BEFORE THE NATIONAL GREEN TRIBUNAL

WESTERN ZONE BENCH, PUNE

ORIGINAL APPLICATION NO.61 OF 2023(WZ)

IN THE MATTER OF:

FIRDOS CAMBATTA …APPLICANT

VERSUS

STATE OF GUJRAT …RESPONDENT

INDEX

6.	**ANNEXURE A-5** A true copy of the fully grown trees.	**92-109**
7.	Proof of Service	**110**

FILED BY:

Ranu Purohit

[Ms. RANU PUROHIT]
S-74, BASEMENT, GREATER KAILASH-I, NEW DELHI- 110048
Mobile No. 9560457997

FILE ON: 10.09.2024

BEFORE THE NATIONAL GREEN TRIBUNAL
WESTERN ZONE BENCH, PUNE

Original Application No.61 Of 2023(WZ)

IN THE MATTER OF:

Firdos Cambatta ...Applicant

Versus

State of Gujrat ...Respondent

AFFIDAVIT ON BEHALF OF THE APPLICANT

I, Firdos Cambatta aged about 8 7 Years, holding Adhaar Card 815443746985 R/o "Serenity" Plot 314/3, Hansol, Ahmedabad, Gujrat, do hereby solemnly affirm and state as under:-

1. That I am the Applicant in the above-mentioned Original Application and as such I am well conversant with the facts and circumstances of the case and competent to swear the present Affidavit.
2. The Present Original Application was registered before this Hon'ble Tribunal on the basis of a letter petition wherein the Applicant had stated that the Applicant had created a green cover by plantation in 1974 of about 4000 trees on plot no. 313, 322 and 323 in Hansol village which was included in the municipal limits of Ahmedabad Municipal Corporation in 1987.

3. That vide order date 01.07.2024 while hearing the aforementioned OA, this Hon'ble Tribunal directed the Applicant to file another Affidavit, detailing therein the number of trees, which have been cut(which were numbered) and whether these trees belong to the category of Gaando Bawal. That the present Affidavit is being filed in this background.

4. It is submitted that during the course of arguments it was indicated by the counsel appearing for the Respondent that the trees that have been numbered as per the photographs are the ones which have been inventoried but not being felled. That the attached photographs reveal that the left half of tree number 34 and 100 is cut, while several other trees have been removed, with the majority taken away by truck, although some remain on the ground. Use of heavy machinery such as JCB is also evident from the pictures which are clearly being used for chopping and felling of trees. That as on 06.11.2022, 33 stumps were recorded by the Applicant. Thus, the images are contrary to the submission sought to be averred before this Hon'ble Tribunal that the trees are numbered to be not felled. On the contrary, the submission of the Applicant herein is substantiated that numbered trees are being felled. A true copy of the recent photographs is annexed herewith and marked as **Annexure A-1[Pages 15 to 19]**. That further map showing comparison in depletion

of forest cover is annexed herewith and marked as **Annexure A-2[Pages 20 to 21].**

5. That it is further submitted that a study was conducted at the behest of the residents of Hansol and Sadar by the Gujarat Institute of Desert Ecology on the ecology and biodiversity of Hansol which assesses the area's ecological condition and biodiversity. The finding of the study emphasized the following key points:

   a) The Land Use Land Cover (LULC) change indicates a significant transformation in landforms from 2020 to 2022. In recent years, there has been a notable decrease in vegetation patches, primarily consisting of Prosopis.

   b) Among the identified species in the area, the Black Kite (Milvus migrans), Shikra (Accipiter badius), and Indian Peafowl are included in Schedule I of the Wildlife (Protection) Act, 1972. Additionally, 57 species are listed under Schedule IV, and 1 species is categorized under Schedule V. The Black-headed Ibis, River Tern, and Alexandrine Parakeet are classified as Near Threatened on the IUCN Red List.

   c) Species such as Nilgai, Wild Boar, Grey Mongoose, and Indian Crested Porcupine were found in vegetation areas,

while Northern Plains Langur, Northern Palm Squirrel, and Indian Flying Fox were seen in home gardens. The locations of these species were recorded. The dense Prosopis along the riverbank provides an optimal habitat and cover for wildlife.

d) The urban woodland interface of the area is crucial for biodiversity amid global development pressures. The study area near the Sabarmati supports significant biodiversity, with 61 bird species recorded. The floral diversity is high, with 50 species found in Prosopis-dominated patches,

e) The Riverbank vegetation patches are crucial for the rejuvenation of the Sabarmati River and the maintenance of its downstream areas. It was further highlighted that various studies have shown that vegetation in the catchment area enhances water quality and improves the river's retention capacity.

f) It was suggested that retaining native vegetation is essential for conserving urban biodiversity. Protecting existing tree patches and planting new native vegetation are effective strategies with significant potential to prevent urban biodiversity loss.

A true copy of the final report by the Gujarat Institute of Desert Ecology on the "Ecology and Biodiversity Study in Hansol" is annexed herewith and marked as **Annexure A-3[Pages 22 to 89].**

6. That from a perusal of the above also it is crystal clear that there is imminent need to preserve the biodiversity of the region specially considering the fact that the entire area is home to endangered and near threatened species.

7. That further as per an article featured in Times of India, compiled by ISRO scientists in Ahmedabad, highlights the impact of tree plantations on the city's climate. The data reveals a significant temperature variation of up to 6 degrees Celsius between the walled city and the developed western regions, particularly in the summer months. It was further highlighted that areas with vegetation cover or water bodies experienced lower temperatures compared to those with higher traffic density. A true copy of the article is annexed herewith and marked as **Annexure A-4[Pages 90 to 91].**

8. As per various studies and newspaper reports, Ahmedabad city has fared the worst in conserving its green cover between 2011 and 2021. According to data tabled before Parliament from the

Indian State of Forest Report (ISFR), the city's green cover went from 17.96 square kilometres (sq km) in 2011 to 9.41 sq km in 2021, a massive 47.6% erosion. The same was reported by the Times of India on March 21, 2023 https://timesofindia.indiatimes.com/city/ahmedabad/ahmedabad-worst-in-green-cover-erosion-in-last-decade/articleshow/98846731.cms

9. Additionally on August 1, 2024 the Times of India published another key study stating that dense vegetation, the ecological lifeblood of a city, has witnessed a 77.6% decrease in Ahmedabad city the past two decades. The analysis of Ahmedabad's vegetation cover was conducted using Landsat 8 data from the United States Geological Survey portal and was published in the Journal for Science and Research in April this year. Between 2011 and 2020, the city's green cover had shrunk by 30.36 sq km, while the built-up area expanded by 87.39 sq km. This rampant concretization has shrunk the city's tree blanket and worsened its air quality. The analysis also reveals a dramatic decline in areas classified as "no vegetation", dropping by a staggering 81.8%. A 2022 report by the Ahmedabad Municipal Corporation (AMC) showed that compared to other Indian cities, the per capita green space available to citizens here is below the standards set for global cities. The Ahmedabad city

currently falls far short of global and national green space standards, with just 1.52 sq m of green and open space per person.

10. The WHO and Union Government's Urban and Regional Development Plans Formulation and Implementation have issued guidelines stating 9 sq m and 10 to 12 sq m respectively of green space must be made available to a citizen. The figure for just green space dips to a meagre 0.78 sq m per person in Ahmedabad city as per study published and reported in The Times of India on August 1, 2024.[1]

11. That the Applicant had at the relevant time planted a mix of indigenous species as well as Prosopis juliflora, commonly known as "Gaando Bawal". However, over the past 50 years, the survival of certain indigenous species may have been adversely affected due to cattle grazing in the area. There were in all 30 other species planted along with the prosopis juliflora species to prevent soil erosion in plots 312,322,323. Since these have always been gauchar lands, the Applicant states that majority of the other species have been eaten by cattle grazing, goats,

---

[1] https://timesofindia.indiatimes.com/city/ahmedabad/citys-dense-green-cover-decreases-by-78-in-20-years-study/articleshow/112180676.cms

camels and blue bulls native to the area over a period of time. During the 1973 floods, 30% of these plots were completely washed away and submerged in the Sabarmati River, since these plots also make up the Sabarmati river floodplains, demonstrated by google map view of 2020. Due to the tree canopy and vegetation cover planted by Applicant, the total soil erosion in plots 312, 322, and 323 has been totally stopped and the gauchar plots have been saved from erosion for the last 50 years, and provide cattle fodder, supporting local communities in the area who also utilise the trees for firewood.

12. That in addition to the above, it is submitted that what has sought to be projected before this Hon'ble Tribunal is that the majority fo the area is covered with bushes or Prosopis juliflora. In this light it is submitted that the said submission is flawed as Prosopis juliflora cannot not be viewed as insignificant bushes. It may be pertinent to note that even Prosopis juliflora has significant value for maintenance of ecology and biodiversity. There are documented instances where its presence has been beneficial, providing habitat and resources for various species and supporting local livelihoods in specific ecosystems.

13. That it is submitted that Prosopis juliflora possesses the potential to yield substantial ecological benefits, including the

reduction of soil erosion, the improvement of soil fertility, and the reclamation of moderately saline soils and degraded land. Furthermore, it plays a crucial role in combating desertification in arid regions by sequestering carbon dioxide, thereby contributing to the mitigation of climate change. In addition to these ecological advantages, Prosopis juliflora also generates significant socioeconomic benefits, most notably by replacing pasture lands and native trees with high browsing value, which are vital sources of fodder for livestock in pastoral communities[2].

14. That it is further submitted that Prosopis juliflora fulfils over 70% of the fuelwood demand in the arid and semi-arid regions of Rajasthan, Gujarat, and Haryana, owing to its high calorific value, and has largely replaced *Anogeissus pendula* (Dhokra) as the primary charcoal source. The species produces strong, durable timber, particularly from its heartwood, which is valuable for agricultural implements, furniture, and utensils. Notably, Prosopis juliflora coppices well, enabling continuous biomass production, thus serving as a reliable renewable wood source[3]. It is further pertinent to mention here that this case does not pertain to isolated instances of invasive species but

---

[2] Dagnachew Bezaredie, Zawde Tadesse,* and Zemenu Tadesse, Effects of Prosopis juliflora on plant diversity on rangeland in Shilabo District, Somali Regional State, Ethiopia, March 2023, Vol 9(3) Heliyon, National Library of Medicine.

[3] S.K Saxena, Ecology of Prosopis juliflora in the arid region of India, <https://www.fao.org/4/AD321E/ad321e04.htm>

rather to the issue of 4000 fully matured trees that now support a diverse range of biodiversity, as evidenced by the accompanying photographs of the trees. A true copy of the fully grown trees is annexed herewith and marked as **Annexure A-5[Pages 92 to 109].**

15. That it is the responsibility of the state to protect and preserve the natural resources. Recently, the Hon'ble Supreme Court of India vide order dated 05.08.2024 in W.P(C) 13381 of 1986 titled "***M.C Mehta v Union of India***" has inter alia, held as follows:-

> *"Keeping in view the spirit of Article 51A of the Constitution of India and right of citizens to a healthy environment, every public authority which makes an application before this Court seeking permission for felling the trees must make the best endeavour to reduce the number of trees which are required to be cut by re-examining the alignment of the public project".*

16. That the Hon'ble Supreme Court has also in ***Writ Petition (Civil) No. 838 of 2019; M.K. Ranjitsinh & Ors. v. Union of India & Ors.*** recognized that without a clean environment, the right to health and therefore right to life is inconceivable and thus, in the absence of right against climate change, the right to life cannot be fully realized. Further, as the traditional communities living in the lap of nature are more severally impacted from any destruction

to the environment, it creates a divide between them and urban population which may not be so immediately affected by the peril of climate change. Thus, Climate Change also impinges on the constitutional guarantee of the right to equality. This step is aimed at ensuring that the states are compelled to prioritize environmental protection and sustainable development. The Court held thus:

"24. Despite a plethora of decisions on the right to a clean environment, some decisions which recognise climate change as a serious threat, and national policies which seek to combat climate change, it is yet to be articulated that the people have a right against the adverse effects of climate change. This is perhaps because this right and the right to a clean environment are two sides of the same coin. As the havoc caused by climate change increases year by year, it becomes necessary to articulate this as a distinct right. It is recognised by Articles 14 and 21.

....

...."

27. The right to equality under Article 14 and the right to life under Article 21 must be appreciated in the context of the decisions of this Court, the actions and commitments of the state on the national and international level, and scientific consensus on climate change and its adverse effects. From these, it emerges that there is a right to be free from the adverse effects of climate change. It is important to note that while giving effect to this right, courts must be alive to other rights of affected communities such as the right against displacement and allied rights. Different constitutional rights must be carefully considered before a decision is reached in a particular case."

Thus, the Hon'ble Supreme Court recognized the right against the adverse effects of climate change as a fundamental right.

17. Further, removing trees and reducing green cover significantly impair environmental rights by undermining essential ecological functions. This deforestation leads to the loss of critical habitat, diminished air and water quality, and increased soil erosion. Such actions not only compromise the health and well-being of the community but also contravene the principles of environmental justice, which protect the right to a healthy and sustainable environment. This is in violation of Article 21 of the Constitution of India, which guarantees the right to life and personal liberty, including the right to a clean and healthy environment. Additionally, it infringes upon the Directive Principles of State Policy under Article 48A, which mandates the State to protect and improve the environment, and Article 51A(g), which imposes a fundamental duty on every citizen to protect and improve the natural environment.

18. That the Applicant reserves the right to raise further points with the prior permission of the Hon'ble Tribunal.

APPLICANT

SR. NO. A/5184/2024

SHAMALBHAI M. DESAI
NOTARY
GOVT. OF GUJARAT

10 SEP 2024

THROUGH COUNSEL

MS RANU PUROHIT
ADVOCATE FOR APPLICANT

NOTARIAL FIVE RUPEES

NOTARY SHAMALBHAI M. DESAI AHMEDABAD REG. NO. 1297/10 EXPIRY DATE 09/02/2025 GOVT. OF GUJARAT (INDIA)

SOLEMNLY AFFIRMED
BEFORE ME

SHAMALBHAI M. DESAI
NOTARY
GOVT. OF GUJARAT (INDIA)

10 SEP 2024

ભારત સરકાર
Government of India

કંબટ્ટા ફિરદોસ
Cambatta Firdos
જન્મ તારીખ / DOB : 24/10/1936
પુરુષ / Male

8154 4374 6985

આધાર – સામાન્ય માણસનો અધિકાર

NOTARY • SHAMALBHAI M. [illegible] • AHMEDABAD • REG. NO. 1297/10 • EXPIRY DATE 09/02/2025 • GOVT. OF GUJARAT (INDIA)

Unique Identification Authority of India

સરનામું:
પિતાનું/માતાનું નામ: સોરાબ,
સેરેનિટી, પ્લોટ નં. 314/3, હંસોલ,
અમદાવાદ શહેર, અમદાવાદ,
શાહીબાગ, ગુજરાત, 380004

Address:
S/O: Sorab, Serenity, Plot No.
314/3, Hansol, Ahmedabad City,
Ahmedabad, Shahibag, Gujarat,
380004

8154 4374 6985

1947
1800 300 1947

help@uidai.gov.in

www.uidai.gov.in


34

// TRUE COPY //


1/2020
1985
2024
Google Maps 2020
સાબરમતી નદી
Sabarmati River
Sabarmati River
Plots 312, 322, 323
Mr Fridos Cambatta Home
Image © 2024 Maxar Technologie
Google Earth
1985
Imagery Date: 1/23/2020 23°05'20.64" N 72°36'45.61" E elev 76 m eye alt 895 m


316
Sabarmati River
Google Map 2024
21
સાબરમતી નદી
Sabarmati River
Plots 312, 322,323
Image © 2024 Airbus
Mr Firdos
Cambatta
Home
// TC//
Dadi Jan
Google Earth
1985
Imagery Date: 4/7/2024 23°05'27.48" N 72°36'38.98" E elev 60 m eye alt 879 m

Final Report

ECOLOGY AND BIODIVERSITY STUDY IN HANSOL, LOCATED AT SABARMATI FLOOD PLAIN AHMEDABAD

Submitted by

Gujarat Institute of Desert Ecology
Opp. Changleshwar Temple, Mundra Road
Bhuj-370001, Kachchh, Gujarat
January 2023

Final Report

Ecology and Biodiversity study in Hansol, located at Sabarmati flood plain, Ahmedabad

Coordinator

Dr. V. Vijay Kumar
Director, GUIDE

Faunal Component

Dr. Soumya Dasgupta
Dr. Sanjay Babu

Floral Component

Mr. Bhagirath Paradva
Mr. Rakesh Poptani

Suggested citation: GUIDE, 2023; Ecology and Biodiversity study in Hansol, located at Sabarmati flood plain, Ahmedabad

INTRODUCTION

Biodiversity or biological diversity is the variety and variability of all living organism sustaining on earth and measured through the variation of genetic, species and ecosystem or habitat level (UNEP). The natural resources and the biodiversity are crucial for fulfilling essential goods and services to the humanity and the cities are not exceptional. The Biodiversity on earth is not distributed evenly in all the ecosystem and also influenced by the anthropogenic activities (IPCC 2014). The Urban Woodland gradient is a special habitat feature that comprised of both the urban and the woodland features and forms an edge of both the habitat and thus used to have a unique diversity of floral and faunal assemblage due to edge effect. Thus, cities to function correctly it's imperative to save the local biodiversity which in turn enhance the wellbeing and sustainable development of the cities, and the overall country (Nowak *et al*. 2013). In general, the population of a city is far denser as compared to that of a rural area hence it makes it more essential to conserve the urban biodiversity. Due to the recent developmental paradigm the urban woodland became major thrust area for conservation of Biodiversity and sustainability of the ecosystem.

Today, urban areas in India are facing excessive population and growing pressure due to industrialization, vehicular emissions along with infrastructure developments. This has led to substantial rise in urban pollution that impacts on air, water, and land. Air pollution has increased rapidly in many cities and has also reached to the rural areas. Further, growing population and the urbanization rate to meet the demands to satisfy urban infrastructure (housing, roads, streets, etc) needs has subsequently decreased the open spaces and green belts, which has resulted in transformation of natural habitats by urbanization processes.

Urban green spaces are familiar places of human-environment interactions providing continuous services to urban dwellers. These services are in terms of social and ecological outcomes, both intended and unintended (Cook *et al.,* 2012 and Fan *et al.,* 2019). In the recent few years, urban green space and vegetation have become an emerging research topic, not only for academicians but also for municipal managers, decision-makers, and local stakeholders.

