
12/C1a

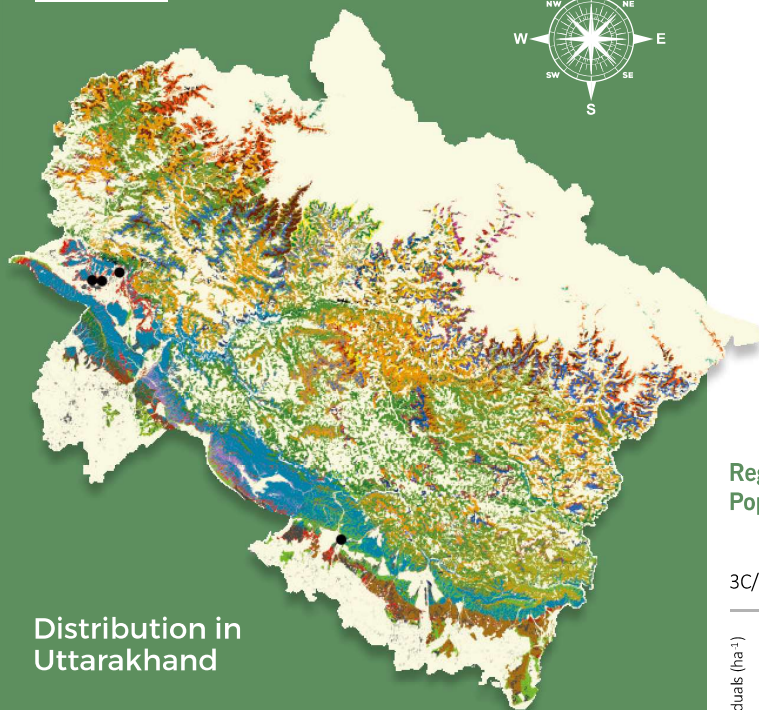
Forest Divisions
Dehra Dun, Uttarkashi and Upper Yamuna.

The species exhibited 'good' regeneration. Seedling and sapling density values observed were: 200 ha^{-1} and 110 ha^{-1} , respectively. Wild population was very low in size. Hence, suitable strategies are required for species conservation.



Spatholobus parviflorus

(Roxb. ex DC.) Kuntze



Distribution in Uttarakhand

Species occurs from 200-2,000 m

Occurrence in Forest Types

3C/C2a and 5B/C1a.

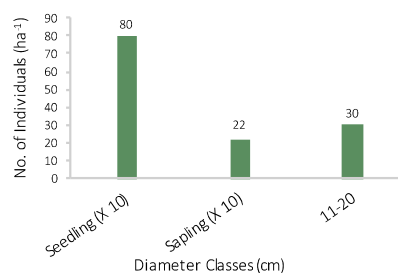
Forest Divisions

Dehra Dun and Mussoorie.

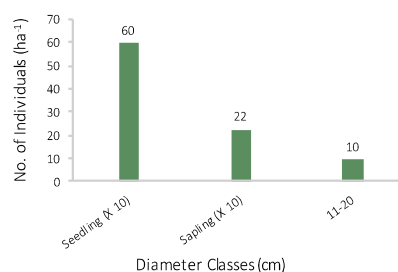
The species exhibited 'good' regeneration in both assessed forest types. Seedling density values recorded were: 800 ha^{-1} and 600 ha^{-1} in Moist Shivalik Sal Forest and Dry Shivalik Sal Forest, respectively. Sapling density value of 220 ha^{-1} was recorded in both forest types. Wild gene pool of the species needs to conserve for tapping its potential in future.

Regeneration Status and Population Structure

3C/C2a Moist Shivalik Sal Forest



5B/C1a Dry Shivalik Sal Forest



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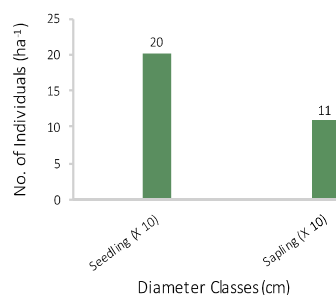
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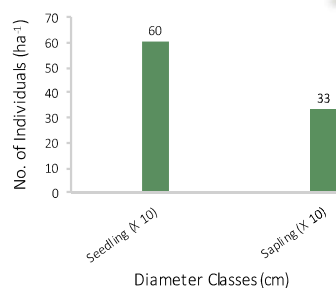


Regeneration Status and Population Structure

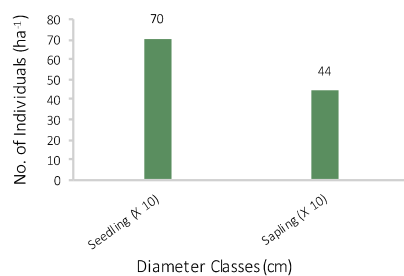
5B/C1a Dry Shiwalik Sal Forest



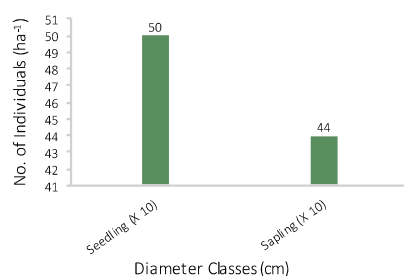
3C/C2c Moist Terai Sal Forest



5B/C2 Northern Dry Mixed Deciduous Forest

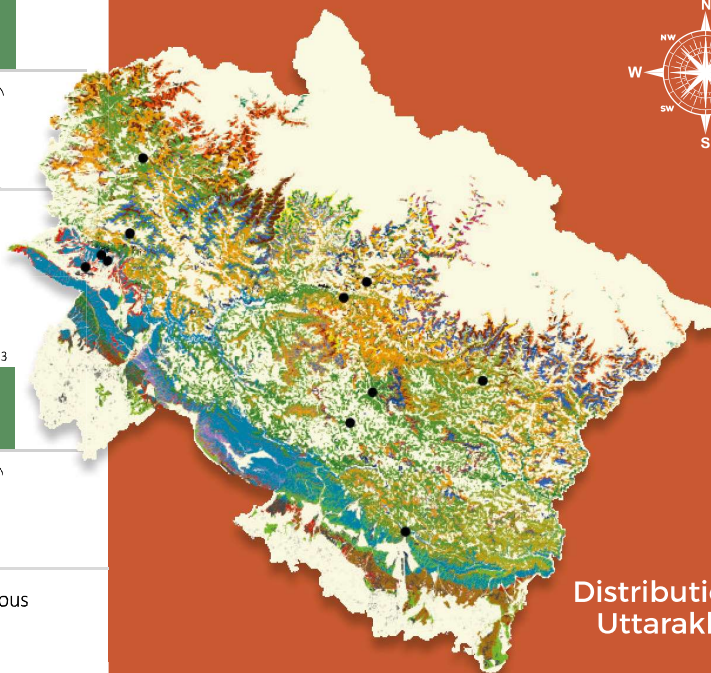


3C/C3a West Gangetic Moist Mixed Deciduous Forest



Stephania glabra

(Roxb.) Miers



Distribution in Uttarakhand

Species occurs up to 1,800 m.

Occurrence in Forest Types

3C/C2a, 3C/C2c, 3C/C3a, 5B/C1a, 5B/C2 and 13/C2b.