A recent report highlights that Ahmedabad city's green cover has increased by 117% which has increased from 4.66% in 2012 to 10.13% by 2021. However, as per another

report (ToI, 5th August, 2018) there are 11 trees per 100 people in the Ahmedabad city. This is very meagre to meet the very basic oxygen and other life supporting services for the human population living in the city. According to Indian Institute of Science (IISc) report from 2014, the ideal tree-human ratio should be 7 Trees/Person. E. P. Diane *et al.,* (2021) reported that current evidence supports local cooling, stormwater absorption, and health benefits of urban trees for local residents. However, the potential for urban trees to appreciably mitigate greenhouse gas emissions and air pollution over a wide array of sites and environmental conditions is limited (Nowak *et al*. 2018). Nevertheless, trees in urban areas can help regulate temperatures and keep our cities cool in the face of global warming (Yirka, 2021). Greening buildings, tree-lined streets and parking lots can help bring down excessive heat. Water in the plants and soil increases the amount of evaporation, providing cooling. Thus, growing plants helps to cool down the local temperature. Even in cities, more green spaces and water bodies help reduce the urban heat island effect. So, in cities, it is extremely important to conserve trees and water bodies.

The Sabarmati river originates in the Aravalli range of the Udaipur District of Rajasthan and confluence with the Arabian Sea at Gulf of Khambhat in Gujarat. The Sabarmati River front Project is one of the ambitious projects undertaken by the government to reduce the river pollution, increase tourism and enrich the economy in and around Ahmedabad. The project aims to provide Ahmedabad with a meaningful waterfront environment along the banks of the Sabarmati River and to redefine an identity of Ahmedabad around the river. The project has reconnected the city with the river and has positively transformed the neglected aspects of the riverfront. The Sabarmati river channel being a seasonal river lost its natural water flow during the dry months and to rejuvenate the water flow Narmada water from its river canal upstream of Sardar Patel Ring Road was diverted to Sabarmati main channel.

In September, 2021 the bench of Justice J B Pardiwala and Justice V D Nanavati issued a slew of directions to rejuvenate the Sabarmati. The riverine ecosystem and biodiversity along the upstream near the Cantonment in Shahibag, Sadar Bazaar near airport and Indira Bridge are keeping the river flourishing. Any disturbance of these areas would lead to loss of green cover for Ahmedabad city and its biodiversity which is like destroying a lung of the city as reported by ISRO, SAC and Pandit Deendayal Energy University. Hence,

to understand the ecological status as per the request of the Resident's of Hansol, a rapid study has been undertaken by GUIDE during the month of December 2022.

THE STUDY AND THE STUDY AREA

The study area covers approximately 50 acres of land with both indigenous and exogenous biodiversity (mostly plants) (Figure 1 and 2). The first construction of residential houses was started in 1966 and now there are quite a few infrastructure developments outside the Armed forces area. In order to prevent the soil erosion Mr. Cambatta a renowned environmentalist got permission from the District collector of Ahmedabad for plantation in the Gauchar lands and *Prosopis* was introduced in those plots to reduce the soil erosion after the massive flood in year 1973. This area shares a common wall with the Army ammunition dump and cantonment which warrants NOC's and building restrictions. Hence the area has largely remained agricultural and low density, and is home to predominantly Parsi families who have resided here since 1960's. Since the year 2000, the gardens developed in this area have consistently been awarded *The Best Private Large Garden Award* by the Gujarat Horticulture Association for 13 consecutive years.

The present study is aimed to document the existing biodiversity through a rapid assessment. The study was carried out in the month of December 2022 during the winter season and the animal and plant species within the residential area, home gardens and adjoining vegetation patches were recorded.

Systematic sampling for Birds was done to record bird species within the residential and riverfront vegetation patches. Checklist was prepared for the recorded bird species and indices of diversity was also estimated. The Plant species within the residential area were recorded and a checklist of species was prepared. The diversity indices for the plant species present in the vegetation patches was also estimated and the tree girth of the major species also measured.

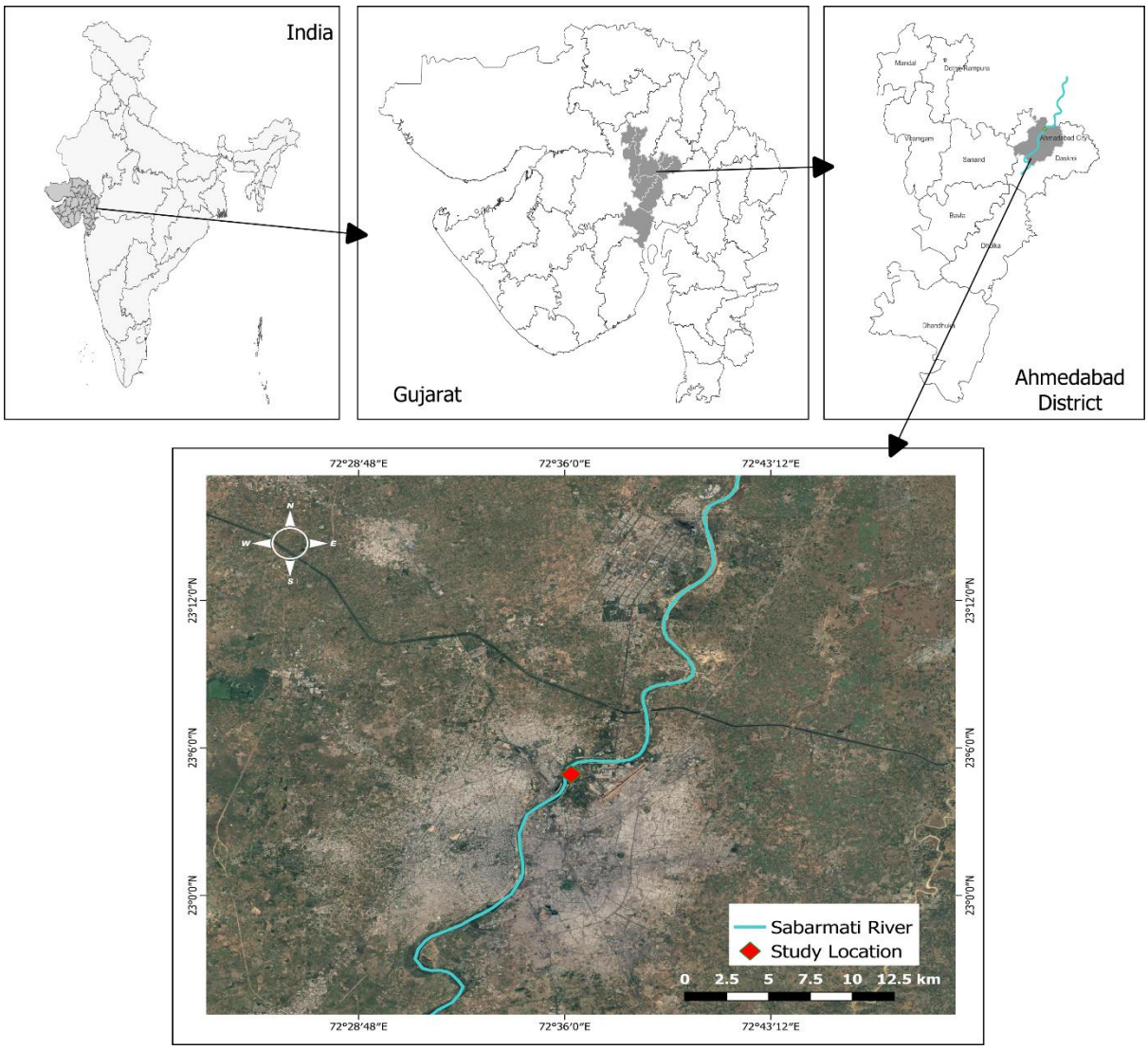


Figure 1: Location Of The Study Area In Hansol Along The Sabarmati River, Ahmedabad

Figure 2: The Study Area with Predominant *Prosopis* Along The River Bank.

Photo Plate 1: Monitoring The Faunal and Floral Assemblage Within the Study Area

Results:

The Land Use Land Cover (LULC) change shows a massive change in the land forms from 2020 to 2022 (Figure 3 to 4). There is a considerable reduction in the vegetation patches during the recent years, which are predominantly *Prosopis*.

Figure 3: The Land Use Land Cover Of The Study Area In Year 2020 (Source Google Earth Images)

Figure 4: The Land Use Land Cover of the Study Area In Year 2022 (Source Google Earth Images)

Faunal Diversity

Mammal Species

During the survey Seven species of Mammals encountered within the Study area (Table 1). The species like Nilgai (*Boselaphus tragocamelus*), Wild Boar (*Sus Scrofa*), Grey Mongoose (*Herpestes edwardsii*) and Indian Crested Porcupine (*Hystrix indica*) were recorded from the vegetation area, whereas Northern Plains Langur (Semnopithecus entellus), Northern Palm Squirrel (*Funambulus pennantii*) and Indian Flying Fox (*Pteropus giganticus*) were recorded within the home gardens. The location of the direct or indirect evidences of different mammalian species recorded were given in Figure 5. The dense *Prosopis* along the river bank provides ideal habitat and cover to wildlife species.

Figure 5: The Location of the Direct and Indirect Evidences of Different Mammal Species Found Within The Study Area.

Photo Plate 2: Direct and Indirect Evidences of Mammal Species Found Within The Study Area (Clock-Wise: Porcupine Nest With Quails, Indian Fing Fox, and Nilgai)

Table 1: Mammal species recorded from the study area during the survey with IUCN and Indian Wildlife (Protection) Act 1972

Sr. No.	Order	Family	Common Name	Scientific name	IUCN	IWPA
1	Primates	Cercopithecidae	Northern Plains Langur	*Semnopithecus entellus*	LC	Sch II
2	Artiodactyla	Bovidae	Nilgai	*Boselaphus tragocamelus*	LC	Sch III
3	Artiodactyla	Suidae	Wild Boar	*Sus Scrofa*	LC	Sch III
4	Carnivora	Herpestidae	Grey Mongoose	*Herpestes edwardsii*	LC	Sch II
5	Rodentia	Hystricidae	Indian Crested Porcupine	*Hystrix indica*	LC	Sch IV
6	Rodentia	Sciuridae	Northern Palm Squirrel	*Funambulus pennantii*	LC	Sch IV
7	Chiroptera	Pteropodidae	Indian Flying Fox	*Pteropus giganticus*	LC	Sch V

Avifaunal Diversity

During the survey a total of 386 individuals of 61 species were recorded. The Shannon Weiner Diversity Index value 3.136 depicted moderate to high avifaunal diversity (Table 2). The high Simpson's index (0.9321) and low Evenness index (0.523) denotes dominance of few species like Mynas, Parakeets etc. within the avifaunal community.

Table 2: Diversity indices for Avifauna sampled from the study area

Diversity Parameters	Values
Taxa	69
Individuals	386
Dominance	0.067
Simpson	0.9321
Shannon Weiner	3.126
Evenness	0.523
Margalef	7.22

Among the Feeding Guild association, most of the species belong to Omnivore (19) followed by Insectivore (18), Piscivore and Granivore (7 each), Frugivore (6), Herbivore (2) and Nectarivore (2) (Figure 6).

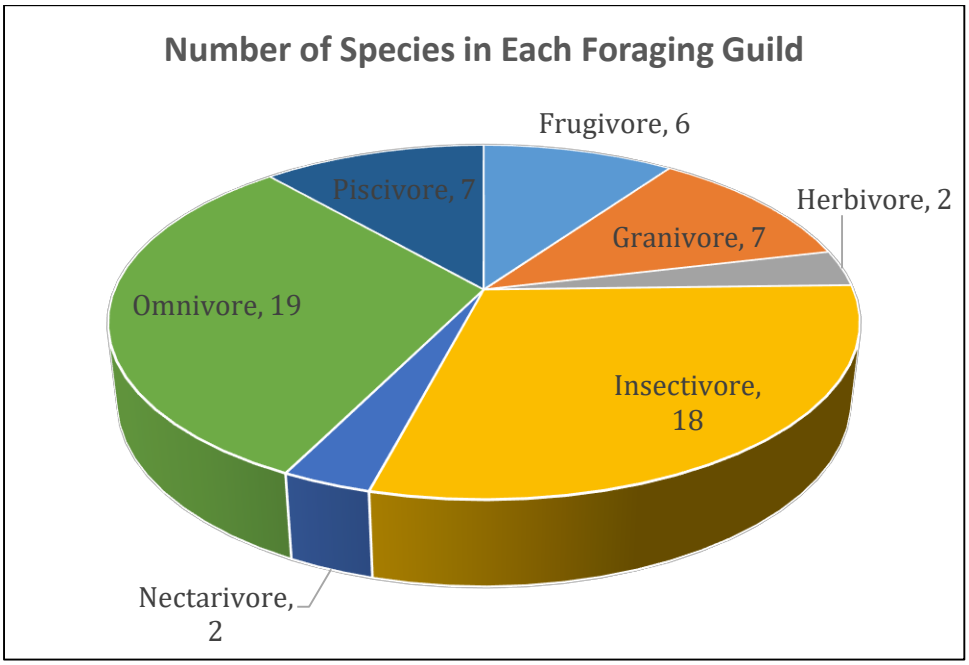


Figure 6: Distribution of Species in Different Feeding Guild

Among the different species found three species the Black Kite (*Milvus migrans*), Shikra (*Accipiter badius*) and Indian Pea Fowl is under Schedule-I of the Wildlife (Protection) Act 1972. A total of 57 species comes under Schedule IV and 1 species are under Schedule V (Figure 7). Among the bird species recorded 3 species the Black Headed Ibis, River Tern and Alexandrine Parakeet are under Near Threatened Category of the IUCN Red list of Threatened species. The other 57 species are of Least Concern (detailed list is given in Checklist of Avifauna).

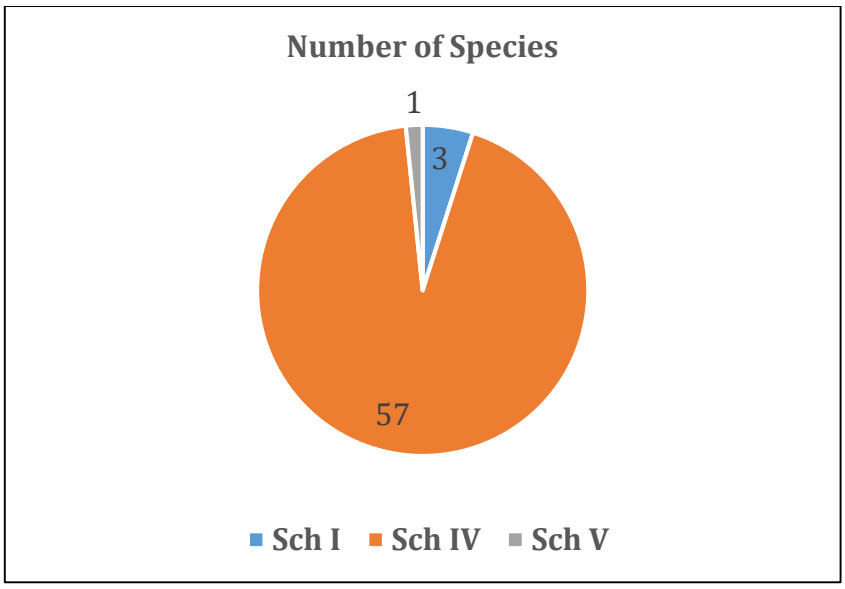


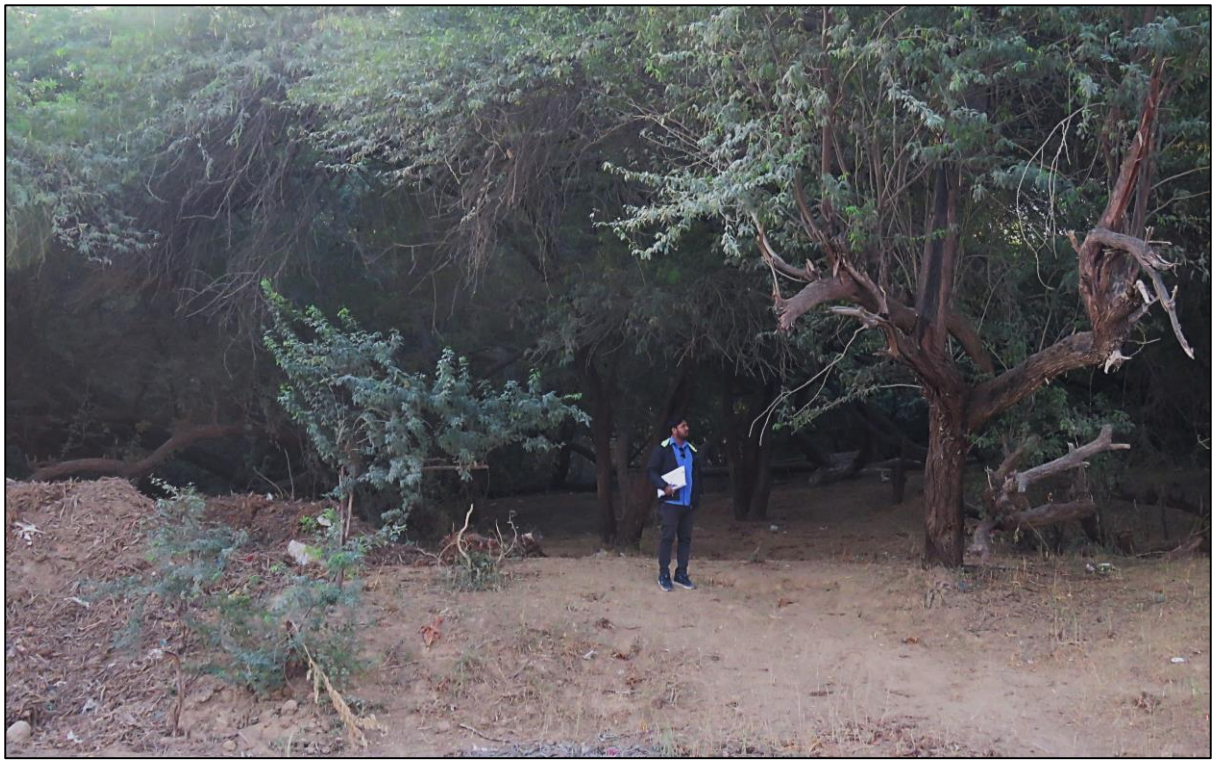
Figure 7: Number of Species Under Wildlife (Protection) Act 1972 and IUCN Red List of Threatened Species

Floral Diversity

A total of 421 species were recorded from the study area. There are 50 species recorded from the vegetation patch with 652 individuals. The Shannon Weiner diversity index value was 2.661 depicting moderate diversity (Table 3). The Simpson index value was 0.8034 and Margalef index value is 7.562. The higher value of Simpson index is because of dominance of *Prosopis* within the vegetation patch.