Forest Division

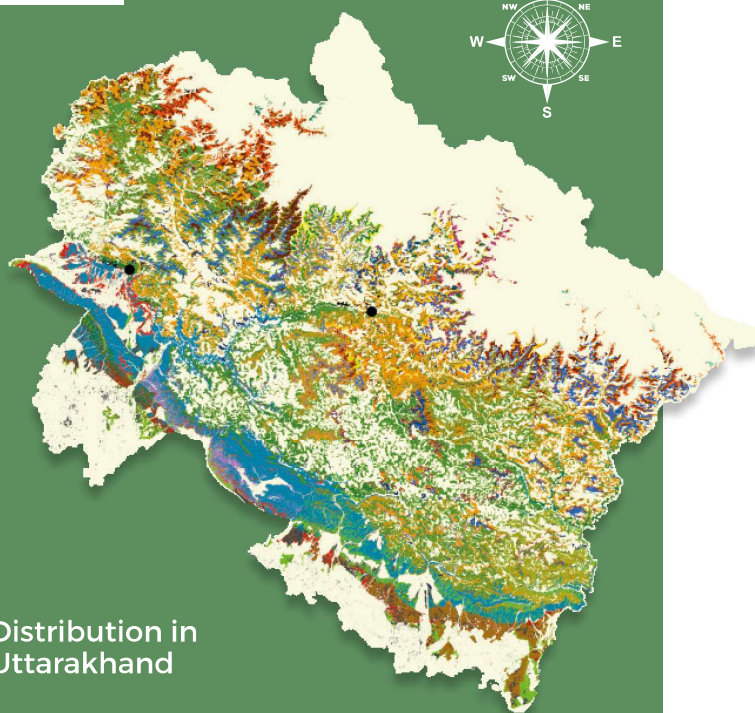
Dehra Dun

Species depicted overall 'good' regeneration. Highest seedling density value observed was 700 ha^{-1} in Northern Dry Mixed Deciduous Forest while the lowest value of 200 ha^{-1} was recorded in Dry Shiwalik Sal Forest. Highest sapling density value of 440 ha^{-1} was recorded in Northern Dry Mixed Deciduous Forest and West Gangetic Moist Mixed Deciduous Forest. The lowest value of sapling density recorded was 110 ha^{-1} in Dry Shiwalik Sal Forest. Wild gene pool needs to conserve. Suitable strategies are proposed for species conservation.



Tinospora sinensis

(Lour.) Merr.



Distribution in Uttarakhand

Species occurs in shady places.

Occurrence in Forest Types

5B/C2 and 9/C1b.

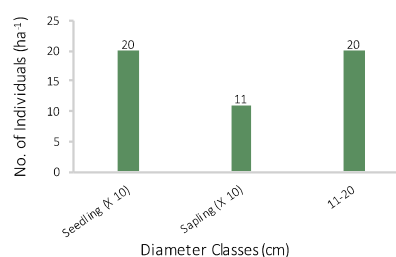
Forest Divisions

Badrinath and Mussoorie.

The species showed 'good' regeneration. Seedling and sapling density values observed were: 200 ha⁻¹ and 110 ha⁻¹, respectively. Adult tree density value recorded was 20 ha⁻¹ in the diameter class of 11 cm -20 cm. Wild population was very low in size. Hence, suitable strategies are proposed for species conservation.

Regeneration Status and Population Structure

5B/C2 Northern Dry Mixed Deciduous Forest



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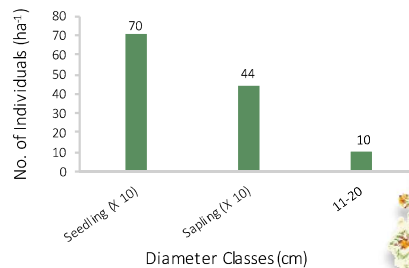
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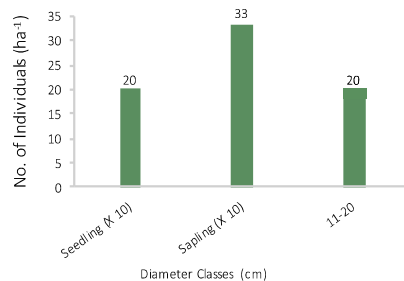


Regeneration Status and Population Structure

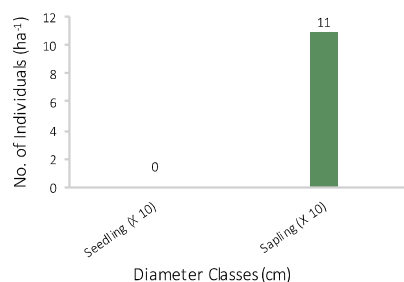
3C/C3a West Gangetic Moist Mixed Deciduous Forest



3C/C2a Moist Shiwalik Sal Forest

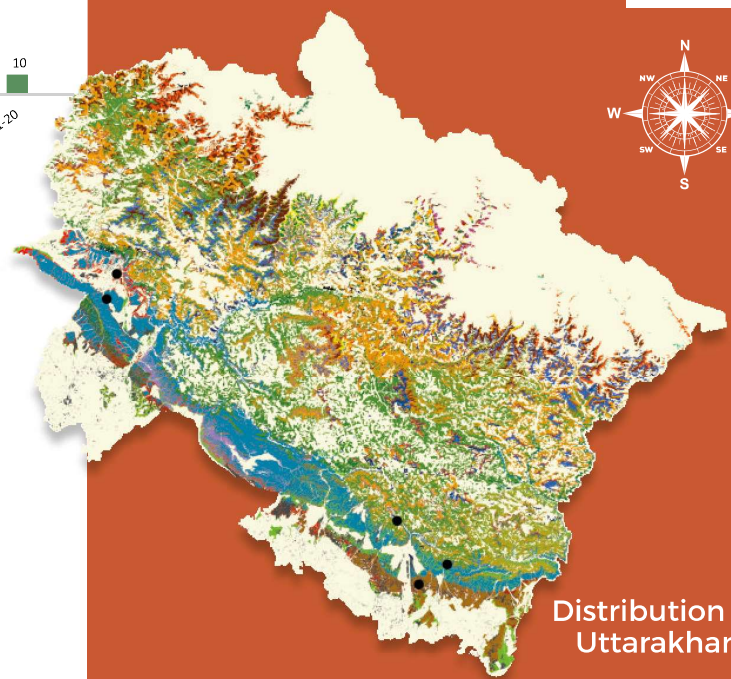


12/C1c Moist Deodar Forest



Ventilago denticulata

Willd.



Distribution in
Uttarakhand

Species occurs in shady mixed forest and
near ravines in Shiwalik and Terai Region.

Occurrence in Forest Types
3C/C2a, 3C/C3a and 12/C1c.

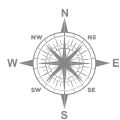
Forest Divisions
Champawat, Terai East and Mussoorie.

The species showed 'good' regeneration in WestGangetic Moist Mixed Deciduous Forest and 'fair' regeneration in Moist Shiwalik Sal Forest. Regeneration of species was conspicuously absent in Moist Deodar Forest. Highest seedling and sapling density values recorded were: 700 ha^{-1} and 440 ha^{-1} respectively in West Gangetic Moist Mixed Deciduous Forest. Adult tree density value recorded were: 20 ha^{-1} and 10 ha^{-1} in Moist Shiwalik Sal Forest and West Gangetic Moist Mixed Deciduous Forest. Population was low in size. Therefore, suitable strategies are proposed for species conservation.



Acacia pseudo-eburnea

Dunn



Distribution in Uttarakhand

Species occurs up to 1,200 m in the Sub-Himalayan tract and Outer Shiwalik Hill Range.

Occurrence in Forest Type

5B/C2

Forest Divisions

Lansdowne, Kalagarh Tiger Reserve and Rajaji Tiger Reserve

Locations

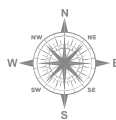
Mayapuri Haridwar Range, Rajaji Tiger Reserve; Opposite Sidhibali, Lansdowne and Kalagarh, Corbett Tiger Reserve

Very few individuals reported from the area. The populations inside the PAs are well protected but those outside PAs and on road sides are vulnerable to destruction by road widening.



Actinidia callosa

Lindl.



Distribution in Uttarakhand

Species occurs between 600 and 1,800 m in the hills.

Occurrence in Forest Types

12/C1c and 14/C1a

Forest Divisions

Mussoorie and Pithoragarh

Locations

Near Company Garden, Mussoorie FD; Near Forest Rest House, Munsiyari, Pithoragarh FD.

The population size of species is critically low. Only 3 individuals were observed in Chakrata FD. Habitat destruction is main cause of threat.

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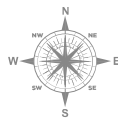
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Aristolochia punjabensis

Lace.



Distribution in Uttarakhand

Species occurs between 1,900 and 2,200 m in the Kumaon region.

Occurrence in Forest Type
12/C1a

Forest Divisions
Pithoragarh and Bageshwar

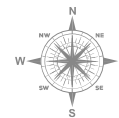
Locations
Didihat-Adichaura, Didihat Range, and Birthi Fall, Munsiyari Range, Pithoragarh FD; Namik Reserve Forest, Glacier Range, Bageshwar FD

Very few individual were recorded in the above mentioned localities. Species is under threat due to lopping of branches for lichen collection. The species is the host plant of Golden birdwing butterfly.



Berberis rawatii

U.L. Tiwari and B.S. Adhikari.



Distribution in Uttarakhand

Species occurs at 2,800-3,200 m.

Occurrence in Forest Type
12/C1d

Forest Divisions
Chamoli and Pithoragarh

Locations
Muniyalikhet, Pindar Valley, Chamoli Shaheed Trilok Singh Pangtey Government Intermediate College, Munsiyari, Pithoragarh FD, Chamoli; on the way to Samkot.

Restricted in very limited area of Chamoli and Pithoragarh FD. The main threat is the over exploitation of species for its roots.

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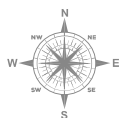
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Uttarakhand State



Berberis kumaonensis

C.K. Schneid



Distribution in Uttarakhand

Species occurs on the slopes of the Greater Himalayan Range from 2,700 to 3,600 m.

Occurrence in Forest Types

15/E1 and 16/C1

Forest Divisions

Pithoragarh and Bageshwar

Locations

Lodhura Bugyal and Glacier Range, Dangu Bugyal, Bageshwar FD and Garbyang Village, Kali Valley, Pithoragarh.

The populations inside the PAs are well protected but those outside PAs and on road sides are vulnerable to destruction by road widening. Species is also exploited for its roots.



Berberis lambertii

Parker



Distribution in Uttarakhand

Species occurs from 2,500 and 2,800 m.

Occurrence in Forest Type

15/E1

Forest Division

Pithoragarh

Locations

In between Ratapani and Humidhura, Pithoragarh FD; Betuli Dhar, Pithoragarh FD; Kalamuni, Pithoragarh FD.

The species is restricted to Pithoragarh FD. The main cause of threat is habitat destruction due to development activities and over exploitation of its roots.

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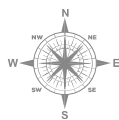
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Berberis osmastonii

Dunn



Distribution in Uttarakhand

Species occur from
2,200 and 2,700 m.

Occurrence in Forest Types

12/C1d, and 12/C1e

Forest Divisions

Chamoli and Pithoragarh

Locations

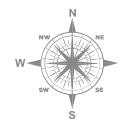
Muniyalikhet, Pindar Valley, Chamoli; Harkot, Munsiyari Range, Pithoragarh FD; Samkot, Pithoragarh FD; Kalamuni, Pithoragarh FD; Betulidhar, Pithoragarh FD; Betulidhar and Pithoragarh FD

The species has localized distribution in Chamoli and Pithoragarh FDs. The main cause of threat is habitat destruction due to developmental activities and over exploitation of its roots.



Berberis pseudumbellata

R. Parker



Distribution in Uttarakhand

Species occurs around
3,000 m on the dry interior
ranges of Garhwal.

Occurrence in Forest Types

12/C1d and 13/C2b

Forest Divisions

Chamoli, Uttarkashi and Gangotri National Park.

Locations

Sattal, Taknor Range, Uttarkashi FD, Nelang, Gangotri National Park

The species is restricted to some subalpine regions. The main cause of threat is habitat destruction due to developmental activities and over exploitation of its roots.



Berchemia floribunda

Wall.



Distribution in Uttarakhand

Species occurs from
600 and 1,800 m

Occurrence in Forest Type
9/C1b

Forest Divisions
Tons and Chakrata.

Locations
Near Jarmola, On way to Mori, Sandra Range,
Tons FD; On way to Deovan, Chakrata FD.

Very few individuals were observed from the
above mentioned areas. The main cause of threat
is forest fire and species is also vulnerable to
destruction by road widening.



Berchemia lineata

DC.



Distribution in Uttarakhand

Species occurs from 2,100
and 2,700 m.

Occurrence in Forest Type
9/C1b

Forest Division
Chakrata

Locations
On way to Deovan, Chakrata FD; On way to
Mundali, Chakrata FD.

Very few individuals were reported from the
above stated locations. The main cause of threat
is forest fire and species also vulnerable to
destruction by road widening.

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Boehmeria penduliflora

Wedd. ex D.G. Long.



Distribution in Uttarakhand

Species occurs on
slopes of Outer
Himalayas.

Occurrence in Forest Type
5B/C2

Forest Divisions
Pithoragarh and Corbett Tiger Reserve

Locations
Alaee Balmi, On way to Narayan Ashram,
Dharchula Range, Pithoragarh FD; Dhikala, Corbett
Tiger Reserve and Nandhaur Wildlife Sanctuary.

The species was sparsely distributed. Habitat
distribution is the main cause of threat by
development activities.



Brassaiopsis aculeata

(Buch.-Ham. ex D. Don) Seem.



Distribution in Uttarakhand

Species occurs from 600
and 1,800 m in shady and
moist ravines.

Occurrence in Forest Type
12/C1a

Forest Divisions
Mussoorie, Bageshwar and Corbett Tiger Reserve.

Locations
Sattal, Taknor Range, Uttarkashi FD, Nelang,
Gangotri National Park

Species is found near water bodies. Only few
individuals were observed. Main cause of threat is
habitat destruction especially landslides.



Caragana sukiensis

C.K. Schneid.



Distribution in Uttarakhand

Species occurs around
altitude of 3,000 m.

Occurrence in Forest Type

12/C2c

Forest Division

Uttarkashi

Locations

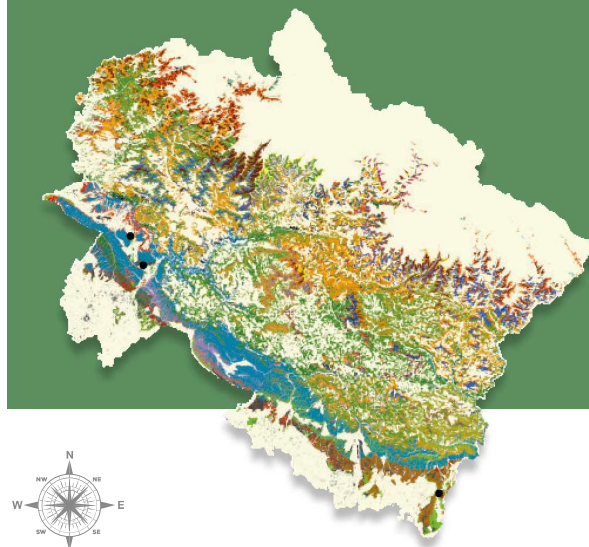
Near Jarmola, On way to Mori, Sandra Range,
Tons FD; On way to Deovan, Chakrata FD.

The species was restricted in its
distribution. The main cause of threat is
developmental activities by road
widening.



Carallia brachiata

(Lour.) Merr.



Distribution in Uttarakhand

Species occurs up to
500 m in swamp.

Occurrence in Forest Type

4C/FS2

Forest Divisions

East Terai, Dehradun and Haldwani

Locations

On way to Deovan, Chakrata FD; On way to
Mundali, Chakrata FD.

The species was restricted to swampy areas.
Few individuals were observed. The major
cause of threat is the habitat fragmentation
due to developmental activities resulting in
shrinkage of water level of swamp.

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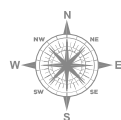
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Catamixis baccharoides

Thomson



Distribution in Uttarakhand

Occurs up to 700 m in
the Shiwalik tract.

Occurrence in Forest Type
5B/C2

Forest Divisions

Narendranagar, Kalsi Soil Conservation FD and
Rajaji Tiger Reserve.

Locations

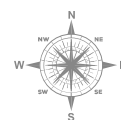
Alaee Balmi, On way to Narayan Ashram,
Dharchula Range, Pithoragarh FD; Dhikala, Corbett
Tiger Reserve and Nandhaur Wildlife Sanctuary.