Table 3: Diversity Indices for Floral Species found in the Vegetation Patch

	A
Taxa_S	50
Individuals	652
Dominance_D	0.1966
Simpson_1-D	0.8034
Shannon_H	2.661
Evenness_e^H/S	0.2863
Margalef	7.562



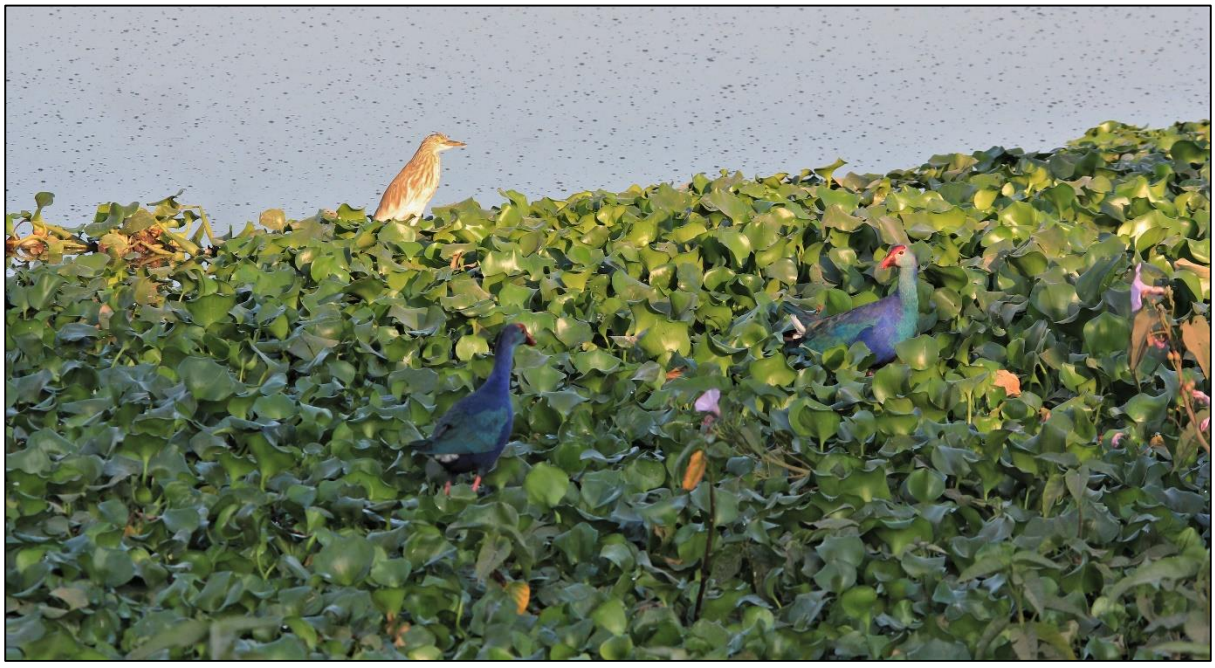


Photo Plate 3: *Prosopis* Dominated Vegetation and Riverine Vegetation Within the Study Area

The list of species including the home garden and the residential area were given in Annexure 1. The species are from 99 different families and species from the Euphorbiaceae (25), Asteraceae (21) and Bigoniaceae (21) and family are dominating followed by Apocynaceae (17), Rubiaceae (17), Acanthaceae (16), Verbenaceae (16) and Caesalpiniaceae (14), (Table 4).

Among the 421 species recorded, majority of 351 species (83.37%) were of ornamental variety and 70 species are of wild variety. Among the different life forms of plants, 128 are trees, followed by 122 shrubs, 105 herbs and 51 climbers, while 5 are grass species and 2 each are fern and orchid species (Figure 8).

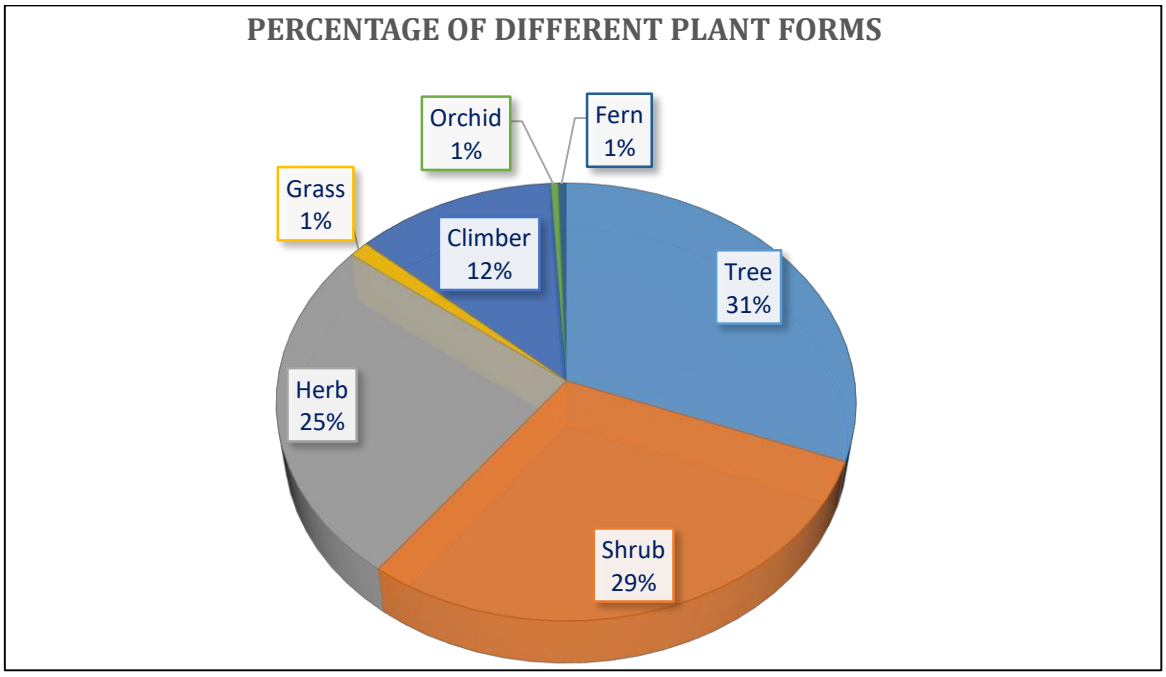


Figure 8: Percentage of Different Plant Forms Recorded From The Study Area

Among the different plant species, only the *Commiphora wightii* (Arn.) Bhandari, is listed under Schedule I of Indian Wildlife (Protection) Act, 1972. A total of twenty individuals were recorded during the survey.

Table 4: List of Families and Number of species belonging to each family.

Sr. No.	Family	No.	Sr. No.	Family	No.	Sr No.	Family	No.
1	Acanthaceae	16	34	Commelinaceae	3	67	Nyctaginaceae	5
2	Agavaceae	8	35	Convolvulaceae	8	68	Nymphaeaceae	1
3	Amaranthaceae	9	36	Convolvulaceae	1	69	Ochnaceae	1
4	Amaryllidaceae	5	37	Cornaceae	1	70	Oleaceae	4

5	Anacardiaceae	1	38	Costaceae	1	71	Orchidaceae	1
6	Annonaceae	3	39	Crassulaceae	3	72	Pandanaceae	1
7	Apiaceae (Umbelliferae)	1	40	Cupressaceae	1	73	Papaveraceae	1
8	Apocynaceae	17	41	Cycadaceae	1	74	Papilionaceae	6
9	Araceae	8	42	Cyperaceae	1	75	Passifloraceae	4
10	Araliaceae	4	43	Elaeocarpaceae	1	76	Phyllanthaceae	1
11	Araucariaceae	1	44	Euphorbiaceae	25	77	Piperaceae	2
12	Arecaceae (Palmae)	10	45	Euphorbiaceae	1	78	Plantaginaceae	1
13	Aristolochiaceae	1	46	Fabaceae	10	79	Poaceae (Gramineae)	5
14	Asclepiadaceae	2	47	Geraniaceae	1	80	Polemoniaceae	1
15	Asparagaceae	8	48	Lamiaceae (Labiatae)	11	81	Polygonaceae	2
16	Asteraceae (Compositae)	21	49	Lauraceae	1	82	Ranunculaceae	1
17	Balsaminaceae	1	50	Lecythidaceae	2	83	Rhamnaceae	3
18	Basellaceae	1	51	Liliaceae	2	84	Rosaceae	3
19	Bignoniaceae	21	52	Lythraceae	5	85	Rubiaceae	17
20	Bixaceae	1	53	Magnoliaceae	1	86	Rutaceae	8
21	Bombacaceae	2	54	Malpighiaceae	1	87	Rutaceae	1
22	Boraginaceae	3	55	Malvaceae	8	88	Salvadoraceae	1
23	Brassicaceae	1	56	Marantaceae	1	89	Sapindaceae	1
24	Burseraceae	1	57	Marsileaceae	1	90	Sapotaceae	3
25	Cactaceae	1	58	Meliaceae	2	91	Scrophulariaceae	2
26	Caesalpiniaceae	14	59	Menispermaceae	4	92	Simaroubaceae	1
27	Cannaceae	1	60	Mimosaceae	8	93	Solanaceae	12
28	Capparaceae	2	61	Mimosaceae	1	94	Sterculiaceae	2
29	Caricaceae	1	62	Moraceae	8	95	Tiliaceae	2
30	Caryophyllaceae	2	63	Moringaceae	2	96	Verbenaceae	16
31	Casuarinaceae	1	64	Musaceae	2	97	Vitaceae	3
32	Clusiaceae	1	65	Myrtaceae	6	98	Zingiberaceae	6
33	Combretaceae	3	66	Nephrolepidaceae	1	99	Zygophyllaceae	1

The important dominant species with large Girth at Breast Height (GBH) also had been measured within the three home Garden and the Factory area of Aava Natural Mineral Water. The details of the measurements are given in Table 5, 6 and 7. Many of the Tree species are quite old and having more than 4 feet of GBH.

Table 5: Tree species Measurement from Mehta's House

Species Name	Local Name	Life Form	Family	GBH (Ft.)
Delonix regia	Gul Mahor	T	Caesalpiniaceae	3.3
Ailanthus excelsa Roxb.	Rukhdo	T	Simaroubaceae	7.7
Peltophorum pterocarpum DC.	Tamrafali	T	Caesalpiniaceae	3.6
Stercullia foetida L.	Jangli kaju badam	T	Sterculiaceae	3.4
Phyllanthus embilica	Amla	T	Euphorbeaceae	3.9
Ceiba pentandra L.	Safed simlo	T	Bombacaceae	8.2
Casuarina equisetifolia L.	Sharu	T	Casuarinaceae	6.5
Ficus hispida L.	Dhedh umardo	T	Moraceae	5.2
Kigelia pinnata Jacq.	Topgolo	T	Bignoniaceae	7.1
Cassia fistula L.	Garmalo	T	Caesalpiniaceae	3.9
Eucalyptus globulus Labill.	Nilgiri	T	Myrtaceae	5.2
Acacia niotica L.	Baval	T	Caesalpiniaceae	6.7
Ficus religiosa L.	Piplo	T	Moraceae	7.2
Ficus recemosa L.	Umaro	T	Moraceae	7.1
Azadirechta indica A. Juss.	Limado	T	Meliaceae	5.2
Plumeria rubra L.	Champo	T	Apocynaceae	3.2
Roystonea regia	Bottle palm	T	Arecaceae	2.9
Drypetes roxburghii Wall.	Putranjivi	T	Euphorbeaceae	4.5
Leucaena leucocephala Lam.	Pardesi baval	T	Caesalpiniaceae	8.1

Table 6: Tree species Measurement from Factory Area

Azadirechta indica A. Juss.	Limado	T	Meliaceae	8.6
Ailanthus excelsa Roxb.	Rukhdo	T	Simaroubaceae	6.8
Prosopis juliflora Sw.	Gando baval	T	Caesalpiniaceae	4.4
Ficus religiosa L.	Piplo	T	Moraceae	3.4
Cordia dichotoma Forst.	Gundo	T	Ehretiaceae	8.5
Ficus recemosa L.	Umaro	T	Moraceae	4.1

Table 7: Tree species Measurement from Mr. Cambatta's House

Azadirechta indica A. Juss.	Limado	T	Meliaceae	6.12
Polyalthia longifolia sonn.	Asopalav	T	Annonaceae	5.5
Adina cordifolia Roxb.	Haldarvo	T	Rubiaceae	8.8
Peltophorum pterocarpum DC.	Tamrafali	T	Caesalpiniaceae	8.7
Kigelia pinnata Jacq.	Topgolo	T	Bignoniaceae	8
Cassia fistula L.	Garmalo	T	Caesalpiniaceae	7.6
Mangifera indica L.	Ambo	T	Anacardiaceae	5.8
Bauhinia purpurea L.	kanchanar	T	Caesalpiniaceae	5.11
Manilkara zapota L.	Chiku	T	Sapotaceae	4.6
Plumeria rubra L.	Champo	T	Apocynaceae	4.3

Photo Plate 4: Large Trees and The Landscape of the Study Area

Discussion:

The urban woodland interphase is very important for sustaining variety of species as well as overall biodiversity in context of the unparalleled developmental pressure worldwide. The study area near the Sabarmati riverfront is also having an urban woodland interphase and thus a good amount of biodiversity exists within the study area. The study being a rapid survey might have missed some species of avifauna, that are seasonal but 61 species were recorded during the rapid survey. Most of them are resident birds and common in urban woodland landscape. The floral species diversity is also very high and within the *Prosopis* dominant patch also we found 50 species. The major species within the home gardens are ornamental species and some are exotic also (Checklist of Floral Species).

Urban development and urbanisation are man-made systems include physical, biological, and social processes and result in the development of urban infrastructure such as buildings and streets/roads, often leaving little space for vegetation. Tree Census (2021) in Ahmedabad urban area showed a density of 10.38 trees/ha which decreased from 13.1 trees/ha in 2011. Interestingly, the percentage of green cover reported by Padmanaban (2016) was 24% for Ahmedabad city which is higher than the other Indian cities like Bhopal (22% by Singh, 2012), Nagpur (12.80 % by Khadri *et al.,* 2014), Delhi (11.90% by Singh, 2012), Kolkota (7.30% by Padmanaban, 2016), Bangalore (6.85% by FSI, 2013) and Hyderabad (5% by FSI, 2013). Among urban green patches, trees commonly comprise the main component, highly represented by exotic species that can become invasive in the urban areas. Nevertheless, even ornamental plants could increase the pollinators in the surrounding areas along with cultural values.

As stated by M. Menon and K. Kohli (2021), the protection and management of trees in cities cannot be seen as a regulatory exercise separated from urban processes and ecologies. Urban planning processes cannot continue to accommodate trees and other environmental features without relating to their socio-ecological functions. The issues of tree planting and afforestation, tree protection or conservation and regulation of tree felling need to be addressed through discussions and deliberations that involve not just experts such as urban planners and ecologists but residents of cities who use city spaces and treescapes in multiple ways, formal and informal. The old growth trees are important

as Carbon sequester and also abating air pollution. So the old growth tree species found within the study site needs to be conserved.

The per capita green space availability in city vicinity as per WHO Norms is 9 m^2/Person while UDPFI Guideline says 10-12 m^2/Person. In Ahmedabad the urban green space availability was 0.37m^2/Person which is very low. The Ahmedabad city is devoid of any major physical feature except for the river Sabarmati, which is suitable area for developing green spaces. The greenery-based conceptual model with green urbanism led to secure a healthy sustainable future for the urban populations of Ahmedabad as well as other cities in Gujarat. For a sustainable and environmentally friendly urbanization, there is an urgent need for comprehensive land use planning and of urban settlements by giving due consideration to create and sustain urban green spaces such as parks, gardens, roadside and riverside vegetation, etc.

The river side vegetation patches are very important for the rejuvenation of Sabarmati river and maintainance of the downstream of the river. It is evident from various studies that the vegetation patches in the catchment area improves the water quality and retention potential of the river (Debska *et al.* 2022: Santosh *et al.* 2020; Bogdal *et al*. 2019). The riverside vegetation also revives in the water quality and also the ground water level (Ramachandra, 2014).

Therefore, it is imperative that the retention of native vegetation is an effective strategy to conserve urban biodiversity [Hahs, A.K. *et al*., 2009) by way of collectively protecting the existing tree patches and planting new native vegetation has great potential to curb urban biodiversity loss. Plantation of *Syzygium cumini, Ficus benghalensis, Saraca indica, Ficus religiosa, Azadirachta indica, Pongamia pinnata* and *Acacia* Spp. will have tolerance to air pollution as well as purify the air quality of the area.

The faunal species distribution used to depend on the habitat integrity and the floral species assemblage as most of the faunal species (herbivores, nectarivores, frugivores, etc.) depends on the floral species assemblage. The developmental pressure often affects the habitat integrity of an area and thus will affect the faunal assemblage of the area. Another important factor is the urban green spaces are fragmented and where ever possible the patches need to be linked to enhance the urban biodiversity which in turn enhance to quality of life for all residents.

So positive management efforts for this area would conserve the remaining vegetation patches in pervue of holistic conservation of the Sabarmati river front area. Further the *Prosopis* may be replaced by native tree species in future for natural growth of the vegetation in the area.

Further, plantation of a greater number of trees in small areas could overcome the problem of human-tree ratio in urban areas of Ahmedabad. Generally, *Miyawaki* forests become self-sustainable within two years; that reduces post maintenances. These plantations are robust, higher survival rates more Carbon-dioxide absorption and also resistance to environmental disturbances. Thus, *Miyawaki* concept could be a best option to enhance the urban green spaces with high number of trees to meet the tree-human ratio.

Purple Sunbird

Baya Weaver

Black Kite

Coppersmith Barbet

Spotted Owlet

White-bellied Drongo

Photo Plate 5: Bird Species Recorded Within the Study Area

Indian Silver Bill

Eurasian Collared Dove

Black Drongo

Rose-ringed Parakeet

White-browed fantail

Red-vented Bulbul

Photo Plate 6: Bird Species Recorded Within the Study Area

Purple Swamphen

Indian Pond Heron

Black-winged Stilt

Indian Spot-billed Duck

Red-naped Ibis

Cattle Egret

Photo Plate 7: Bird Species Recorded Within the Study Area

Common Greenshank

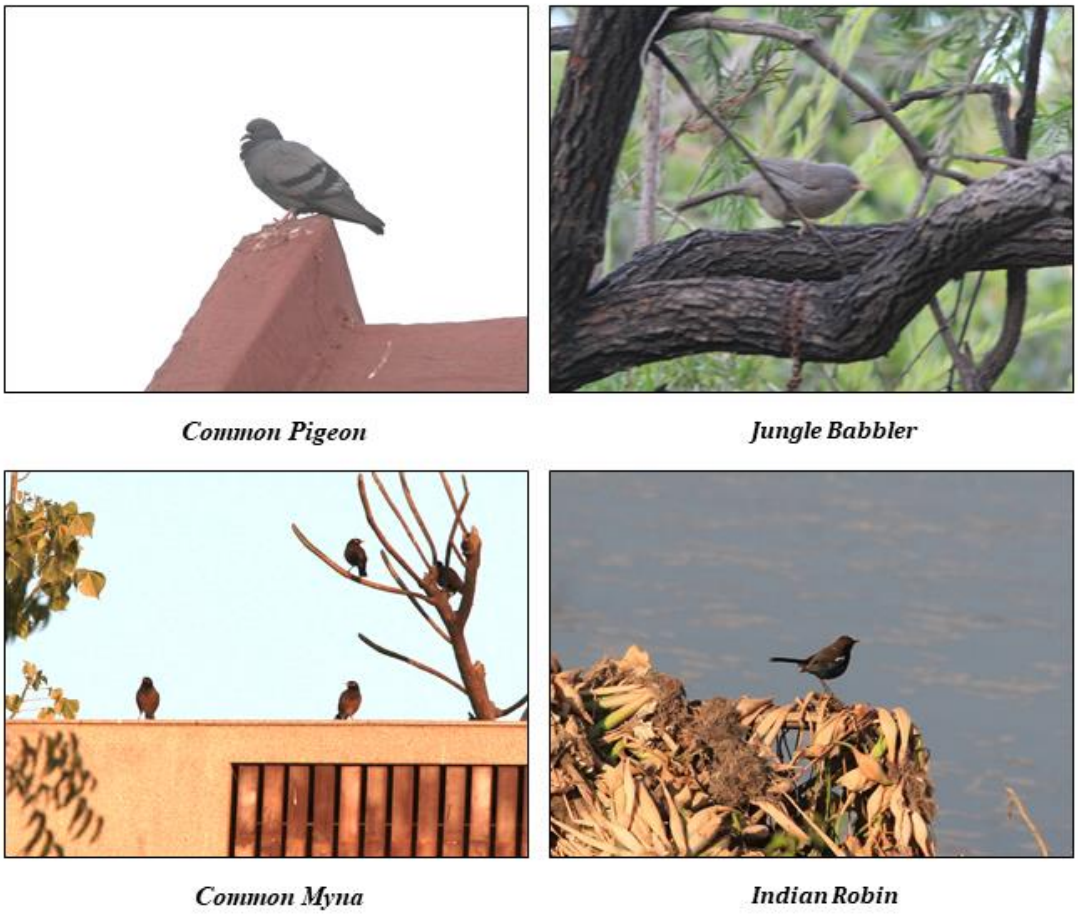
White-throated Kingfisher

White-browed Wagtail

White-breasted Waterhen

A group of 5 bird spp., i.e., Black-winged Stilt, Eurasian Coot, Indian Spot-billed Duck, River Tern, and Indian Cormorant in one frame

Photo Plate 8: Bird Species Recorded Within the Study Area



Common Pigeon

Jungle Babbler

Common Myna

Indian Robin

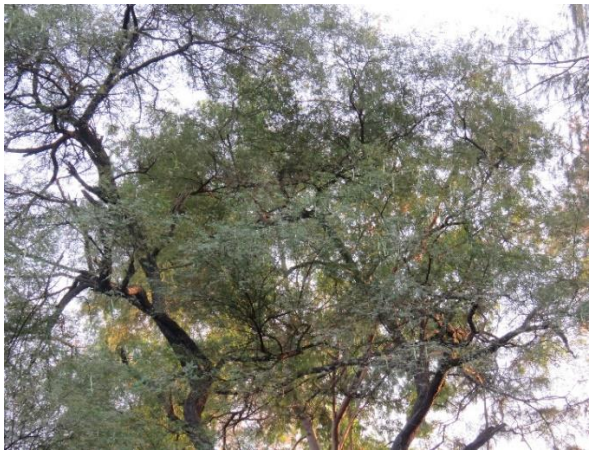
Photo Plate 9: Bird Species Recorded Within the Study Area

Fernandoa adenophylla

Phyllanthus emblica

Commiphora wightii

Sterculia foetida

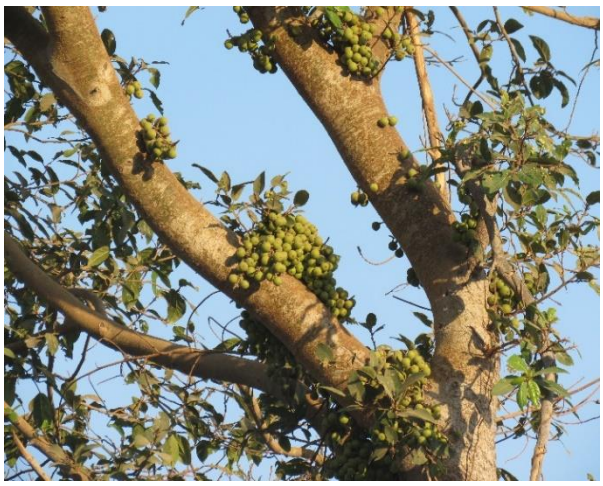


Acacia nilotica

Putranjiva roxburghii

Photo Plate 10: Plant Species Recorded Within the Study Area

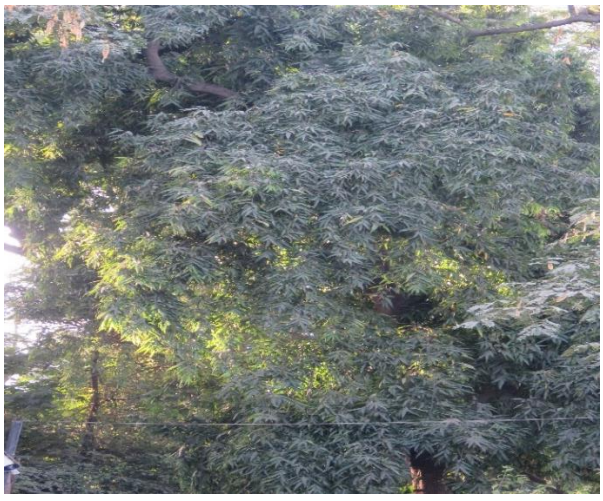
Prosopis juliflora



Ficus racemosa

Ficus religiosa

Albizia lebbeck



Polyalthia longifolia

Ailanthus excelsa

Photo Plate 11: Plant Species Recorded Within the Study Area

Leucaena leucocephala

Lantana camara

Delonix regia

Couroupita guianensis

Hyptis suaveolens

Azadirachta indica

Photo Plate 12: Plant Species Recorded Within the Study Area

Celosia argentea

Lilium bulbiferum

Impatiens walleriana

Tagetes erecta

Calendula officinalis

Cheilocostus speciosus

Photo Plate 13: Plant Species Recorded Within the Study Area

Mansoa alliacea

Bauhinia blakeana

Epipremnum aureum

Euphorbia pulcherrima

Rosa damascena

Canna indica

Photo Plate 14: Plant Species Recorded Within the Study Area

Triplaris brasiliana

Barleria cristata

Adenium obesum

Mirabilis jalapa

Euphorbia leucocephala

Galphimia glauca

Photo Plate 15: Plant Species Recorded Within the Study Area

Checklist of Avifauna observed in the study area

Sr. No.	Order	Family	Common Name	Scientific Name	IUCN Status	IWPA Status	Foraging Status
1	Accipitriformes	Accipitridae	Black Kite	*Milvus migrans*	LC	Sch I	Omnivore
2	Accipitriformes	Accipitridae	Shikra	*Accipiter badius*	LC	Sch I	Omnivore
3	Anseriformes	Anatidae	Comb Duck	*Sarkidiornis melanotos*	LC	Sch IV	Herbivore
4	Anseriformes	Anatidae	Indian Spot-billed Duck	*Anas poecilorhyncha*	LC	Sch IV	Herbivore
5	Apodiformes	Apodidae	Asian Palm Swift	*Cypsiurus balasiensis*	LC	Sch IV	Insectivore
6	Bucerotiformes	Upupidae	Common Hoopoe	*Upupa epops*	LC	Sch IV	Insectivore
7	Caprimulgiformes	Recurvirostridae	Black-winged Stilt	*Himantopus himantopus*	LC	Sch IV	Insectivore
8	Charadriiformes	Charadriidae	Red-wattled Lapwing	*Vanellus indicus*	LC	Sch IV	Omnivore
9	Charadriiformes	Laridae	River Tern	*Sterna aurantia*	NT	Sch IV	Piscivore
10	Charadriiformes	Scolopacidae	Common Greenshank	*Tringa nebularia*	LC	Sch IV	Omnivore
11	Columbiformes	Columbidae	Eurasian Collared Dove	*Streptopelia decaocto*	LC	Sch IV	Granivore
12	Columbiformes	Columbidae	Laughing Dove	*Streptopelia senegalensis*	LC	Sch IV	Granivore
13	Columbiformes	Columbidae	Rock Pigeon	*Columba livia*	LC	Sch IV	Granivore
14	Columbiformes	Columbidae	Spotted Dove	*Streptopelia chinensis*	LC	Sch IV	Granivore

15	Coraciiformes	Alcedinidae	Pied Kingfisher	*Ceryle rudis*	LC	Sch IV	Piscivore
16	Coraciiformes	Alcedinidae	White-throated Kingfisher	*Halcyon smyrnensis*	LC	Sch IV	Piscivore
17	Coraciiformes	Coraciidae	Indian Roller	*Coracias benghalensis*	LC	Sch IV	Insectivore
18	Coraciiformes	Meropidae	Green Bee-eater	*Merops orientalis*	LC	Sch IV	Insectivore
19	Cuculiformes	Cuculidae	Asian Koel	*Eudynamys scolopaceus*	LC	Sch IV	Frugivore
20	Cuculiformes	Cuculidae	Greater Coucal	*Centropus sinensis*	LC	Sch IV	Omnivore
21	Galliformes	Phasianidae	Grey Francolin	*Francolinus pondicerianus*	LC	Sch IV	Omnivore
22	Galliformes	Phasianidae	Indian Peafowl	*Pavo cristatus*	LC	Sch I	Omnivore
23	Gruiformes	Rallidae	Eurasian Coot	*Fulica atra*	LC	Sch IV	Omnivore
24	Gruiformes	Rallidae	Purple Swamphen	*Porphyrio porphyrio*	LC	Sch IV	Omnivore
25	Gruiformes	Rallidae	White-breasted Waterhen	*Amaurornis phoenicurus*	LC	Sch IV	Omnivore
26	Passeriformes	Aegithinidae	Common Iora	*Aegithina tiphia*	LC	Sch IV	Insectivore
27	Passeriformes	Cisticolidae	Ashy Prinia	*Prinia socialis*	LC	Sch IV	Insectivore
28	Passeriformes	Cisticolidae	Plain Prinia	*Prinia inornata*	LC	Sch IV	Insectivore
29	Passeriformes	Corvidae	House Crow	*Corvus splendens*	LC	Sch V	Omnivore
30	Passeriformes	Corvidae	Rufous Treepie	*Dendrocitta vagabunda*	LC	Sch IV	Omnivore
31	Passeriformes	Dicruridae	Black Drongo	*Dicrurus macrocercus*	LC	Sch IV	Insectivore

32	Passeriformes	Dicruridae	White-bellied Drongo	*Dicrurus caerulescens*	LC	Sch IV	Insectivore
33	Passeriformes	Estrildidae	Indian Silverbill	*Euodice malabarica*	LC	Sch IV	Granivore
34	Passeriformes	Hirundinidae	Barn Swallow	*Hirundo rustica*	LC	Sch IV	Insectivore
35	Passeriformes	Hirundinidae	Wire-tailed Swallow	*Hirundo smithii*	LC	Sch IV	Insectivore
36	Passeriformes	Laniidae	Long-tailed Shrike	*Lanius schach*	LC	Sch IV	Omnivore
37	Passeriformes	Leiothrichidae	Jungle Babbler	*Turdoides striata*	LC	Sch IV	Omnivore
38	Passeriformes	Motacillidae	White-browed Wagtail	*Motacilla maderaspatensis*	LC	Sch IV	Insectivore
39	Passeriformes	Muscicapidae	Black Redstart	*Phoenicurus ochruros*	LC	Sch IV	Insectivore
40	Passeriformes	Muscicapidae	Indian Robin	*Saxicoloides fulicatus*	LC	Sch IV	Insectivore
41	Passeriformes	Muscicapidae	Oriental Magpie Robin	*Copsychus saularis*	LC	Sch IV	Insectivore
42	Passeriformes	Nectariniidae	Purple Sunbird	*Cinnyris asiaticus*	LC	Sch IV	Nectarivore
43	Passeriformes	Oriolidae	Indian Golden Oriole	*Oriolus kundoo*	LC	Sch IV	Insectivore
44	Passeriformes	Passeridae	House Sparrow	*Passer domesticus*	LC	Sch IV	Granivore
45	Passeriformes	Ploceidae	Baya Weaver	*Ploceus philippinus*	LC	Sch IV	Granivore
46	Passeriformes	Pycnonotidae	Red-Vented Bulbul	*Pycnonotus cafer*	LC	Sch IV	Frugivore
47	Passeriformes	Pycnonotidae	White-eared Bulbul	*Pycnonotus leucotis*	LC	Sch IV	Frugivore
48	Passeriformes	Rhipiduridae	White-browed Fantail	*Rhipidura aureola*	LC	Sch IV	Insectivore

49	Passeriformes	Sturnidae	Asian Pied Starling	*Gracupica contra*	LC	Sch IV	Omnivore
50	Passeriformes	Sturnidae	Common Myna	*Acridotheres tristis*	LC	Sch IV	Omnivore
51	Passeriformes	Zosterpidae	Oriental White-eye	*Zosterops palpebrosus*	LC	Sch IV	Nectarivore
52	Pelecaniformes	Ardeidae	Great Egret	*Ardea alba*	LC	Sch IV	Piscivore
53	Pelecaniformes	Ardeidae	Indian Pond Heron	*Ardeola grayii*	LC	Sch IV	Piscivore
54	Pelecaniformes	Ardeidae	Little Egret	*Egretta garzetta*	LC	Sch IV	Piscivore
55	Pelecaniformes	Threskiornithidae	Black-headed Ibis	*Threskiornis melanocephalus*	NT	Sch IV	Omnivore
56	Pelecaniformes	Threskiornithidae	Red-naped Ibis	*Threskiornis melanocephalus*	LC	Sch IV	Omnivore
57	Piciformes	Megalaimidae	House Crow	*Psilopogon haemacephalus*	LC	Sch IV	Frugivore
58	Psittaciformes	Psittaculidae	Alexandrine Parakeet	*Psittacula eupatria*	NT	Sch IV	Frugivore
59	Psittaciformes	Psittaculidae	Rose-ringed Parakeet	*Psittacula krameri*	LC	Sch IV	Frugivore
60	Strigiformes	Strigidae	Spotted Owlet	*Athene brama*	LC	Sch IV	Omnivore
61	Suliformes	Phalacrocoracidae	Little Cormorant	*Microcarbo niger*	LC	Sch IV	Piscivore

Checklist of Floral Species observed in the study area

No.	Scientific Names	Common Name	Family	Variety (O/W)	Plant Form
1	*Abutilon indicum* (L.) Sw.	Khapato, Dabaliar	Malvaceae	Wild	Shrub
2	*Acacia nilotica* (L.) Del.	Deshi Baval, Bavar	Mimosaceae	Wild	Tree
3	*Acacia tortalis* (Forsk.) Hayne.	Israil Baval	Mimosaceae	Wild	Tree
4	*Acalypha hispida* Burm.f.	Bilad punch, Cat's Tail	Euphorbiaceae	Wild	Shrub
5	*Acalypha indica* L	Vaichikato, Dadaro, Indian	Euphorbiaceae	Wild	Herb
6	*Acalypha wilkesiana* MuelL - ARg. ex. DC. Var Ceylon	copperleaf	Euphorbiaceae	Ornamental	Shrub
7	*Adenium obesum* (Forssk.)Roem. & Schult.	Red Sandalwood, Desert rose	Apocynaceae	Ornamental	Shrub
8	*Aegle marmelos* (L.) Correa	Bili, Stone apple, Wood apple	Rutaceae	Wild	Tree
9	*Agave americana* L.	Ketki, Vilayati Kumvar, Century	Agavaceae	Wild	Shrub
10	*Agave attenuata* Salm-Dyck	Dragon Tree Agave, Fox Tail	Agavaceae	Ornamental	Herb
11	*Agave sisalana* Perrive	Sisal Fobre Plant	Agavaceae	Ornamental	Shrub
12	*Ageratum houstonianum*	Floss flower, Blue mink, Mexican Paintbrush	Asteraceae (Compositae)	Wild	Herb