The species is a monotypic genera. A very small
population was found in the above mentioned
areas. The populations inside the PAs are well
protected but those outside PAs and on road sides
were vulnerable to destruction by developmental
activities i.e., road widening.



Ceriscoides turgida

(Roxb.) Tirveng.



Distribution in Uttarakhand

Species found up to
600 m in Shiwalik and
Terai region.

Occurrence in Forest Types
3C/C2a and 3C/C2c

Forest Divisions

Ramnagar, Terai East, Haridwar, Lansdowne,
Nandhaur Wildlife Sanctuary, and Rajaji Tiger
Reserve.

Locations

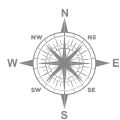
Bhalon, com. 5, Kakrad Nala, Kota Range, Ramnagar
FD; Surai Range, Terai East FD; Near Kansrao Range
Rest House, Rajaji Tiger Reserve.

Very few individuals were observed in the above
mentioned areas.



Cinnamomum glanduliferum

(Wall.) Meisn.



Distribution in Uttarakhand

Species occurs at around 1,500 m in the Champawat.

Occurrence in Forest Type
12/C1a

Forest Division
Champawat FD

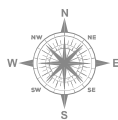
Locations
Cherapani Beat, Champawat FD.

The species was restricted to Cherapani, Champawat.



Cleyera japonica

Thunb.



Distribution in Uttarakhand

Species occurs from 2000 to 2500 m.

Occurrence in Forest Type
12/C1a

Forest Division
Pithoragarh

Locations
Udyari Bend, Berinag Range, Pithoragarh FD.

The species was restricted to Udyari Bend near Berinag Range, Pithoragarh.

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Cochlospermum religiosum

(L.) Alston, Handb.



Distribution in Uttarakhand

Species occurs up to 500 m on drier slopes of the Outer Shiwaliks Range.

Occurrence in Forest Type
5B/C2

Forest Divisions
Haridwar and Rajaji Tiger Reserve.

Locations
Chandi Devi -Shyampur Range and Mayapuri-Haridwar Range, Rajaji Tiger Reserve.

The species was sparsely distributed in above mentioned area. Only few individuals were observed.



Cotoneaster frigidus

Wall.



Distribution in Uttarakhand

Species occurs from 2,500 to 3,000 m.

Occurrence in Forest Type
12/C1d

Forest Division
Pithoragarh

Locations
Nangling, Darma Valley, Dharchula Range, Pithoragarh FD

The species was restricted to Pithoragarh Division. Only few individual were observed.



Cyathea spinulosa

Wall. ex Hook.



Distribution in Uttarakhand

Species occurs up to 1,500 m.

Occurrence in Forest Types

9/C1b and 12/C1a

Forest Divisions

Badrinath, Pithoragarh and Kedarnath Wildlife Forest Division.

Locations

Pithoragarh FD (Near Pamtodi Didihat Range)
Chamoli and Joshimath, Badrinath FD; Near Birahi Ganga catchment and Nagnath Pokhari along Gopeshwar-Tangsa road, Kedarnath Wildlife Division.

The species was restricted to above mentioned areas. Few individuals were observed.



Datisca cannabina

L.



Distribution in Uttarakhand

Species occurs from 900 to 1,500 m.

Occurrence in Forest Type

9/C1b

Forest Divisions

Pithoragarh and Nandprayag.

Locations

Dharchula Range (Near Tawagha) and
Chatuwa peepal, Near Karanprayag,
Alaknanda Soil Conservation FD

The species was restricted to Udyari Bend
neOnly few individuals were observed from
above mentioned localities.ar Berinag Range,
Pithoragarh.

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Dodecadenia grandiflora

Nees.



Distribution in Uttarakhand

Species occurs from
2,100 and 2,600 m.

Occurrence in Forest Types

12/C1b, 12/C1c and 12/C1d

Forest Divisions

Rudraprayag, Pithoragarh, Bageshwar, Mussoorie
and Kedarnath.

Locations

Near Trigugi Naryan, Rudraprayag FD, Near Ogala,
Didihat Range, Pithoragarh FD, Near Ecopark,
Dhanaulti, Mussoorie FD and Kedarnath FD (Near
Kanchula Mandal).

The species was sparsely distributed in above
locations. Only few individuals were observed.



Drypetes assamica

(Hook. f.) Pax & K.Hoffm.



Distribution in Uttarakhand

Species occurs up to 600
m near swampy places in
the Dehra Dun.

Occurrence in Forest Type

4C/FS2

Forest Division

Dehra Dun

Locations

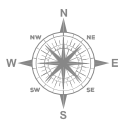
Nakraunda Swamp and Golatappar
Swamp, Dehra Dun FD.

The species was scantily distributed in the
swamps of Dehra Dun. The main cause of threat
is the fragmentation due to developmental
activities near swamps resulting decrease of
water level.



Dysoxylum gotadhora

(Buch.- Ham.) Mabb.



Distribution in Uttarakhand

Species occurs up to
250 m in moist areas.

Occurrence in Forest Type

3C/C2c

Forest Division

Haldwani

Locations

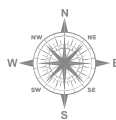
5 km from Jwalasal towards Tanakpur, South Jwalasal Range, Haldwani FD.

The species was restricted to above mentioned area. Only one individual was observed.



Ficus glaberrima

Blume.



Distribution in Uttarakhand

Species occurs from 300 and
750 m near swampy
localities and shady ravines.

Occurrence in Forest Types

3C/C2a and 4C/FS2.

Forest Divisions

Dehra Dun, Nandhaur Wildlife Sanctuary and
Kalgarh, Corbett Tiger Reserve.

Locations

Near Nakraunda Swamp, Dehra Dun FD; Corbett
Tiger Reserve; Nandhaur Wildlife Sanctuary.

Species was restricted near to water bodies.
Only few individuals were observed.

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Ficus pomifera

Wall. ex King.



Distribution in Uttarakhand

Species occurs up to 800 m
along the steam banks.

Occurrence in Forest Type

4C/FS2

Forest Division

Dehra Dun FD.

Locations

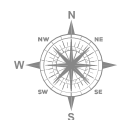
Near Trigugi Naryan, Rudraprayag FD, Near Ogala,
Didihat Range, Pithoragarh FD, Near Ecopark,
Dhanaulti, Mussoorie FD and Kedarnath FD (Near
Kanchula Mandal).

The species was restricted near to swampy areas of
Dehra Dun FD. Only few individuals were observed.



Fraxinus xanthoxyloides

(Wall. ex G. Don) A. DC



Distribution in Uttarakhand

Species occurs from
2,500 and 3,400 along
the Dhauli valley.

Occurrence in Forest Type

12/C2c

Forest Division

Nanda Devi National Park

Locations

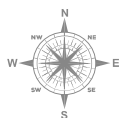
4 km after Malari, towards Niti Valley,
Dhauliganga and Nanda Devi National Park.

Only few individuals were observed from
above mentioned areas.



Glochidion ellipticum

Wight.



Distribution in Uttarakhand

Species occurs up to 600 m in moist localities.

Occurrence in Forest Type

3C/C3a

Forest Division

Rajaji Tiger Reserve

Locations

Comp. -9 (Near Motichur River), Motichur West Beat, Motichur Range, Rajaji Tiger Reserve.

Only few individuals were recorded from above mentioned area.



Heteropanax fragrans

(Roxb. ex DC.) Seem.



Distribution in Uttarakhand

Species occurs up to 1,200 m in the Sub-Himalayan tract and Shiwalik and Terai.

Occurrence in Forest Types

3C/C2a and 3C/C2c.

Forest Divisions

Ram Nagar and Dehra Dun.

Locations

Compartment -1, Bhandarpani Beat, Kota Range, Ramnagar FD; Watershed Management Directorate Uttarakhand, Indira Nagar, Forest Colony; Tea Garden, Vasant Vihar, Dehra Dun FD.

Only few individuals were observed from above mentioned locations.