13	*Ailanthus excelsa* Roxb	Arduso, Indian Tree of Heaven	Simaroubaceae	Wild	Tree
14	*Alangium salvifolium* (L.f.)	Ankol, Ankoli, Sage Leaved	Cornaceae	Ornamental	Tree
15	*Albizia lebbeck* (L.) Benth	Kaliosaras, Shirish	Mimosaceae	Wild	Tree
16	*Albizia saman* (Jacq.) Merr	Rato Shirish, Rato Sarasdo,	Mimosaceae	Ornamental	Tree
17	*Alcea rosea* L.	Hollyhock	Malvaceae	Ornamental	Herb
18	*Allamanda blanchetii* A. DC	Purple Allamanda	Apocynaceae	Ornamental	Climber
19	*Allamanda schottii* Pohl	Golden Trumpet Vine	Apocynaceae	Ornamental	Climber
20	*Alocasia macrorrhizos* (L.) G.	Advi, Giant Taro, Upright	Arecaceae (Palmae)	Ornamental	Herb
21	*Aloe vera* (L.) Burm.f	Kuwarpathu	Liliaceae	Wild	Herb
22	*Alpinia purpurata* (Vieillard) K	Ornamental Ginger	Zingiberaceae	Ornamental	Herb
23	*Alstonia macrophylla* Wall. Ex G. Don	Batino, Hard Alstonia	Apocynaceae	Ornamental	Tree
24	*Alstonia scholaris* (L.) R.Br.	Saptaparni, Devil's Tree,	Apocynaceae	Ornamental	Tree
25	*Alternanthera bettzickiana* (Regel) G. Nicholson	Lal Mehndi, Red Calico Plant,	Amaranthaceae	Ornamental	Herb
26	*Alternanthera ficoidea* (L.) P. Beauv.	Sanguinarea	Amaranthaceae	Ornamental	Herb
27	*Alternanthera pungens* H. B. & K.	Kantaro Jar Bhangaro	Amaranthaceae	Wild	Herb
28	*Alternanthera sessilis* (L.) DC.	Jar Bhaji, Jar Bhangaro	Amaranthaceae	Wild	Herb
29	*Amaranthus hypochondriacus* L.	Prince-of-Wales Feather,	Amaranthaceae	Ornamental	Herb

30	*Ammannia nagpurensis*	Jal Agio	Amaranthaceae	Ornamental	Herb
31	*Amomum subulatum* Roxb.	Elcho	Zingiberaceae	Ornamental	Herb
32	*Amorphophallus paeoniifolius*	Suran, Elephant's Foot	Araceae	Ornamental	Herb
33	*Angelonia angustifolia* Benth	Narrowleaf Angelonia,	Scrophulariaceae	Ornamental	Herb
34	*Anisomeles heyneana* Benth	Western Hill Catmint	Lamiaceae (Labiatae)	Ornamental	Herb
35	*Anisomeles indica* (L.) Kuntze	Gopati, Chodhari, Indian	Lamiaceae (Labiatae)	Wild	Herb
36	*Anisomeles malabarica*	Catmint	Lamiaceae (Labiatae)	Wild	Herb
37	*Annona squamosa* L.	Sitaphal, Custard Apple,	Annonaceae	Ornamental	Tree
38	*Antigonon leptopus* Hook. &	Ice-cream Vel, Coral Vine,	Polygonaceae	Ornamental	Climber
39	*Aphelandra Coccinea* Rizzini	Zebra Plant	Acanthaceae	Ornamental	Shrub
40	*Araucaria columnaris*	Cook pine	Araucariaceae	Ornamental	Tree
41	*Arctotis fastuosa*	Venidium, Cape Daisy	Asteraceae (Compositae)	Ornamental	Plant
42	*Areca catechu*	Sopari	Arecaceae (Palmae)	Ornamental	Tree
43	*Argyreia nervosa* (Burm. f.) Bojer	Samudrasosh, Elephant Creeper	Convolvulaceae	Ornamental	Climber
44	*Aristida adscensionis* L.	Jandhar Lambha Ga	Poaceae (Gramineae)	Wild	Grass

45	*Aristolochia Indica* L	Sapsund	Aristolochiaceae	Ornamental	Climber
46	*Artabotrys hexapetalus* (L.f.)Bhandari	Green Champa, Lilo Champo,	Annonaceae	Ornamental	Shrub
47	*Asclepias curassavica* L.	Scarlet Milkweed, Bloodflower,Silkweed, Butterfly Weed	Asclepiadaceae	Ornamental	Herb
48	*Leea asiatica* Risdale L	Vanchalita (Asiatic Leea)	Vitaceae	Ornamental	Shrub
49	*Asparagus densiflorus* (Kunth)Jessop	Asparagus Fern, Sprenger Asparagus, Foxtail Asparagus	Asparagaceae	Ornamental	Herb
50	*Asparagus recemosus* Willd	Satavari	Asparagaceae	Wild	Climber
51	*Asystasia gangetica* (L.) T. Anderson	Ganges Primrose, Chinese Violet, Creeping Foxglove	Acanthaceae	Ornamental	Herb
52	*Azadirachta indica* A. Juss.	Limbdo, Neem, Margosa	Meliaceae	Wild	Tree
53	*Bacopa monnieri* (L) Wettst.	Brahmi, Jalnevari	Scrophulariaceae	Ornamental	Herb
54	*Bambusa tuldoides* Munro	Buddha Bamboo, Buddha's-	Poaceae (Gramineae)	Ornamental	Grass
55	*Bambusa vulgaris* Schrad	Vans, Golden Bamboo	Poaceae (Gramineae)	Ornamental	Grass
56	*Barleria cristata* L.	Gokran, Crested Philippine violet, Vajradanti	Acanthaceae	Ornamental	Herb
57	*Barleria lupulina* Lindl.	Hophead, Philippine Violet	Acanthaceae	Ornamental	Shrub
58	*Barleria prionitis* Linn Pennel	Vajradanti	Acanthaceae	Ornamental	Shrub

59	*Basella alba* L.	Pothi-ni-vel, Poi, Indian	Basellaceae	Ornamental	Climber
60	*Basilicum polystachyon* (L.)Moench	Musk Basil	Lamiaceae (Labiatae)	Ornamental	Herb
61	*Bauhinia acuminata*	White Dwarf Orchid	Fabaceae	Ornamental	Shrub
62	*Bauhinia blakeana*	Kanchnar	Fabaceae	Ornamental	Tree
63	*Bauhinia purpurea* L.	Rakta - Kanchan, Dev -	Caesalpiniaceae	Ornamental	Tree
64	*Bauhunia variegata* L. Var. Candida	Safed Kachnar	Caesalpiniaceae	Ornamental	Tree
65	*Beaucarnea recurvata* Lem	Elephant's Foot Tree, Ponytail	Asparagaceae	Ornamental	Herb
66	*Bignonia magnifica* W.Bull	Glow Vine, Purple Funnel Vine, Lasan Vel	Bignoniaceae	Ornamental	Climber
67	*Bixa orellana* L.	Sindoori, Lipstick tree,	Bixaceae	Ornamental	Shrub
68	*Blainvillea acmella* (L.) Philip.	Aso Bhangaro, Tal Bhangro	Asteraceae (Compositae)	Wild	Herb
69	*Boerhavia diffusa* L.	Rafadi, Rafadiaul, Rati	Nyctaginaceae	Wild	Herb
70	*Bombax ceiba* L.	Shimlo, Red-Silk Cotton	Bombacaceae	Ornamental	Tree
71	Bougainvillea glabra Choisy	Bogal Vel	Nyctaginaceae	Ornamental	Climber
72	*Bougainvillea spectabilis* Willd	Bougainvel	Nyctaginaceae	Wild	Climber
73	*Breynia disticha / Breynia nivosa*	Snow bush	Phyllanthaceae	Ornamental	Shrub
74	*Brugmansia versicolor*	Angels Trumpet	Solanaceae	Ornamental	Shrub
75	*Brya ebenus* (L.) DC	Jamaican Rain tree	Fabaceae	Ornamental	Shrub

76	*Bryophyllum delagoense* (Eckl.& Zeyh.) Druce	Live-Forever, Mother of	Crassulaceae	Ornamental	Herb
77	*Bryophyllum pinnatum* (Lam.)Oken.	Pan-Futi, Life-Plant, Ghamari,	Crassulaceae	Ornamental	Herb
78	*Butea monosperma* (Lam.)Taub.	Khakhro, Palash, Flame of the	Papilionaceae	Wild	Tree
79	*Caesalpinia pulcherrima* (L)Sw.	Galtoro, Peacock Flower,	Caesalpiniaceae	Ornamental	Shrub
80	*Calamus rotang*	Tadi	Arecaceae (Palmae)	Ornamental	Tree
81	*Calathea crotalifera*	Yellow Rattleshaker, Rattlesnake Plant	Marantaceae	Ornamental	Plant
82	*Calendula officinalis* L.	Calendula, Pot-Marigold,Garden Marigold, Kadambari	Asteraceae (Compositae)	Ornamental	Herb
83	*Calliandra haematocephala* Hassk.	Powder Puff	Mimosaceae	Ornamental	Shrub
84	*Calliandra surinamensis* Benth.	Powder Puff	Fabaceae	Ornamental	Tree
85	*Callistemon citrinus* (Curtis)Skeels	Bottle Brush, Laila Majnu	Myrtaceae	Ornamental	Tree
86	*Calophyllum inophyllum* L.	Nagchampo, Undi, Sultan	Clusiaceae	Ornamental	Tree
87	*Campsis radicans* (L.) Seem.	Tilottama, Trumpet Creeper,	Bignoniaceae	Ornamental	Climber
88	*Canna indica* L.	Indian Shot, Dev Ked,Bajarbattu	Cannaceae	Ornamental	Herb
89	*Capparis sepiaria* L.	Kanther, Wild Caper Bush	Capparaceae	Wild	Climber
90	*Careya arborea*	Wild Guava	Lecythidaceae	Ornamental	Tree
91	*Carica papaya* L.	Papaiyu, Papaw, Tree Melon	Caricaceae	Ornamental	Tree

92	*Carissa congesta* Wight	Karamda, Karanda	Apocynaceae	Wild	Shrub
93	*Caryota urens* L.	Shivjata, Shankerjata, Wine	Arecaceae (Palmae)	Ornamental	Tree
94	*Cassia auriculata*	Aval, Avaram Senna	Caesalpiniaceae	Wild	Shrub
95	*Cassia biflora*		Fabaceae	Ornamental	shrub
96	*Cassia fistula* L.	Garmalo, Indian Laburnum,	Caesalpiniaceae	Wild	Tree
97	*Cassia grandis* L.f.	Coral Shower Tree, Horse	Caesalpiniaceae	Ornamental	Tree
98	*Cassia javanica* L.	Java Cassia, Pink Cassia, Pink	Caesalpiniaceae	Wild	Tree
99	*Cassia occidentalis* L.	Vado Sundaro, Vadi Sundari	Caesalpiniaceae	Wild	Herb
100	*Cassia roxburghii* DC.	The Red Cassia, Ceylon	Caesalpiniaceae	Wild	Tree
101	*Cassia tora* L.	Punvar, Povario	Caesalpiniaceae	Wild	Herb
102	*Casuarina equisetifolia* L.	Sharu, Beef-wood Tree, Sea-	Casuarinaceae	Ornamental	Tree
103	*Catharanthus roseus* (L) G.Don.	Baramasi, Sadaphuli,	Apocynaceae	Ornamental	Herb
104	*Ceiba pentandra* (L.) Gaertn.	Kapok Tree, White Silk Cotton Tree, Safed Shimdo	Bombacaceae	Ornamental	Tree
105	*Celosia argentea* L.	Lalmurga, Cockscomb Crested, Morshikha	Amaranthaceae	Wild	Herb
106	*Celosia spicata* Spreng.	Silver Cockscomb, Wheat Celosia, Lampdi, Lampdu	Amaranthaceae	Ornamental	Herb
107	*Centella asiatica* (L.) Urb.	Brahmi, Indian Pennywort	Apiaceae (Umbelliferae)	Ornamental	Herb

108	*Centratherum punctatum* Cass.	Brazilian Button Flower, Lark	Asteraceae (Compositae)	Ornamental	Herb
109	*Cestrum diurnum* L.	Divas no Raja, Day Jasmine	Solanaceae	Ornamental	Shrub
110	*Cestrum nocturnum* L.	Raat-ni-Rani, Night-blooming Jasmine	Solanaceae	Ornamental	Shrub
111	*Cestrum parqui* (Lam) L'Her	Willow-leaved Jasmine, Pili Raat-rani	Solanaceae	Ornamental	Shrub
112	*Cheilocostus speciosus* (J. Koenig) C. D. Specht	Crepe Ginger, Valkadi, Pavuta	Costaceae	Ornamental	Herb
113	*Chlorophytum comosum* (Thunb.) Jacques	Ribbon Plant, Spider-Ivy,Spider Plant, Airplane Plant,	Asparagaceae	Ornamental	Herb
114	*Cinnamomum tamala* (Buch.- Ham.) T.Nees & Eberm.	Tamalpatra, Indian Bay Lea f	Lauraceae	Ornamental	Tree
115	*Cissampelos pareira* L.	Venivel, Karandhiu, Velvet Leaf	Menispermaceae	Ornamental	Climber
116	*Cissus quadrangularis* L.	Hadsankal, Devil's backbone,	Vitaceae	Ornamental	Climber
117	*Citrus aurantifolia* (Christ.) Siwngle	West Indian Lime	Rutaceae	Ornamental	Tree
118	*Citrus grandis* Osbek	Pomelo	Rutaceae	Ornamental	Tree
119	*Citrus limon* (L.) Burm.f.	Lemon, Limbu	Rutaceae	Ornamental	Tree
120	*Citrus maxima* (Burm.) Osbeck	Papnas, Chakotra Limbu,	Rutaceae	Ornamental	Tree
121	*Citrus microcarpa* A Bounge	Chinese Orange	Rutaceae	Ornamental	Tree
122	*Clerodendrum fragrans*	Glory Bower	Lamiaceae (Labiatae)	Ornamental	Shrub

123	*Clerodendrum indicum* Druce	Bharangi, Turks Turban	Verbenaceae	Ornamental	Shrub
124	*Clerodendrum inerme* (L.)Gaertn	Vanjai, Vilayati Mehendi, Glory	Verbenaceae	Ornamental	Shrub
125	*Clerodendrum paniculatum*	Pagoda Flower	Verbenaceae	Ornamental	Shrub
126	*Clerodendrum speciosum* Dombrain	Red Bleeding Heart, Java	Verbenaceae	Ornamental	Climber
127	*Clerodendrum splendens* G.Don.	Flaming Glory Bower, Marvadi-Mogro	Verbenaceae	Ornamental	Climber
128	*Clitoria ternatea* L	Garnibibri Butterfly Pea	Papilionaceae	Ornamental	Climber
129	*Cocculus hirsutus* (L.) W.Theob.	Vevdi, Vasan vel, Broom	Menispermaceae	Wild	Climber
130	*Cocos nucifera* L.	Nariyal, Coconut	Arecaceae (Palmae)	Ornamental	Tree
131	*Codiaeum variegatum* (L.) Rumph. ex A.Juss.	Croton	Euphorbiaceae	Ornamental	Herb
132	*Codiaeum variegatum* L. var. Medium	Croton	Euphorbiaceae	Ornamental	Shrub
133	*Codiaeum variegatum* L. var. Petra	Croton	Euphorbiaceae	Ornamental	Shrub
134	*Codiaeum Variegatum* L. var. Thai gold	Croton	Euphorbiaceae	Ornamental	Shrub
135	*Codiaeum Variegatum* L. var. vi-ride	Croton	Euphorbiaceae	Ornamental	Shrub
136	*Combretum coccineum* Lam	Flame Vine	Bignoniaceae	Ornamental	Climber
137	*Combretum indicum* (L.) De Filipps	Madhumalti, Rangoon Vel,	Combretaceae	Ornamental	Climber
138	*Commelina benghalensis* L.	Sishmuliu	Commelinaceae	Wild	Herb

139	*Commiphora wightii* (Arn.) Bhandari	Gugal	Burseraceae	Ornamental	Shrub
140	*Consolida ajacis* (L.) Schur	Larkspur, Rocket Larkspur,	Ranunculaceae	Ornamental	Shrub
141	*Convolvulus microphyllus* (Roth) Sieb. ex Spr.	Mankhani, Makhan Val	Convolvulaceae	Wild	Herb
142	*Corchorus trilocularis* L.	Ubhi Mundheri	Tiliaceae	Ornamental	Herb
143	*Cordia dichotoma* G.Forst.	Mota Gunda, Indian Cherry,	Boraginaceae	Wild	Tree
144	*Cordia sebestena* L.	Scarlet Cordia, Orange Geiger	Boraginaceae	Ornamental	Shrub
145	*Cordia Sinesis* Lamk.	Gundi, Gondani, Lindri	Boraginaceae	Wild	Tree
146	*Cordyline fruticosa* (L.) A.Chev.	Red Dracaena, Ti Plant, Good	Agavaceae	Ornamental	Shrub
147	*Coreopsis tinctoria* Nutt.	Golden Coreopsis, Plains Coreopsis, Golden Tickseed	Asteraceae (Compositae)	Ornamental	Herb
148	*Corymbia citriodora* (Hook.)K.D.Hill & L.A.S.Johnson	Lemon Scented Gum, Nilgiri	Myrtaceae	Ornamental	Tree
149	*Cosmos bipinnatus* Cav.	Mexican Aster, Surangi	Asteraceae (Compositae)	Ornamental	Herb
150	*Cosmos sulphureus* Cav.	Yellow Cosmos	Asteraceae (Compositae)	Ornamental	Herb
151	*Couroupita guianensis*	Kailashpti	Lecythidaceae	Ornamental	Tree
152	*Crateva religiosa* G. Forst.	Vayvarno, The Sacred Barna,	Capparaceae	Ornamental	Tree
153	*Crescentia alata* Kunth.	Mexican Calabash, Winged	Bignoniaceae	Ornamental	Tree

154	*Crescentia cujete*	Calbash tree	Bignoniaceae	Ornamental	Tree
155	*Crinum asiaticum* L.	Nagdaman, Sukhdarshan,Sudarshan, Grand Crinum Lily,	Amaryllidaceae	Ornamental	Herb
156	*Crinum latifolium* L.	Pink Striped Trumpet Lily, Milk	Amaryllidaceae	Ornamental	Herb
157	*Crossandra infundibuliformis* (L.) Nees	Crossandra, Firecracker	Acanthaceae	Ornamental	Shrub
158	*Cryptostegia grandiflora* Roxb.ex R.Br.	Rubber Vel, Rubber Vine,Vilayati-Vacundi	Apocynaceae	Wild	Climber
159	*Cyanthillium cinereum* (L.) H.Rob.	Sahadevi, Little Ironweed,	Asteraceae (Compositae)	Ornamental	Herb
160	*Cycas revoluta*	Cycas	Cycadaceae	Ornamental	Tree
161	*Cymbopogon citratus* (DC.)Stapf	Lili Cha, Lemon Grass	Poaceae (Gramineae)	Ornamental	Grass
162	*Cyperus haspan* L.	Chiyo, Nidan moth	Cyperaceae	Wild	Shrub
163	*Dahlia pinnata (*D. × pinnata	Dahlia	Asteraceae (Compositae)	Ornamental	Shrub
164	*Dalbergia sissoo* DC.	Indian Rosewood, Sisum	Papilionaceae	Ornamental	Tree
165	*Datura innoxia* Mill	Horn of Plenty, Downy Thorn	Solanaceae	Wild	Herb
166	*Datura metel* L.	Horn of Plenty, Downy Thorn Apple, Kalo Dhaturo	Solanaceae	Wild	Shrub
167	*Delonix regia* (Hook.) Raf.	Gulmohar, Flame Tree, Royal	Caesalpiniaceae	Ornamental	Tree