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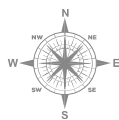
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Ilex fragilis

J.D. Hooker



Distribution in Uttarakhand

Species occurs from 2,200
and 2,500 m.

Occurrence in Forest Type
9/C1b

Forest Divisions
Nainital and Pithoragarh

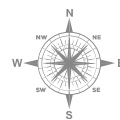
Locations
Patwadangar, Manora Range, Nainital FD

Very rare, few individuals were found in
Patwadangar, Nainital. The cause of threat
is forest fire.



Ilex pseudo-odorata

Loes.



Distribution in Uttarakhand

Species occurs from
1,200 and 1,700 m.

Occurrence in Forest Types
12/C1a, 12/C1c and 12/C1e.

Forest Divisions
Mussoorie, Nainital, Almora and
Pithoragarh

Locations
Near Bhatta Falls, Mussoorie FD; Ogla-
Kanalicheena, Didihat Range,
Pithoragarh FD; Benog Wildlife
Sanctuary, Patwadangar, Manora Range,
Nainital FD; Enraoli to Mori, Sankri
Range, Bank of Tons, Tons FD and Near
Ukhalyu Forest Rest House, Almora FD

A few individuals were observed in above
mentioned locations.



Indopiptadenia oudhensis

(Brandis) Brenan.



Distribution in Uttarakhand

Species occurs between 400 and 650 m.

Occurrence in Forest Type

5B/C2

Forest Division

Champawat

Locations

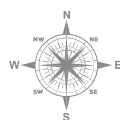
5 km before Shukhi Dang from Tanakpur, Champawat FD.

The species is a monotypic genus confined to Champawat FD.



Macaranga indica

Wight.



Distribution in Uttarakhand

Species occurs from 900 to 1,200 m in the Kumaun.

Occurrence in Forest Type

12/C1a

Forest Division

Pithoragarh FD.

Locations

Near Ogla, Didihat Range, Pithoragarh FD.

The species is restricted to Pithoragarh FD. A few individuals were observed from the above locations.

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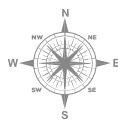
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Macropanax dispermus

(Blume) Kuntze



Distribution in Uttarakhand

Species occurs up
to 1,800 m

Occurrence in Forest Type
12/C1a

Forest Division
Pithoragarh

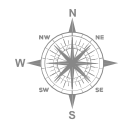
Locations
Comp. 5, Sandev, Didihat Range,
Pithoragarh FD

The species is restricted to Pithoragarh FD.
Only two individuals were observed in
Sandev forest, Didihat Range, Pithoragarh
FD.



Magnolia kisopa

(Buch.-Ham. ex DC.) Figlar



Distribution in Uttarakhand

Species occurs from
1,500 and 2,100 m in
dense shady ravines.

Occurrence in Forest Type
9/C1b

Forest Division
Badrinath

Locations
Pandukeshwar, Near Temple, Pandukeshwar
Van Panchayat, Badrinath FD

Species is very restricted in its
distribution. A few individuals were
observed.



Mahonia jaunsarensis

Ahrendt



Distribution in Uttarakhand

Species occurs up
to 2,000 m

Occurrence in Forest Type
9/C1b

Forest Division
Chakrata

Locations
Chunakhala, near Deovan Kanasar diversion,
Chakrata FD

Species is restricted to Jaunsar region of
Dehra Dun.



Malus baccata

(L.) Borkh.



Distribution in Uttarakhand

Species occurs
around at 3,000 m.

Occurrence in Forest Type
13/C2b

Forest Division
Pithoragarh FD.

Locations
Near Ogla, Didihat Range, Pithoragarh FD.

The species is restricted to Pithoragarh FD.
A few individuals were observed from the
above locations.

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Marsdenia griffithii

Hook. f.



Distribution in Uttarakhand

Species occurs up to
1,600 and 2,600 m.

Occurrence in Forest Types
9/C1b, 12/C1a and 12/C1d.

Forest Division
Gangotri National Park

Locations
Mesar Kund, Munsiyari Range, Pithoragarh
FD, Lands End forest, Nainital FD; Liti,
Glacier Range, Bageshwar FD; Ukimath
Range, Kedarnath Wildlife Division; Binsar
Wildlife Sanctuary; Almora, Baccham,
Glacier Range, Bageshwar FD.

A few individuals were observed from
above locations.



Maytenus rufa

(Wall.) Cufod.



Distribution in Uttarakhand

Species occurs up
to 1,800 m

Occurrence in Forest Type
12/C1a

Forest Divisions
Pithoragarh, Bageshwar and Ramnagar.

Locations
Pamtodi, Didihat Range, Pithoragarh FD;
Liti, Bageshwar FD; Ramnager FD and Anar
Village, Near Brham. Gori Valley, Askot
Range, Pithoragarh FD.

The species was observed in isolated patch
with few individuals.



Meizotropis pellita

(Hook. f. ex Prain) Sanjappa



Distribution in Uttarakhand

Species occurs up
to 1,500 m.

Occurrence in Forest Type
9/C1b.

Forest Divisions
Nainital and Pithoragarh.

Locations
Patwadangar, Manora Range, Nainital FD; Near
Banoliya Forest Rest House, Barain Range,
Nainital FD and Marhmanley, Pithoragarh
Range, Pithoragarh FD

The species is restricted to above
mentioned forest Divisions. A few
individuals were observed.



Neolitsea pallens

(D. Don) Momiy. & H. Hara



Distribution in Uttarakhand

Species occurs from
1,400 and 2,400 m in
open moist areas.

Occurrence in Forest Types
9/C1b and 12/C1a

Forest Divisions
Champawat and Almora

Locations
Chaturboard, East Krantashwar,
Champawat FD; Near Ramgarh, Almora FD

Only one small population was observed
in Champawat Forest Division.

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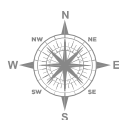
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Olax nana

Wall



Distribution in Uttarakhand

Species occurs up to 500 m
on the crests of Shiwaliks.

Occurrence in Forest Type
5B/C2

Forest Division
Rajaji Tiger Reserve

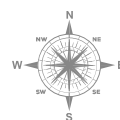
Locations
Mayapuri, Haridwar Range, Rajaji Tiger
Reserve

The species is preferred by wildlife for its
fruit. The species was observed only in
crests of Rajaji Tiger Reserve.



Osmanthus fragrans

Loureir



Distribution in Uttarakhand

Species occurs from 1,100
and 2,000 m in shady
moist ravines.

Occurrence in Forest Types
9/C1b, 12/C1a and 12/C1c

Forest Divisions
Pithoragarh and Rudraprayag

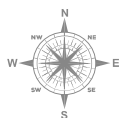
Locations
Sandev Forest, Didihat Range, Pithoragarh
FD; Mostamanu Temple, Satsiling,
Pithoragarh Range, Pithoragarh; Ransi Village
Madmaheshwar, Ukhimath Range,
Rudraprayag FD.

A few individuals were observed from above
mentioned locations.



Phoenix acaulis

Buch



Distribution in Uttarakhand

Species occurs up to 500 m in open grassy areas.

Occurrence in Forest Type

5B/C2

Forest Division

Rajaji Tiger Reserve

Locations

Dhaulkhanda, Rajaji Tiger Reserve

A few individuals were observed from above mentioned location.



Pittosporum eriocarpum

Royle



Distribution in Uttarakhand

Species occurs from 900 to 2000 mt. throughout the hills.

Occurrence in Forest Types

9/C1b and 12/C1a

Forest Divisions

Mussoorie, Tehri Dam-I Forest Division.

Locations

Near Shikhar falls, Near Bhatta Fall, Mussoorie road near diversion of Jharapani, Mussoorie FD; Tehri Dam –I FD: Bhilangana Range (Near Moolgarh), Tehri FD: Saklana range.

Species is very rare in its distribution with very small size population. Only few individuals were recorded from above mentioned locations.

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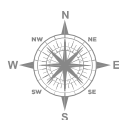
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Prunus undulata

Buch.-Ham. ex D. Don



Distribution in Uttarakhand

Species occurs in the lesser and outer Himalayan Ranges.

Occurrence in Forest Type
12/C1a

Forest Divisions
Rudraprayag and Pithoragarh

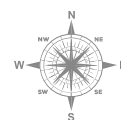
Locations
Rudraprayag FD: South Jakholi Range,
Budana II Beat (Launga, comp. 14),
Rudraprayag FD.

Species is very rare in its distribution with very small population. A few individuals were recorded from above mentioned locations.



Pterocarpus marsupium

Roxb.



Distribution in Uttarakhand

Species occurs up to 600 m in the Terai region.

Occurrence in Forest Type
3C/C2c.

Forest Division
Haldwani Forest Division

Locations
Near Jwalasal Forest Rest House, South Jwalasal
Range, Haldwani FD.

Species is economically very important, with sparse distribution. A few individuals were observed.



Rivea ornata

(Roxb.) Choisy



Distribution in Uttarakhand

Species occurs up to
1,100 m in dry places.

Occurrence in Forest Type
5B/C2

Forest Division
Champawat Forest Division

Locations
Near Amodi (on way to Tankapur), Champawat Range,
Champawat FD.

Species is restricted to Champawat
Forest Division.



Saurauia napaulensis

DC.



Distribution in Uttarakhand

Species occurs
up to 1,800 m.

Occurrence in Forest Types
3C/C3a, 9/C1b and 12/C1a.

Forest Divisions
Pithoragarh, Tons, Bageshwar and Mussoorie

Locations
Pamtodi, Didihat Range, Pithoragarh FD; In
between Tuni and Mori, just before Khuni Gad,
Devta Range, Tons FD; Paudidhar, Bageshwar
FD; Kempti and Shikhar Falls, Mussoorie FD,
Askot, Kanalicheena, Sandev Forest, Udyari Bend
and, Near Ogala, Pithoragarh FD.

The species was sparsely distributed. A
few individuals were observed.

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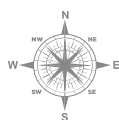
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Schisandra propinqua (Wall.) Baill.



Distribution in Uttarakhand

Species occurs from
1,200 to 1,900 m.

Occurrence in Forest Types
12/C1a and 12/C1b

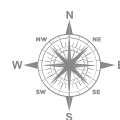
Forest Divisions
Bageshwar and Nainital

Locations
Kapkot and Glacier Ranges, Bageshwar
FD; Lands End forest, Nainital FD

A few individuals were recorded from
above locations.



Schrebera swietenioides Roxb.



Distribution in Uttarakhand

Species occurs
up to 750 m.

Occurrence in Forest Types
3C/C2c and 3C/C3a

Forest Divisions
Haldwani and Corbett Tiger Reserve.

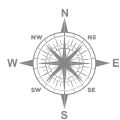
Locations
Son Nadi and Sarpdhauli, Corbett Tiger Reserve;
Jamunagniar, Kalagarh, Corbett Tiger Reserve;
Nandhaur Wildlife Sanctuary; Haldwani FD.

The species has scanty distribution. A few
individuals were observed in above mentioned
locations.



Sloanea tomentosa

(Benth.) Rehder & Wilson



Distribution in Uttarakhand

Species occurs at around 1,500 m
in the Middle Himalayas

Occurrence in Forest Type

12/C1a

Forest Division

Almora

Locations

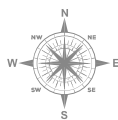
3 Km after Dholachina towards Sherghat Road,
Dholachina Range, Almora FD

Very rare in distribution only 2 individuals
were recorded from Dholachina, Almora
Forest Division.



Sophora mollis

(Royle) Baker



Distribution in Uttarakhand

Species occurs from 450
to 1,250 m in open
miscellaneous forests.

Occurrence in Forest Types

5B/C2 and 9/C1b

Forest Divisions

Rudrapur, Mussoorie and Bageshwar

Locations

Near Tuneta village, Tilwara, Rudrapur
FD; Sahastradhara, Mussoorie FD; and
Bageshwar FD.

The species was sparsely distributed. A
few individuals were observed from above
referred areas.

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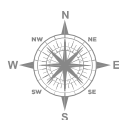
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Staphylea emodi

Wall. ex Brandis



Distribution in Uttarakhand

Species occurs at around
3,000-3,500 m in moist
shady areas.

Occurrence in Forest Type
12/C1d

Forest Division
Valley of Flowers National Park

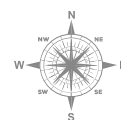
Locations
Near Park Gate, Near Phulna Village, Valley
of National Park.

A few individuals were observed from
above referred locations.



Symplocos cochinchinensis

var. *laurina* (Retz.) Noot.



Distribution in Uttarakhand

Species occurs
up to 1,000 m.

Occurrence in Forest Type
9/C1b

Forest Divisions
Pithoragarh, Uttarkashi and Nainital.

Locations
Enraoli to Taluka (6 km from Sankri), Supeen
Range, Uttarkashi FD.

The species was sparsely distributed. A few
individuals were observed from above referred
locations.



Toricellia tiliifolia

DC.



Distribution in Uttarakhand

Species occurs from in
the Inner Himalayas.

Occurrence in Forest Type
12/C1a

Forest Division
Pithoragarh.

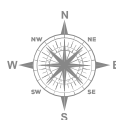
Locations
Ginni Band, Munsyari Range, Pithoragarh FD

The species was restricted to above referred
location. Only few individuals were observed.



Trachycarpus takil

Becc.



Distribution in Uttarakhand

Species occurs at
around 2,500-2,800 m.

Occurrence in Forest Types
12/C1a and 12/C1b.

Forest Division
Pithoragarh.

Locations
Samkot to Giniband, 1.2 km from Girgaon
and Barbe near base Thal Kedar,
Munsyari Range, Pithoragarh FD.

The species is economically important for
its leaves for making thatch. Species was
restricted to Pithoragarh FD with very
small population size.

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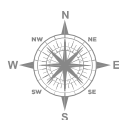
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Turpinia cochinchinensis

(Lour.) Merr.



Distribution in Uttarakhand

Species occurs from
1,200 to 1,900 m.

Occurrence in Forest Type
9/C1b.

Forest Divisions
Pithoragarh FD and Nainital FD.

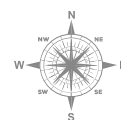
Locations
Ghandhura R F, Didihat Range, Pithoragarh FD;
and Patwadangar, Manora Range, Nainital FD.

Few individuals were recorded from above
referred locations.



Uncaria scandens

(Sm.) Hutch



Distribution in Uttarakhand

Species occurs up to 750 and
1,200 m. in shady ravines.

Occurrence in Forest Types
3C/C3a, and 5B/C2

Forest Divisions
Pithoragarh, Pauri and Lansdowne.

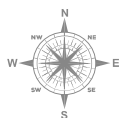
Locations
Hudaki Bagad near Brham, Dhu-dhura Block East,
Askot Range, Sasket Gaon near Thal and Kalika-
Joshikhet, Dharchula Range, Pithoragarh FD;
Girigaon, Srinagar, Pauri FD; Ratuadhab,
Lansdowne FD.

The species was sparsely distributed in isolated
patches. Only few individuals were observed.



Viburnum cordifolium

Wall. ex DC.



Distribution in Uttarakhand

Species occurs at around
2,800 m.

Occurrence in Forest Type

14/C1a

Forest Division

Bageshwar FD

Locations

On way to Dangu Bugyal, Glacier Range,
Bageshwar FD.

The species was restricted to Bageshwar Forest
Division. Only a few individuals were observed
from above referred locations.



Wallichia oblongifolia

Griffith



Distribution in Uttarakhand

Species occurs up to 800 m
in deep shady ravines.

Occurrence in Forest Type

5B/C2

Forest Divisions

Haldwani, Lansdowne, Pithoragarh and Corbett Tiger
Reserve

Locations

Danda Range, Haldwani FD; Sendhikhal, Dumbki
near Kalhuchur – Chaukhamba, and Nauri,
Lansdowne FD; Corbett Tiger Reserve; Kamtoli, Near
Thal, Pithoragarh FD; Across the waterfall of Dogaon
on Nainital Road.