168	*Dendrobium phalaenopsis*	Cooktown orchid, mauve butterfly orchid	Orchidaceae	Ornamental	orchid
169	*Dendrocalamus strictus* (Roxb.) Nees	Nakor Vans, Nar Vans, Man-	Poaceae (Gramineae)	Ornamental	Grass
170	*Dianthus barbatus*	sweet William	Caryophyllaceae	Ornamental	Herb
171	*Dianthus plumarius* L.		Caryophyllaceae	Ornamental	Herb
172	*Dieffenbachia seguine* (Jacq.) Schott	Dumb Cane, Mother-in-Law	Araceae	Ornamental	Herb
173	*Dimorphotheca pluvialis*	Rain daisy	Asteraceae (Compositae)	Ornamental	Plant
174	*Dombeya spectabilis* Bojer	Showy Dombeya, Maple	Sterculiaceae	Ornamental	Tree
175	*Dombeya wallichii*	Pinkball	Malvaceae	Ornamental	Shrub
176	*Dracaena Concinn*a Kunth	Dragon Tree	Agavaceae	Ornamental	Shrub
177	*Dracaena fragrans* (L.) Ker Gawl.	Cornstalk Dracaena	Agavaceae	Ornamental	Shrub
178	*Dracaena reflexa* Lam.	Song-of-India, Pleomele	Agavaceae	Ornamental	Tree
179	*Dracaena trifasciata*		Asparagaceae	Ornamental	Herb
180	*Duranta erecta* L.	Damyanti, Golden Dew-drops,	Verbenaceae	Ornamental	Shrub
181	*Dypsis lutescens* (H.Wendl.)Beentje & J.Dransf.	Golden Cane Palm, Areca	Arecaceae (Palmae)	Ornamental	Tree
182	*Elaeocarpus ganitrus*	Rudraksha Tree	Elaeocarpaceae	Ornamental	Tree
183	*Elettaria cardamomum*	Elaichi	Zingiberaceae	Ornamental	Shrub

184	*Epipremnum aureum* (Linden & Andre) G.S. Bunting	Centipede Tonga Vine, Golden	Araceae	Ornamental	Climber
185	*Epipremnum pinnatum* (L.) Engl.	Tonga Vine, Variegated-Philodendron, Surpankha,	Araceae	Ornamental	Climber
186	*Erythrina suberosa* Roxb.	Corky Coral Tree, Indian Coral Tree, Pangaro	Papilionaceae	Ornamental	Tree
187	*Erythrina Variegata* L	Pangaro	Fabaceae	Ornamental	Tree
188	*Etlingera elatior*	Torch Ginger	Zingiberaceae	Ornamental	Herb
189	*Eucalyptus globulus* Labill	Tasmanian Blue Gum Tree	Myrtaceae	Wild	Tree
190	*Euphorbia antiquorum* L.	Tidhari Thor, Triangular Spurge	Euphorbiaceae	Ornamental	Shrub
191	*Euphorbia grandicornis* Goebel	Cow horn Euphorbia	Euphorbiaceae	Ornamental	Shrub
192	*Euphorbia hirta* L.	Vadi Dudheli	Euphorbiaceae	Wild	Herb
193	*Euphorbia leucocephala* Lotsy	Snow Bush, White Small Leaf Poinsettia, Snow Flake, White-	Euphorbiaceae	Ornamental	Shrub
194	*Euphorbia milii* Des Moul.	Crown of Thorns	Euphorbiaceae	Ornamental	Shrub
195	*Euphorbia pulcherrima* Willd. Ex Klotzsch	Lalpatti, Poinsettia, Christmas	Euphorbiaceae	Ornamental	Shrub
196	*Euphorbia thymifolia* L.	Nani-Dudheli	Euphorbiaceae	Ornamental	Herb
197	*Euphorbia tithymaloides* L.	Lady's Slipper Flower Plant,Vilati Kharsani, Devil's	Euphorbiaceae	Ornamental	Shrub

198	*Fernandoa adenophylla* (Wall.ex G.Don) Steenis	Katsagon Tree	Bignoniaceae	Ornamental	Tree
199	*Ficus amplissima* Sm.	Piper, Pipali	Moraceae	Wild	Tree
200	*Ficus benghalensis* L.	Vad, Banyan	Moraceae	Wild	Tree
201	*Ficus benjamina* L.	Weeping Fig, Golden Fig	Moraceae	Ornamental	Tree
202	*Ficus carica* L.	Common Fig, Anjeer	Moraceae	Ornamental	Tree
203	*Ficus hispida* L. f.	Jangli Umarado	Moraceae	Ornamental	Shrub
204	*Ficus racemosa* L.	Cluster Fig, Goolar, Umardo	Moraceae	Ornamental	Tree
205	*Ficus religiosa* L.	Pipado, Bodhi Tree, Holy Tree,	Moraceae	Wild	Tree
206	*Filicium decipiens* (Wight & Arn.) Thwaites	Ningal, Fern Tree, Fern Leaf	Sapindaceae	Ornamental	Tree
207	*Flueggea leucopyrus* Willd.	Bushweed, Cool Pot, Indian Snow Berry, Thermacole Plant,	Euphorbiaceae	Wild	Shrub
208	*Fragaria ananassa*	strawberry	Rosaceae	Ornamental	Herb
209	*Furcraea foetida*		Asparagaceae	Ornamental	Herb
210	*Gaillardia pulchella* Foug.	Taptavarna, Blanket Flower,	Asteraceae (Compositae)	Ornamental	Herb
211	*Galphimia glauca* Cav.	Slender Goldshower, Gold	Malpighiaceae	Ornamental	Shrub
212	*Gardenia jasminoides*	Gardenia	Rubiaceae	Ornamental	Shrub

213	*Glandularia pulchella* (Sweet) Tronc	Moss Verbena, South	Verbenaceae	Ornamental	Herb
214	*Glebionis coronaria* (L.) Cass.ex. Spach	Crown Daisy, Garland Chrysanthemum, Japanese-	Asteraceae (Compositae)	Ornamental	Herb
215	*Gliricidia sepium* (Jacq) Walp.	Madre Tree, The Spotted Gliricidia, Dormouse Destroyer	Papilionaceae	Ornamental	Tree
216	*Gmelina arborea* Roxb	Sevan, Shivan	Verbenaceae	Wild	Tree
217	*Graptophyllum pictum*	Caricature plant	Acanthaceae	Wild	Shrub
218	*Grewia tenax* (Forsk.) Fiori	Gangati, Gangi, Gangni	Tiliaceae	Wild	Shrub
219	*Gymnema sylvestre* (Retz.)	Madhunashi, Vakhandi	Asclepiadaceae	Ornamental	Climber
220	*Haldina cordifolia* (Roxb.) Ridsdale	Haldu, Haldavan	Rubiaceae	Ornamental	Tree
221	*Hamelia patens* Jacq.	Fire Bush, Scarlet Bush,Humming Bird Bush	Rubiaceae	Ornamental	Shrub
222	*Hardwickia binata* Roxb.	Anjan	Caesalpiniaceae	Ornamental	Tree
223	*Helianthus annus* L.	Surajmukhi, Sunflower	Asteraceae (Compositae)	Ornamental	Herb
224	*Helianthus debilis* Nutt.	Beach Sunflower, Cucumber	Asteraceae (Compositae)	Ornamental	Herb
225	*Heliconia psittacorum* L.f.		Musaceae	Ornamental	Herb
226	*Heterophragma quadriloculare* (Roxb.) K.Schum.	Varas, Pullnug, Waras	Bignoniaceae	Ornamental	Tree
227	*Hibiscus Mutabilis* L	Chanegable Rose	Malvaceae	Ornamental	Shrub

228	*Hibiscus rosa-sinensis* L.	China Rose, Jasud, Shoe-	Malvaceae	Ornamental	Shrub
229	*Hibiscus schizopetalus* Hk.	Latkan Jasud, Coral Hibiscus,	Malvaceae	Ornamental	Shrub
230	*Holmskioldia sanguinea* Retz.	Chinese Hat, Cup and Saucer,Parasol Flower, Mandarins Hat	Verbenaceae	Ornamental	Shrub
231	*Hylocereus undatus*	Dragon fruit	Cactaceae	Ornamental	Shrub
232	*Hymenocallis caribaea* (L.)Herb.	Pancratium, Garden Lily, Sea-	Amaryllidaceae	Ornamental	Herb
233	*Hyptis suaveolens* (L.) Poit	Vilayati-Tulsi	Lamiaceae (Labiatae)	Ornamental	Herb
234	*Impatiens walleriana*	impatiens	Balsaminaceae	Ornamental	Plant
235	*Indigofera oblongifolia* Forsk.	Zeel, Zeel Jo Zad	Fabaceae	Ornamental	Shrub
236	*Ipomoea aquatica* Forsk.	Nalichi-bhaji, Jalgamini,	Convolvulaceae	Ornamental	Climber
237	*Ipomoea cairica* (L.) Sweet	The Railway Creeper, Porter's Joy, Narvel, Swairini	Convolvulaceae	Wild	Climber
238	*Ipomoea carica* (L.) Sw. var. carica	-	Convolvulaceae	Wild	Climber
239	*Ipomoea Indica*	Blue Danw flower	Convolvulaceae	Wild	Climber
240	*Ipomoea pes-caprae* (L.) R. Br.	Maryad-Vel, Arvel,Samudraphen	Convolvulaceae	Wild	Climber
241	*Ixora alba* L	Bem Schetti	Rubiaceae	Wild	Shrub
242	*Ixora brachiata* Roxb	Garbale	Rubiaceae	Ornamental	Shrub
243	*Ixora chinensis* Lam.	Scarlet Ixora, Flame Tree of Woods, Bakora, Ishvaku	Rubiaceae	Ornamental	Shrub

244	*Ixora coccinea* L.	Ixora	Rubiaceae	Ornamental	Shrub
245	*Ixora Lutea* Hutchins	Ixora	Rubiaceae	Ornamental	Shrub
246	*Ixora parviflora* Lam.	White Ixora, Naveri, Kuraat,	Rubiaceae	Ornamental	Shrub
247	*Ixroa arborea* Roxb ex Sm	Safed Ixora	Rubiaceae	Ornamental	Shrub
248	*Jacaranda mimosifolia* D. Don	Blue or Mimosa-Leafed	Bignoniaceae	Ornamental	Tree
249	*Jacquemontia pentatha*	Skyblue Clustervine	Convolvulaceae	Ornamental	Climber
250	*Jasminum hirustum* L	Juie, Mogra, Kunda	Oleaceae	Ornamental	Climber
251	*Jasminum laurifolium* Roxb.	Angel-Hair Jasmine,	Oleaceae	Ornamental	Climber
252	*Jasminum multiflorum*	Chameli, Star Jasmine, Downy	Oleaceae	Ornamental	Climber
253	*Jasminum officinale* L.	Jui	Oleaceae	Ornamental	Shrub
254	*Jatropha curcas* L	Mogali errand, Ratanjyot	Euphorbiaceae	Wild	Shrub
255	*Jatropha integerrima* Jacq.	Peregrina, Spicy Jatropha,	Euphorbiaceae	Ornamental	Shrub
256	*Jatropha multifida* L.	Coral Bush, Coral Plant, China	Euphorbiaceae	Ornamental	Shrub
257	*Jatropha panduraefolia* Andrew	Feddled Leaved Jatropha	Euphorbiaceae	Ornamental	Shrub
258	*Jatropha podagrica* Hook.	Australian Bottle Plant, GoutyStemmed Jatropha, Buddha	Euphorbiaceae	Ornamental	Shrub
259	*Justicia adhatoda* L.	Ardusi, Malabar Nut	Acanthaceae	Ornamental	Shrub
260	*Justicia procumbens* L.	Kari Andhedi	Acanthaceae	Wild	Herb
261	*Justicia spicigera* Schltdl	Mexican Honeysuckle	Acanthaceae	Ornamental	Shrub

262	*Kalanchoe pinnata*	Panfuti	Crassulaceae	Ornamental	Herb
263	*Kigelia africana* (Lam.) Benth.	Common Sausage Tree,Cucumber Tree	Bignoniaceae	Ornamental	Tree
264	*Lagerstroemia indica* L	Crape Mertyl	Lythraceae	Ornamental	Shrub
265	*Lagerstroemia speciosa* (L.) Pers	Taman, JArul, Pride of India	Lythraceae	Ornamental	Tree
266	*Lagerstroemia thorelii* Gagnep	Crepe Myrtle	Lythraceae	Ornamental	Tree
267	*Lantana camara* L	Tantani Ghaneri	Verbenaceae	Wild	Shrub
268	*Lawsonia inermis* L.	Hennah, Mehndi	Lythraceae	Ornamental	Shrub
269	*Leea rubra* BLume	Red Leea	Vitaceae	Ornamental	Shrub
270	*Leucaena leucocephala* (Lam.) de Wit	Pardeshi Baval, Liso-Baval,	Mimosaceae	Wild	Tree
271	*Leucanthemum vulgare*	Mauguerite Daisy	Asteraceae (Compositae)	Ornamental	Herb
272	*Lignum vitae*	Gautam	Zygophyllaceae	Ornamental	Tree
273	*Lilium bulbiferum*	Lily	Liliaceae	Ornamental	Herb
274	*Limonia acidissima* L.	Wood Apple, Kothu, Kavath	Rutaceae	Ornamental	Tree
275	*Lobularia maritima*	Sweet Alyssum	Brassicaceae	Ornamental	Herb
276	*Malvaviscus penduliflorus* DC	Pendulous Sleeping Hibiscus	Malvaceae	Ornamental	Shrub
277	*Mangifera indica* L.	Mango, Aambo, Keri	Anacardiaceae	Ornamental	Tree
278	*Manihot esculenta* Crantz	Tapioca, Cassava, Brazil	Euphorbiaceae	Ornamental	Shrub

279	*Manilkara hexandra* (Roxb.)	Rayan, Ceylon Iron Wood, Milk	Sapotaceae	Ornamental	Tree
280	*Manilkara zapota* (L.) P. Royen	The Sapodilla Plum, Chikoo,	Sapotaceae	Ornamental	Tree
281	*Mansoa alliacea* (Lam.) A. H.	Garlic Vine	Bignoniaceae	Ornamental	Climber
282	*Marsilea quadrifolia*	WATER-CLOVER	Marsileaceae	Ornamental	Fern
283	*Melia azedarach* L.	Bakain Limbo, Chinaberry	Meliaceae	Ornamental	Tree
284	*Merremia vitifolia* (Burm.G) Hall	Grape-Leaf Wood rose	Convolvulaceae	Ornamental	Climber
285	*Michelia champca* L	Soneri Champo	Magnoliaceae	Ornamental	Tree
286	*Millettia peguensis* Gillett	Milletia, Moulmein rosewood	Fabaceae	Ornamental	Tree
287	*Millingtonia hortensis* L.	Indian Cork Tree, Tree Jasmine ,Latak Chameli, Akash-Limbdo, Buch,	Bignoniaceae	Ornamental	Tree
288	*Mimusops elengi* L.	Borsalli, Bakul, Spanish Cherry	Sapotaceae	Ornamental	Tree
289	*Mirabilis jalapa* L.	Marvel of Peru, Four O'Clock Plant, Gulbaas, False Jalap	Nyctaginaceae	Ornamental	Herb
290	*Mitragyna parvifolia* (Roxb.)	Dhara Kadam, Kaim	Rubiaceae	Ornamental	Tree
291	*Monstera deliciosa* Liebm.	Fruit Salad Plant, Split-Leaf Philodendron, Mexican Bread	Araceae	Ornamental	Climber
292	*Moringa concanensis* Nimmo	Kadvo Saragvo, Konkan	Moringaceae	Wild	Tree
293	*Moringa oleifera* Lam.	Saragvo, Drumstick, Horse	Moringaceae	Ornamental	Tree
294	*Morus alba* L.	Shetoor, White Mulberry,	Moraceae	Ornamental	Shrub
295	*Murraya exotia* L Jack	Kamini, Kunti	Rutaceae	Ornamental	Shrub

296	*Murraya koenigii* (L.) Spreng.	Kadi-Patta, Mittho Limbdo,	Rutaceae	Ornamental	Shrub
297	*Musa paradisiaca* L.	Ked, Keda, Banana	Musaceae	Ornamental	Shrub
298	*Mussaenda lutea* Delile	Mussanda	Rubiaceae	Ornamental	Shrub
299	*Mussaenda philippica* 'Aurorae'	White Mussanda	Rubiaceae	Ornamental	Shrub
300	*Mussaenda philippica* 'Queen Sirkit'	Pink Mussanda	Rubiaceae	Ornamental	Shrub
301	*Neolamarckia cadamba* (Roxb.) Bosser	Kadamb	Rubiaceae	Ornamental	Tree
302	*Nephrolepis cordifolia*	hansraj	Nephrolepidaceae	Ornamental	Fern
303	*Nerium oleander* L.	The Oleander, Kanher, Lal	Apocynaceae	Ornamental	Shrub
304	*Nyctanthes arbortristis* L.	Parijatak, Harshringar	Nyctaginaceae	Ornamental	Tree
305	*Nymphaea panama* Pacific	Tropical Water Lily, Waterlily	Nymphaeaceae	Ornamental	Herb
306	*Ochna kirkii* oliver	Mickey Mouse Plant	Ochnaceae	Ornamental	Shrub
307	*Ocimum basilicum* L.	Damro, Sweet Basil, Ram Tulsi	Lamiaceae (Labiatae)	Ornamental	Herb
308	*Ocimum gratissimum* L.	Aavchi Baavchi, Ram Tulsi,	Lamiaceae (Labiatae)	Ornamental	Shrub
309	*Oroxylum indicum* (L.) vent	Aralu, Tetu	Bignoniaceae	Ornamental	Tree
310	*Pachystachys lutea* Nees	Lollipop Plant, Golden Shrimp	Acanthaceae	Ornamental	Shrub

311	*Pandanus odorifer* (Forssk.)Kunzte	Kewda, Fragrant Screw Pine,Umbrella Tree, Screw Pine	Pandanaceae	Ornamental	Shrub
312	*Papaver somniferum*	Poppy	Papaveraceae	Ornamental	Herb
313	*Passiflora caerulea* L	Krishna Kamal	Passifloraceae	Ornamental	Climber
314	*Passiflora foetida* L.	Love-in-a-Mist, Stinking Passion Flower, Valighani	Passifloraceae	Ornamental	Climber
315	*Passiflora incarnata*	Purple Passionflower	Passifloraceae	Ornamental	Plant
316	*Patrea volubilis* L	Purple Wreath	Verbenaceae	Ornamental	Climber
317	*Pelargonium hortorum*	Geranium	Geraniaceae	Ornamental	Herb
318	*Peltophorum pterocarpum* (DC) Baker ex DC	Tamraparni, Copperpod, Rusty	Caesalpiniaceae	Wild	Tree
319	*Pentas lanceolata* (Forsk) Deflers	Pentas, Star Flower, Star Cluster, Egyptian Star Cluster	Rubiaceae	Ornamental	Shrub
320	*Petunia hybrida* Vilm.	Petunia	Solanaceae	Ornamental	Herb
321	*Petunia atkinsiana*	Garden Petunia	Solanaceae	Ornamental	Herb
322	*Phalaenopsis amabilis*	Moth Orchid		Ornamental	Plant
323	*Philodendron bipinnatifidum* Schott ex Endl.	Lacy Tree Philodendron,	Araceae	Ornamental	Herb
324	*Philodendron giganteum*	Giant Philodendron		Ornamental	Climber
325	*Phlox drummondii* Hook.	Annual Phlox, Drummond's	Polemoniaceae	Ornamental	Herb

326	*Phoenix sylvestris* (L.) Roxb.	Wild Date Palm, Date-Sugar	Arecaceae (Palmae)	Wild	Tree
327	*Phyllanthus acidus* (L.) Skeels	Star Goose Berry, Country	Euphorbiaceae	Ornamental	Tree
328	*Phyllanthus emblica* L.	Indian Goose Berry, Amla	Euphorbiaceae	Ornamental	Tree
329	*Physalis minima* L.	Fofati, Fad, Fotaji Val	Solanaceae	Ornamental	Herb
330	*Pimenta dioica*	All spice, Jamaican Pepper		Ornamental	tree
331	*Piper betle* L.	Nagvel, Nagarvel, Betel Leaf	Piperaceae	Ornamental	Climber
332	*Piper nigrum* L.	Black Pepper, Kala Mari	Piperaceae	Ornamental	Climber
333	*Pistia stratiotes* L.	Water Lettuce Prashani, Water Cabbage, Nile, Water Soldier,Gondali, Prasni, Jalshankhla,	Araceae	Ornamental	Herb
334	*Pithecellobium dulce* (Roxb.) Bth.	Manilla Tamarind, Madras	Mimosaceae	Wild	Tree
335	*Plectranthus amboinicus* (Lour.) Spreng	Cuban Oregano, Indian	Lamiaceae (Labiatae)	Ornamental	Herb
336	*Plectranthus scutellarioides* (L.) R. Br. Syn.	Coleus	Lamiaceae (Labiatae)	Ornamental	Herb
337	*Plumbago auriculata*	Plumbum, blue plumbago		Ornamental	Shrub
338	*Plumeria alba* L	Safed Champo		Ornamental	Tree
339	*Plumeria obtusa*	Champo	Apocynaceae	Ornamental	Shrub
340	*Plumeria pudica* Jacq.	Wild Plumeria, Bridal Bouquet, White Frangipani	Apocynaceae	Ornamental	Shrub

341	*Plumeria rubra* L.	Champo, Khad-Champo,	Apocynaceae	Ornamental	Tree
342	*Polianthes tuberosa* L	Rajnigandha	Asparagaceae	Ornamental	Plant
343	*Polyalthia longifolia* (Sonn.) Thw.	Asopalav, Mast-Tree, False Ashok	Annonaceae	Ornamental	Tree
344	*Polyscias balfouriana* (Andre) L. H. Bailey	Balfour Aralia, Dinner Plate Aralia, Plate Aralia	Araliaceae	Ornamental	Shrub
345	*Polyscias filicifolia* (C.Moore ex E.Fourn.) L.H. Bailey	Fern-Leaf Aralia, Angelica	Araliaceae	Ornamental	Shrub
346	*Polyscias guilfoylei* (W. Bull) L. H. Bailey	Geranium Aralia	Araliaceae	Ornamental	Shrub
347	*Pongamia pinnata* (L.) Pierre	Karanj, Pongam Tree, Indian	Papilionaceae	Ornamental	Tree
348	*Prosopis cineraria* (L) Druce	Khijado	Mimosaceae	Ornamental	Tree
349	*Prosopis juliflora* (Sw) DC	Gando Baval	Mimosaceae	Ornamental	Tree
350	*Prunus avium*	Sweet Cherry	Rosaceae	Ornamental	Tree
351	*Pseuderanthemum carruthersii* (Seem.) Guillaumin	Purple False Eranthemum	Acanthaceae	Ornamental	Shrub
352	*Pseuderanthemum laxiflorum* (A. Gray) F.T. Hubb. ex L.H.	Shooting Star, Star Flower,	Acanthaceae	Ornamental	Shrub
353	*Psidium guajav*a L.	Jamphal, Guava, Peru	Myrtaceae	Ornamental	Tree
354	*Punica Granatum* L	Dalim, anar Pomegranate	Lythraceae	Ornamental	Shrub
355	*Pupalia lappacea* (L.) Juss	Vegetation Burr, Creeping Cock's	Amaranthaceae	Wild	Herb

356	*Putranjiva roxburghii* Wall.	Putranjeev, Putravanti, Lucky	Euphorbiaceae	Ornamental	Tree
357	*Pyrostegia venusta*	Flame Vine	Bignoniaceae	Ornamental	Climber
358	*Pyrostegia venusta* (Ker Gawl.) Miers	Flame Vine, Flaming Trumpet	Bignoniaceae	Ornamental	Climber
359	*Rhapis excelsa* (Thunb.) Henry	Broadleaf Lady Palm, Lady Palm, Lady Finger Palm,	Arecaceae (Palmae)	Ornamental	Shrub
360	*Rondeletia odorata*	Panama-rose	Rubiaceae	Ornamental	Shrub
361	*Rosa cymosa* Tratt	Rose, Gulab	Rosaceae	Ornamental	Shrub
362	*Roystonea regia* (Kunth) O. F. Cook	Bottle Palm, Royal Palm	Arecaceae (Palmae)	Ornamental	Tree
363	*Russelia equisetiformis* Shcult & Cham	Coral Plant	Plantaginaceae	Ornamental	Shrub
364	*Salvadora persica* L.	Tooth Brush Tree, Mustard	Salvadoraceae	Wild	Tree
365	*Salvia splendens* Sellow exSchult.	Scarlet Sage, Red Salvia	Lamiaceae (Labiatae)	Ornamental	Herb
366	*Sansevieria trifasciata* Prain	Snake Plant	Asparagaceae	Ornamental	Herb
367	*Saraca asoca* (Roxb.) Willd.	Ashok Tree, Sita Ashok,	Caesalpiniaceae	Ornamental	Tree
368	*Scadoxus multiflorus*	Blood lilly	Amaryllidaceae	Ornamental	shrub
369	*Schefflera arboricola* Hayata	Dwarf Umbrella Tree	Araliaceae	Ornamental	Shrub
370	*Sesbania sesban* (L.) Meer.	Ekad	Fabaceae	Ornamental	Shrub

371	*Solanum seaforthianum* Andrews	Brazilian Nightshade	Solanaceae	Ornamental	Climber
372	*Solanum surattense* Burm. f.	Jangali Ringani, Pat Ringani	Solanaceae	Ornamental	Herb
373	*Spathodea campanulata* Beauv.	The Scarlet Bell, Fountain	Bignoniaceae	Ornamental	Tree
374	*Sphagneticola trilobata* (L.) Pruski	Singapore Daisy, Trailing	Asteraceae (Compositae)	Ornamental	Herb
375	*Stachytarpheta indica* (L.) Vahl.	Indian Snakeweed, BlueVervain Snakeweed, Nettle-Leaved	Verbenaceae	Ornamental	Herb
376	*Stachytarpheta mutabilis* (Jacq.) Vahl	Pink Snake Weed, Red Porter	Verbenaceae	Ornamental	Herb
377	*Sterculia foetida* L.	Jangly Badam, Bastard, Poon	Sterculiaceae	Ornamental	Tree
378	*Strophanthus gratus*	Climbing oleander	Apocynaceae	Ornamental	Climber
379	*Syngonium podophyllum*	Arrowhead plant	Araceae	Ornamental	Herb
380	*Syzygium cumini* (L.) Skeels	Jambu, Java Plum, Jamun, Black Plum, Java Apple	Myrtaceae	Ornamental	Tree
381	*Syzygium malaccense* (L.) Merr. & L. H. Perry	Safed Jambu, Malay Apple,Mountain Apple, Rose Apple	Myrtaceae	Ornamental	Tree
382	*Tabebuia aurea* (Silva Manso) Benth. & Hook. f. ex S. Moore	Caribbean Trumpet Tree, Silver Trumpet Tree, Yellow	Bignoniaceae	Ornamental	Tree
383	*Tabebuia pallida* (Lindl.) Miers Cuban	Pink Trumpet Tree,Pink Tabebuia, Pink Trumpet	Bignoniaceae	Ornamental	Tree

384	*Tabebuia rosea* (Bertol.) Bertero ex A.DC.	Salvador Pink Trumpet Tree	Bignoniaceae	Ornamental	Tree
385	*Tabernaemontana divaricata* Burkill	Chandni	Apocynaceae	Ornamental	Shrub
386	*Tagetes erecta* L. Asteraceae	The African Marigold, Galgota	Asteraceae (Compositae)	Ornamental	Herb
387	*Tecoma capensis* (Thunb) Lindl.	Cape Honeysuckle	Bignoniaceae	Ornamental	Shrub
388	*Tecoma castanifolia* (D. Don) Melch.	Chest Nut Leaf, Trumpet Bush	Bignoniaceae	Ornamental	Tree
389	*Tecoma stans* (L.) Juss. ex	Yellow Bells, Yellow Trumpet,	Bignoniaceae	Ornamental	Shrub
390	*Tectona grandis* L.	Teak, Saag, Sagwan	Verbenaceae	Ornamental	Tree
391	*Tephrosia purpurea* (L.) Pers.	Sarpankho	Fabaceae	Wild	Shrub
392	*Terminalia bellirica* (Gaertn) Roxb.	Behda, Belleric Myrobalan,	Combretaceae	Ornamental	Tree
393	*Terminalia catappa* L.	Badam, Desi Badam, Lili	Combretaceae	Ornamental	Tree
394	*Thespesia populnea* (L.)Soland ex. Corr.	Paras Pipado, Indian Tulip	Malvaceae	Ornamental	Tree
395	*Thevetia peruviana* (Pers) Merrill	Mexican Oleander, Yellow	Apocynaceae	Ornamental	Tree
396	*Thuja occidentalis*	Thuja	Cupressaceae	Ornamental	Tree
397	*Thunbergia alata*. Hook	Black eyed Susan	Acanthaceae	Ornamental	CLimber
398	*Thunbergia erecta* (Benth.) T.Anderson	Bush Clock Vine, King's Mantle, Mohan	Acanthaceae	Ornamental	Shrub

399	*Thunbergia grandiflora* (Roxb. ex Rottl.) Roxb.	Bengal Clock Vine, Bengal Trumpet Vine, Neel Lata	Acanthaceae	Ornamental	Climber
400	*Tinospora cordifolia* (Willd.) Miers.	Gado, Gulbel, Indian	Menispermaceae	Ornamental	Climber
401	*Tinospora cordifolia* Roxb.	Guddaval, Gadu	Menispermaceae	Wild	Climber
402	*Tradescantia pallida* (Rose) D. R. Hunt	Wandering Jew, Purple Heart,	Commelinaceae	Ornamental	Herb
403	*Tradescantia spathacea* Sw.	Boat Lily, Oyster Plan	Commelinaceae	Ornamental	Herb
404	*Triplaris brasiliana*	Ant Tree	Polygonaceae	Ornamental	Tree
405	*Turnera ulmifolia* L.	Yellow Alder, Yellow	Passifloraceae	Ornamental	Herb
406	*Verbena hybrida* Voss	Garden Vervain, Verbena,	Verbenaceae	Ornamental	Herb
407	*Vernonia elaeagnifolia* DC.	Curtain Creeper, Vernonia Creeper, Parda Vel	Asteraceae (Compositae)	Ornamental	Climber
408	*Vitex negundo* L.	Nagod, Chaste Tree	Verbenaceae	Ornamental	Tree
409	*Withania somnifera* (L.) Dunal	Ashwagandha, Ghodakun,	Solanaceae	Wild	Herb
410	*Wodyetia bifurcata* Irvine	Foxtial Palm	Arecaceae (Palmae)	Ornamental	Tree
411	*Wrightia arborea* (dEnnst.) Mabb	Dudhlo	Apocynaceae	Ornamental	Tree
412	*Wrightia dolichocarpa*	Dudh Kudi	Apocynaceae	Ornamental	Tree
413	*Xanthium strumarium* L.	Kantaru Zadvu, Gokhru	Asteraceae (Compositae)	Wild	Herb

414	*Yucca gloriosa* L.	Adam's Needle, Spanish	Agavaceae	Ornamental	Shrub
415	*Zephyranthes candida* (Lindl.) Herb.	Fairy Lily, Zephyr Lily, Rain Lily	Amaryllidaceae	Ornamental	Herb
416	*Zingiber nimmoniana* Grhaam Dalzel		Zingiberaceae	Ornamental	Shrub
417	*Zingiber officinale* Roscoe	Ginger, Aadu, Adrak	Zingiberaceae	Ornamental	Herb
418	*Zinnia elegans* Jacq.	Youth and Old Age, Zhiniya	Asteraceae (Compositae)	Ornamental	Herb
419	*Ziziphus jujuba* Mill.	Indian Jujube, Indian Plum,	Rhamnaceae	Ornamental	Tree
420	*Ziziphus mauritiana* Lamk.	Indian Jujube, Bor	Rhamnaceae	Wild	Tree
421	*Ziziphus nummularia* (Burm. f.)	Chani Bor, Jhar Beri	Rhamnaceae	Wild	Shrub

References:

Bogdał A, Wałęga A, Kowalik T, Cupak A. Assessment of the Impact of Vegetationry and Settlement-Vegetation Use of the Catchments on the Parameters of Surface Water Quality: Case Studies for Chechło Reservoir Catchment, Southern Poland. *Water*. 2019; 11(5):964. https://doi.org/10.3390/w11050964

Dębska, K., Rutkowska, B. & Szulc, W. Influence of the catchment area use on the water quality in the Utrata River. *Environ Monit Assess* **194**, 165 (2022). https://doi.org/10.1007/s10661-022-09821-z

Fulwadhani, P. S., Gujre, N., Dhyani, S. and Wate, S. R. (2020). A Score Based Method for Assessing Importance of Urban Forest and its Ecosystem Services. International Journal of Plant and Environment, 6(1): 35-46.

Hahs, A.K., Mcdonnell, M.J.,Mccarthy, M.A. et al. (2009) A global synthesis of plant extinction rates in urban areas. Ecology Letters, 12, 1165–1173.

IPCC, 2014. In: Stocker, T.F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S.K., Boschung, J., Nauels, A., Xia, Y., Bex, V., Midgley, P.M. (Eds.), Climate Change 2013: the Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Changes to the Underlying Scientific/Technical Assessment. Cambridge University Press, Cambridge.

Krishnaswamy J. M. Bunyan. V.K Mehta. N. Jain and K.U. Karanth. Impact of iron ore mining on suspended sediment response in a tropical catchment in Kudremukh, Westren Ghats, India. *Vegetation Ecology and Management*. 2006. 224. 187-198.

Menon, M., and Kanchi Kohli, 2021. Regulating Urban Trees in India-Issues and Challenges, Edited by the Heinrich Böll Foundation 2021.

Nowak, D. J., Greenfield, E. J., Hoehn, R. E., and Lapoint, E. (2013). Carbon storage and sequestration by trees in urban and community areas of the United States. *Environ. Pollut.* 178, 229–236. doi: 10.1016/j.envpol.2013.03.019

Nowak, D. J., Hirabayashi, S., Doyle, M., McGovern, M., and Pasher, J. (2018). Air pollution removal by urban forests in Canada and its effect on air quality and human health. *Urban For. Urban Green.* 29, 40–48. doi: 10.1016/j.ufug.2017.10.019

Padmanaban, D. 2016. Green Cover: How Indian cities are being shorn of trees A new study reveals the rate of urbanisation in four Indian cities. Retrieved December 2019 fromhttp://www.indiaspend.com/cover-story/how-indian-cities-are-being-shorn-of-trees-67909.

Pataki DE, Alberti M, Cadenasso ML, Felson AJ, McDonnell MJ, Pincetl S, Pouyat RV, Setälä H and Whitlow TH (2021) The Benefits and Limits of Urban Tree Planting for Environmental and Human Health. *Front. Ecol. Evol.* 9:603757. doi: 10.3389/fevo.2021.603757

Ramachandra, T.V. Hydrological Responses at Regional Scale to Landscape Dynamics. *Journal of Biodiversity*. 2014. 5(1,2). 11-32.

Santhosh K. T. M, Prakash K. L. Surface Water Quality in the Vegetation Catchment – A Case Study of Tunga and Bhadra River Stretches, Karnataka. Curr World Environ 2020; 15(2). Available from: https://bit.ly/3dGKFi4

Singh, H.S. 2012. Tree density and canopy cover in the urban areas in Gujarat, India. Current Sciences 104: 10.

http://timesofindia.indiatimes.com/articleshow/83267513.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

Yirka, B. (2021, November 26). *Trees found to reduce land surface area temperatures in cities up to 12°C.* Phys.Org.