The species has scanty distribution. Only
a few individuals were observed from
referred locations.

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3.6.3.1

Distribution of FGR Species Across Different Forest Types

Field surveys and studies in 5,290 quadrats revealed that 250 prioritized FGR species were present and distributed in as many as 37 forest types of Uttarakhand, out of overall 45 forest types listed by FSI (Table 3.7). Distribution of FGR species across different forest types is summarized below at two levels. Firstly, overall distribution of 250 species across different forest types, and secondly, species wise distribution in varied forest sub-types.

(A) Overall Distribution of 250 FGR Species

The Upper or Himalayan Chir Pine (*Pinus roxburghii*) Forest recorded maximum number (120) of tree, shrub, climber, and RET species. Following this diverse and species rich prominent forest sub-type, the Ban (*Q. oblongata*) Oak Forest, Moist Shiwalik Sal (*Shorea robusta*) Forest, Northern Dry Mixed Deciduous Forest, West Gangetic Moist Mixed Deciduous Forest, Moist Terai Sal Forest, Dry Shiwalik Sal (*Shorea robusta*), Lower or Shiwalik Chir Pine Forest, and Moru Oak (*Q. dilatata*) Forest recorded diversity of 118, 109, 106, 88, 78, 66, 65 and 55 FGR species, respectively (Table 3.7). In contrast, Low Level Blue Pine Forest and Dwarf *Rhododendron* Scrub Forest recorded lowest diversity of just two FGR species each only.

(a) Tree Diversity

The number of tree species in sampled forest types based on quadrat studies revealed variation in their occurrence from just one FGR species in Dry Deodar (*Cedrus deodara*) Forest to as many as 83 FGR tree species in Moist Shiwalik Sal Forest and Upper or Himalayan Chir Pine Forest. Other prominent forest sub-types based on the presence/ occurrence of FGR tree species were Ban Oak Forest, Northern Dry Mixed Deciduous Forest, West Gangetic Moist Deciduous Forest, Moist Terai Sal Forest, Dry Shiwalik Sal Forest, and Lower or Shiwalik Chir Pine Forest as they registered 76, 74, 67, 58, 52, and 49, respectively (Table 3.7).

(b) Shrub Diversity

Out of 27 shrub species of FGR, the highest number of shrub species, being 16 in number were recorded in Ban Oak Forest and Upper or Himalayan Chir Pine Forest (Table 3.7). Other prominent forest sub-types recording higher shrub diversity were Moist Shiwalik Sal Forest (14), Northern Dry Mixed Deciduous Forest (14), West Gangetic Moist Mixed Deciduous Forest (12), and Lower or Shiwalik Chir Pine Forest (11). As many as eight forest sub-types out of 37 forest types were devoid of any shrub species of prioritized FGR (Table 3.7).

(c) Climber Diversity

Out of 15 climber species of prioritized FGR, the highest number of nine species was recorded in the case of Moist Shiwalik Sal Forest, followed by four forest sub-types viz., Moist Terai Sal Forest, Dry Shiwalik Sal Forest, Northern Dry Mixed Deciduous Forest, and Ban Oak Forest had presence of seven climber species each. As many as 21 out of 37 forest sub-types assessed recorded absence of climber species of prioritized FGR (Table 3.7).

(d) RET Species

As many as 21 out of 37 forest sub-types were devoid of any RET species of prioritized FGR. The highest number of RET species, being 19 were recorded from Ban Oak Forest, followed by 16, 11, 7, and 5 species from Upper or Himalayan Chir Pine Forest, Northern Dry Mixed Deciduous Forest, Western Mixed Coniferous Forest, and Moist Terai Sal Forest, respectively (Table 3.7).

In view of the above stated distribution of tree, shrub, climber and RET species of prioritized FGR, Upper or Himalayan Chir Pine Forest, Ban Oak Forest, Moist Shiwalik Sal Forest and Northern Dry Mixed Deciduous Forest were of notable importance from the perspective of conservation of prioritized FGR species and deserve higher management attention. The Upper or Himalayan Chir Pine Forest recorded 83 tree, 16 shrub, 5 climber and 16 RET species, representing 48 per cent of assessed prioritized FGR species. The Ban Oak Forest had presence of as many as 76 tree, 16 shrub, 7 climber and 19 RET species of prioritized FGR, representing 47.2 per cent of the studied prioritized FGR species. The Moist Shiwalik Sal Forest recorded the presence of 83 tree, 14 shrub, 9 climber and 3 RET species, amounting to 43.6 per cent of the prioritized FGR species. The Northern Dry Mixed Deciduous Forest recorded 74 tree, 14 shrub, 7 climber and 11 RET species, amounting to 42.4 per cent of the assessed prioritized FGR species.

(B) Summary of Species-Wise Distribution

Among 146 prioritized FGR tree species, four species viz., *Quercus leucotrichophora*, *Pinus roxburghii*, *Ficus semicordata*, and *Grewia optiva* were widely distributed as their presence was recorded in as many as 13 forest sub-types in each case (Table 3.7). Species like *Falconeria insignis*, *Lannea coromandelica*, *Q. semecarpifolia*, *Rhododendron arboreum* and *Terminalia tomentosa* occurred in as

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many as 12 different forest sub-types. Presence of *Alnus nepalensis*, *Celtis tetrandra*, *Ficus auriculata*, *Litsea monoptela*, *Myrica esculenta*, *Pyrus pashia*, *Taxus wallichiana* and *Toona ciliata* prioritized FGR tree species was recorded in 11 forest sub-types in each case (Table 3.7). Tree species like *Aegle marmelos*, *Aesculus indica*, *Betula alnoides*, *Bombax ceiba*, *Buxus wallichiana*, *Dalbergia sissoo*, *Ficus racemosa*, *Juglans regia*, *Kydia calycina*, *Melia azedarach*, *Ougeinia oojeinensis*, *Q. floribunda*, *Syzygium cumini*, and *Terminalia chebula* were recorded in 10 different forest sub-types in each case. Tree species like *Acronychia pedunculata*, *Albizia odoratissima*, *Dalbergia latifolia*, *Dillenia pentagyna*, *Ficus microcarpa*, *Machilus odoratissimus*, *Piliostigma malabaricum*, *Pittosporum nepaulense*, *Q. glauca* and *Vachellia nilotica* subsp. *indica* were rare as their presence was recorded in just one forest sub-type in each case across the Himalayan State of Uttarakhand (Table 3.7).

Among shrubs, *Berberis asiatica* and *B. chitria* were the most widely distributed prioritized FGR species as both the species were recorded from 13 different forest sub-types (Table 3.7). Other three prominent shrub species viz., *Callicarpa macrophylla*, *Prinsepia utilis*, and *Vitex negundo* occurred in ten different forest sub-types. *Helicteres isora*, and *Rhus parviflora* were recorded from nine different forest sub-types. Species like *Picrasma quassioides* was recorded in two forest sub-types. Species like *Caragana gerardiana*, and *Uraria picta* were present in only two sampled forest sub-types (Table 3.7).

Out of 15 studied climber species of prioritized FGR, *Pueraria tuberosa* was recorded from seven different forest sub-types while species like *Calamus tenuis*, *Celastrus paniculatus*, *Clematis montana*, *Cryptolepis dubia*, *Phanera vahlii*, and *Stephania glabra* occurred in six different forest sub-types in each case (Table 3.7).

Nearly two-third (66.12 per cent) of the studied RET species out of 250 prioritized FGR were recorded from just one forest sub-type. Five RET species viz., *Dodecadenia grandiflora*, *Ilex pseudo-odorata*, *Marsdenia griffithii*, *Osmanthus fragrans* and *Saurauia napaulensis* were recorded from three forest sub-types in each case (Table 3.7).



Table 3.7

Details of Sampled Quadrats in Different Forest Divisions, Uttarakhand and Forest Ranges Covered Under Sampling

Sr. No.	Species Name	3C/C2a Moist Shiwalik Sal Forest	3C/C2c Moist Terai Sal Forest	3C/C2d (I) Western Light Alluvial Plain Sal	3C/C3a West Gangetic Moist Mixed Deciduous Forest	4C/FS2 Submontain Hill Valley Swamp forest	5B/C1a Dry Shiwalik Sal Forest	5B/C1b Dry Plains Sal Forest	5B/C2 Northern Dry Mixed Deciduous Forest	5/DS1 Dry Deciduous Scrub	5/IS2 Khair-Sissoo Forest	9/C1a Lower or Shiwalik Chir Pine Forest	9/C1b Upper or Himalayan Chir Pine Forest	9/DS1Himalayan Subtropical Scrub	9/DS2 Subtropical Euphorbia Scrub	12/C1a Ban Oak Forest (Q. oblongata)	12/C1b Moru Oak Forest (Q. dilatata)	
TREE																		
1	<i>Abies pindrow</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1	
2	<i>Abies spectabilis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	<i>Acacia catechu</i>	1	-	-	+	-	1	+	+	1	1	-	-	1	-	-	-	
4	<i>Acer caesium</i>	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	
5	<i>Acer oblongum</i>	-	-	-	-	-	-	-	1	-	-	-	1	-	-	1	1	
6	<i>Acer sterculiaceum</i>	-	-	-	2	-	-	-	-	-	-	-	+	-	-	+	+	
7	<i>Acronychia pedunculata</i>	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
8	<i>Aegle marmelos</i>	1	1	-	1	-	+	+	+	+	1	-	1	+	-	-	-	
9	<i>Aesculus indica</i>	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	
10	<i>Alangium salviifolium</i>	1	-	-	-	-	-	-	-	-	-	-	+	-	-	+	+	
11	<i>Albizia chinensis</i>	+	-	-	-	-	-	-	+	-	-	1	+	-	-	1	-	
12	<i>Albizia julibrissin</i>	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	+	
13	<i>Albizia lebbeck</i>	1	-	-	1	-	-	-	2	-	+	-	2	-	-	1	-	
14	<i>Albizia odoratissima</i>	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15	<i>Albizia procera</i>	1	1	-	1	-	+	-	2	+	+	+	-	-	-	1	-	
16	<i>Alnus nepalensis</i>	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1	1	
17	<i>Alnus nitida</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
18	<i>Alstonia scholaris</i>	1	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	
19	<i>Anogeissus latifolia</i>	1	-	-	+	-	+	+	1	-	+	+	-	-	-	-	-	
20	<i>Azadirachta indica</i>	+	-	-	-	-	1	-	1	-	+	-	-	-	-	-	-	
21	<i>Bauhinia purpurea</i>	-	-	-	1	-	-	-	-	-	-	-	+	-	-	1	-	
22	<i>Bauhinia racemosa</i>	1	1	-	+	-	+	-	+	2	+	-	-	-	-	-	-	
23	<i>Bauhinia variegata</i>	-	-	-	-	-	-	-	1	-	-	-	+	-	+	1	-	
24	<i>Betula alnoides</i>	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1	1	
25	<i>Betula utilis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
26	<i>Bischofia javanica</i>	1	+	-	1	-	-	-	1	-	-	-	-	-	-	-	-	
27	<i>Boehmeria rugulosa</i>	+	-	-	-	-	1	-	+	-	-	1	+	-	-	2	-	
28	<i>Bombax ceiba</i>	+	+	-	1	-	+	-	1	+	1	+	+	-	-	+	-	
29	<i>Boswellia serrata</i>	+	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
30	<i>Bridelia retusa</i>	+	1	-	1	-	1	-	+	-	+	+	+	-	-	+	-	
31	<i>Buchanania cochinchinensis</i>	+	1	-	-	-	-	-	1	-	+	-	-	-	-	-	-	

Sr. No.	Species Name	3C/C2a Moist Shiwalik Sal Forest	3C/C2c Moist Terai Sal Forest	3C/C2d (I) Western Light Alluvial Plain Sal	3C/C3a West Gangetic Moist Mixed Deciduous Forest	4C/FS2 Submontain Hill Valley Swamp forest	5B/C1a Dry Shiwalik Sal Forest	5B/C1b Dry Plains Sal Forest	5B/C2 Northern Dry Mixed Deciduous Forest	5/DS1 Dry Deciduous Scrub	5/1S2 Khair-Sissoo Forest	9/C1a Lower or Shiwalik Chir Pine Forest	9/C1b Upper or Himalayan Chir Pine Forest	9/DS1Himalayan Subtropical Scrub	9/DS2 Subtropical Euphorbia Scrub	12/C1a Ban Oak Forest (Q. oblongata)	12/C1b Moru Oak Forest (Q. dilatata)	
32	<i>Butea monosperma</i>	1	-	-	1	-	+	-	+	1	1	-	-	-	-	-	-	
33	<i>Buxus wallichiana</i>	-	-	-	-	-	-	-	-	-	-	+	+	+	-	1	+	
34	<i>Careya arborea</i>	1	2	-	1	-	+	-	+	-	-	-	+	-	-	-	-	
35	<i>Carpinus viminea</i>	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1	+	
36	<i>Cassia fistula</i>	1	1	-	+	-	+	+	1	-	+	-	-	-	-	-	-	
37	<i>Cedrus deodara</i>	-	-	-	-	-	-	-	-	-	-	-	+	+	-	+	+	
38	<i>Celtis australis</i>	-	-	-	-	-	-	-	-	-	-	+	+	+	-	1	-	
39	<i>Celtis tetrandra</i>	+	+	-	1	-	+	-	+	-	-	+	+	-	-	1	+	
40	<i>Cinnamomum tamala</i>	-	-	-	-	-	-	-	-	-	-	+	1	-	-	1	+	
41	<i>Cordia dichotoma</i>	1	1	-	+	-	+	-	+	+	-	+	+	-	-	-	-	
42	<i>Cornus capitata</i>	-	-	-	-	-	-	-	-	-	-	+	1	-	-	1	1	
43	<i>Cornus macrophylla</i>	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1	+	
44	<i>Corylus jacquemontii</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
45	<i>Crateva adansonii</i> subsp. <i>odora</i>	+	-	-	1	-	+	-	1	-	-	-	-	-	-	-	-	
46	<i>Cupressus torulosa</i>	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1	1	
47	<i>Dalbergia lanceolaria</i>	1	+	-	1	-	-	-	+	-	+	-	-	-	-	+	-	
48	<i>Dalbergia latifolia</i>	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	
49	<i>Dalbergia sissoo</i>	+	1	-	1	-	+	+	1	+	1	+	-	-	-	-	-	
50	<i>Daphniphyllum himalayense</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	
51	<i>Dillenia pentagyna</i>	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
52	<i>Diospyros melanoxylon</i> var. <i>tupru</i>	+	+	-	1	-	+	-	+	+	-	-	-	-	-	-	-	
53	<i>Diospyros montana</i>	1	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	
54	<i>Diploknema butyracea</i>	-	-	-	-	-	-	-	+	-	-	+	1	1	-	1	-	
55	<i>Elaeodendron glaucum</i>	1	+	-	1	-	1	-	+	-	+	-	+	-	-	4	-	
56	<i>Engelhardtia spicata</i> var. <i>integra</i>	-	-	-	-	-	+	-	1	-	-	+	1	-	-	1	+	
57	<i>Erythrina suberosa</i>	-	-	-	-	-	1	-	-	-	3	1	-	-	-	-	-	
58	<i>Ficus auriculata</i>	+	-	-	3	-	1	-	+	-	-	+	3	-	3	+	+	
59	<i>Ficus benghalensis</i>	2	2	-	1	-	-	-	2	+	+	-	+	+	-	-	-	
60	<i>Ficus microcarpa</i>	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
61	<i>Ficus neriifolia</i>	-	-	-	-	-	+	-	+	-	+	-	1	-	-	2	-	
62	<i>Ficus racemosa</i>	1	1	+	3	-	+	+	2	-	+	+	-	-	-	-	-	
63	<i>Ficus rumphii</i>	4	+		+	-	+	1	3	-	-	+	+	-	-	3	-	
64	<i>Ficus semicordata</i>	+	1	+	1	-	1	+	+	-	+	+	+	-	-	2	-	