"What is biodiversity?" (PDF). United Nations Environment Programme, World Conservation Monitoring Centre

// TRUE COPY //

ANNEXURE A-4

TIMES OF INDIA
MONDAY 9th SEPTEMBER 2024

'Severe urban heat island effect grips 14% of A'bad'

Micro-Climates Of Major Cities Influenced By Urbanization, Loss Of Vegetation: Study

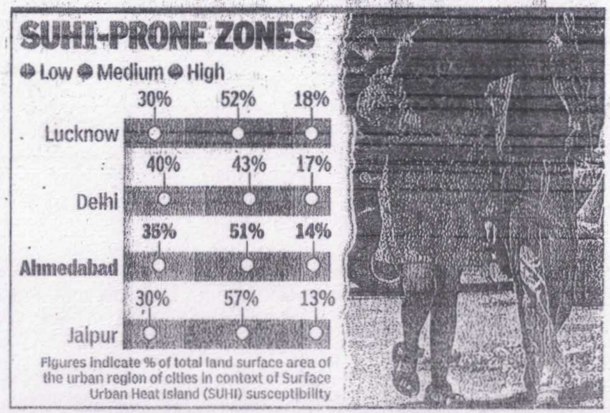
Parth.Shastri @timesofindia.com

Ahmedabad: Feeling hotter than what the forecast indicates? This is because of the surface urban heat island (SUHI) effect, where certain pockets of the city record relatively higher temperatures than their surroundings.

About 14% of Ahmedabad city is susceptible to high SUHI effect, according to a recent study. Moreover, another 51% of the city area is under moderate SUHI effect. The study, which covered Ahmedabad, Delhi, Jaipur and Lucknow, also linked the presence of water bodies and green cover with a low SUHI effect.

These findings are part of the paper 'Green Space Cooling Effect and Relation to Mitigate Surface Urban-Heat Island Effect of Metropolitans Cities of India' by R K Gupta, which was published in the journal Current World Environment.

The study of climatic changes and urban planning has gained traction in recent years with a gradual rise in temperatures globally and its impact on the urbanpopulation.

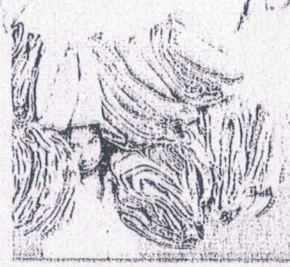


While 2024 has been one of the hottest years in recent times, Ahmedabad witnessed one of its hottest days at 46.6°C and one of the hottest nights at 29°C in May this year.

Several studies have identified the loss of green cover (vegetation) and blue cover (water bodies) coupled with a rapid increase in the built environment, which is characterized by the extensive use of concrete and asphalt, as the primary reason for the relatively higher temperatures experienced in urban areas such as Ahmedabad.

Prof Gupta told TOI that USGS Earth Explorer and NASA Earthdata for 2023 were used primarily to look at the normalized difference vegetation index (NDVI) to study vegetation's spatial distribution and its correlation with land surface temperature (LST). P 2

▸Continued on P 2



Isro study identifies Ahmedabad's heat islands

Land Use Patterns Drive Temperature Variations

Paul.John
@timesofindia.com

Ahmedabad: A new study by scientists at Isro's Space Applications Centre has found significant temperature disparities within Ahmedabad, known as Intra-Urban Heat Islands (IUHI). The study employed a mobile vehicle equipped with a HOBO thermo-hygrometer to measure air temperature in various zones, including commercial areas, residential localities, near water bodies and in green spaces.

The mobile experiments by Neeru Jaiswal, Sanjib Deb, Sambit Panda Anup K Mandal, Aman Khan and C M Kishtawal of the Atmospheric and Oceanic Sciences Group at Isro-SAC demonstrated noticeable temperature variations, sometimes within a distance of less than 1km. These variations were particularly prominent in urban areas, traffic junctions, market zones, and near water bodies. A 2.5°C difference was noted within a 10km range through Ahmedabad's central region.

The team measured temperature during mouth of May since 2019, focusing on how urban structures and green spaces contribute to heat exposure. "Areas with higher vegetation, water bodies or barren land displayed a cooling effect," the study states. Temperature dropped by 0.8°C near Ghuma, while rose by 1.5°C as the vehicle passed through Bopal market.

It further adds, "The temperature at traffic junctions is higher by 1°C than in nearby areas." Areas like Vikram Nagar, Sanand and Paldi showed temperature variations due to a combination of vegetation, market activity and traffic conditions.

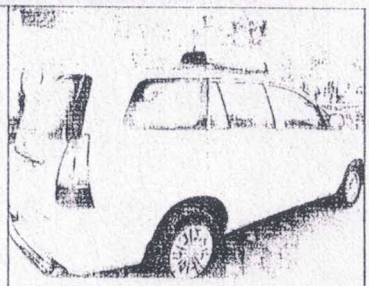
The measurements showed temperature differences were higher during night-time than during the day.

Compared to rural areas the transect nighttime temperature was up to 6°C higher in urban areas, particularly in regions like Satellite Road and Kalupur, and 4°C higher in areas like Bopal and Teen Darwaja.

While measuring temperatures from SAC Bopal campus to the IIT Gandhinagar campus (40km) between 11.45 am and 3.25 pm, a maximum difference of 1.43°C between 12 noon and 12:30 midnight was noticed.

During a night measurement while moving between SVP airport to the railway station via Bopal-Ghuma, significant temperature variations were observed, with higher temperatures on busy market roads (38.39°C) and lower temperatures (33.16°C) in less populated areas like Ghuma. The temperatures measured along the route showed significantly higher temperatures than the urban of up to 5°C and in urban areas and of up to 6°C in rural sites, with a maximum difference of 5.84°C near the Satellite area at 9pm. The urban reference site had higher temperatures than the rural site, with the transect recording a maximum of 38.3°C near Teen Darwaja at 9:55pm.

DIFFERENCE & WHY?

Significant variations occur within less than 1km, especially in urban areas, traffic junctions, market zones and near waterbodies	 Isro-SAC vehicle equipped with a HOBO thermo-hygrometer to measure air temperature across various city zones
Busy areas like Bopal Road and Sarkhej recorded higher temperatures than less populated regions like Ghuma and Godhavi	Cooling effect in areas with higher vegetation, waterbodies, or barren land
A 2.5°C difference noted within a 10km range through central Ahmedabad	Temperatures dropped by 0.8°C near Ghuma and rose by 1.5°C through the Bopal market
Near Satellite area: The maximum difference was 1.43°C during the day and 5.84°C at night	Dense building materials in areas like Sarkhej and Kalupur saw warmer temperatures due to emitted radiation, especially at night
Similar trends were observed on other days, especially through Kalupur, Prahladnagar and Sarangpur	Lakes and greenery, like in Ghuma and Manipur, brought down the local daytime temperature

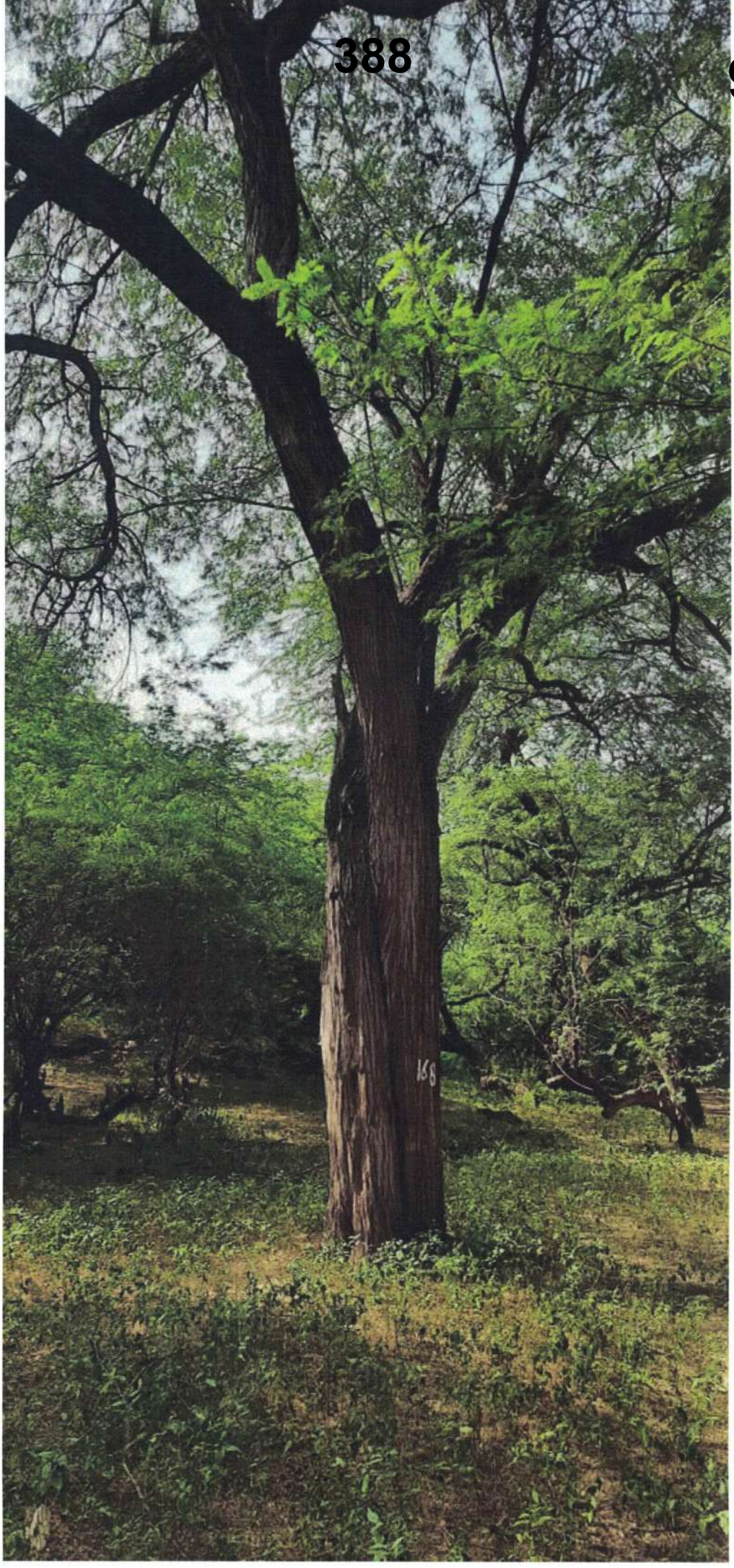
▸Continued from P1

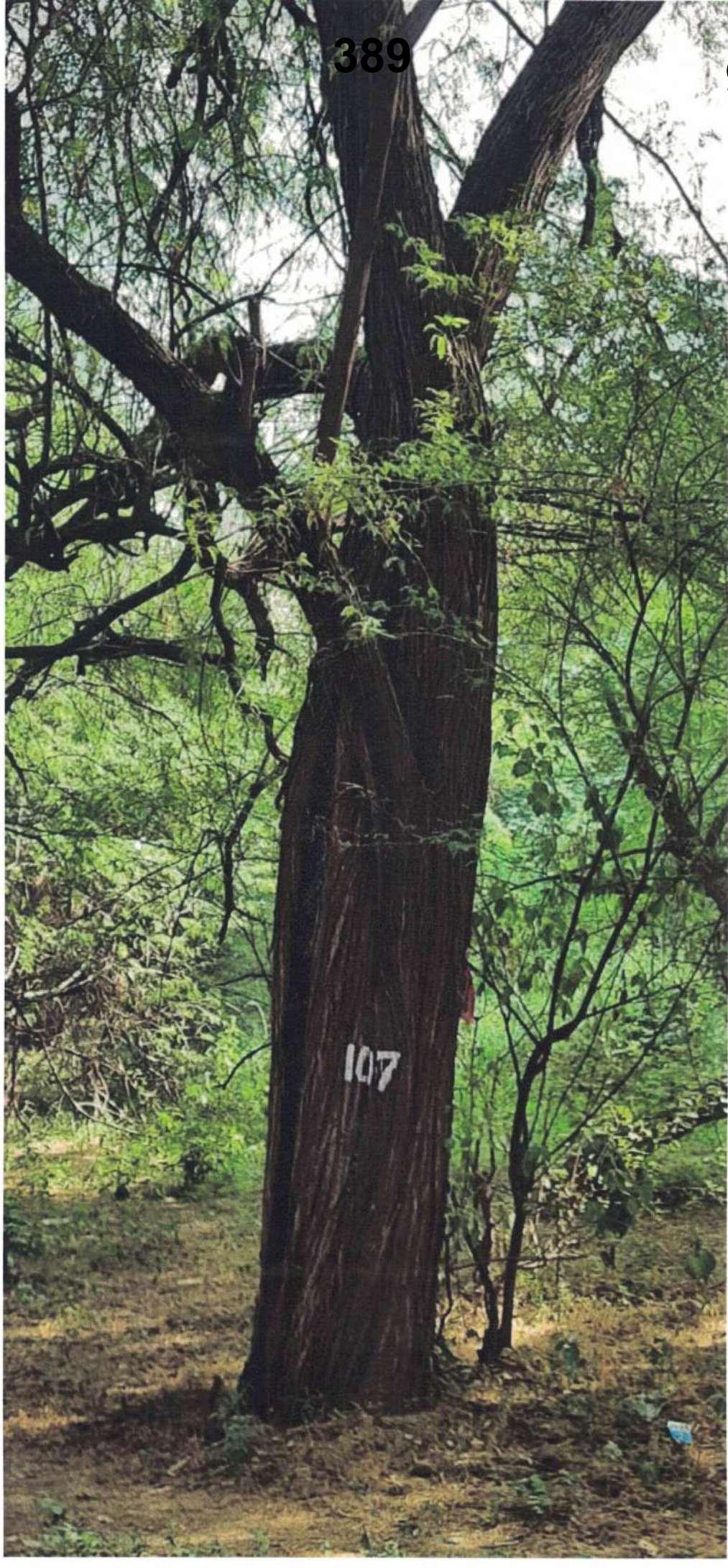
he cities were chosen based on their characteristics and rapid growth. The areas with open spaces, green and blue covers, were found to have cooler environments. The planned cities have relatively better heat resilience compared to those which do not take into account water bodies and green spaces," said Prof R K Gupta.

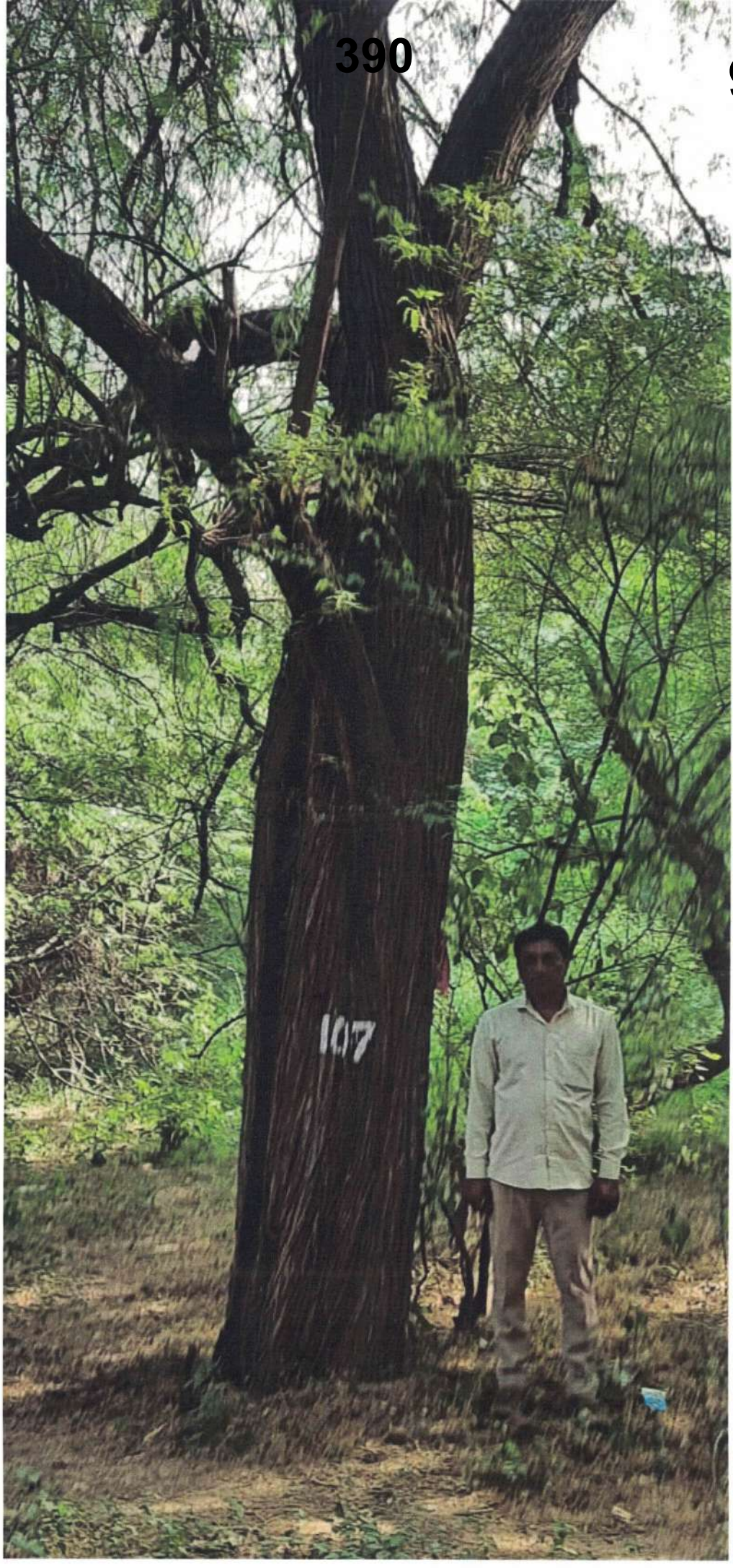
In the context of Ahmedabad, the highest land surface temperature (LST) was found to be 45.19°C and the lowest, 37.31°C. Compared to core areas and eastern areas with high presence of industries, the city's periphery shows relatively low temperatures, according to the study. Some of the 'green' patches identified included Sabarmati Riverfront and neighbourhoods in the north and south zones. "For major cities like Ahmedabad, it is time to understand micro-climates where there are variations in temperature and rainfall profiles even in areas that are just 5-10 km apart. This phenomenon is attributed to the SUHI effect," Prof Gupta added.

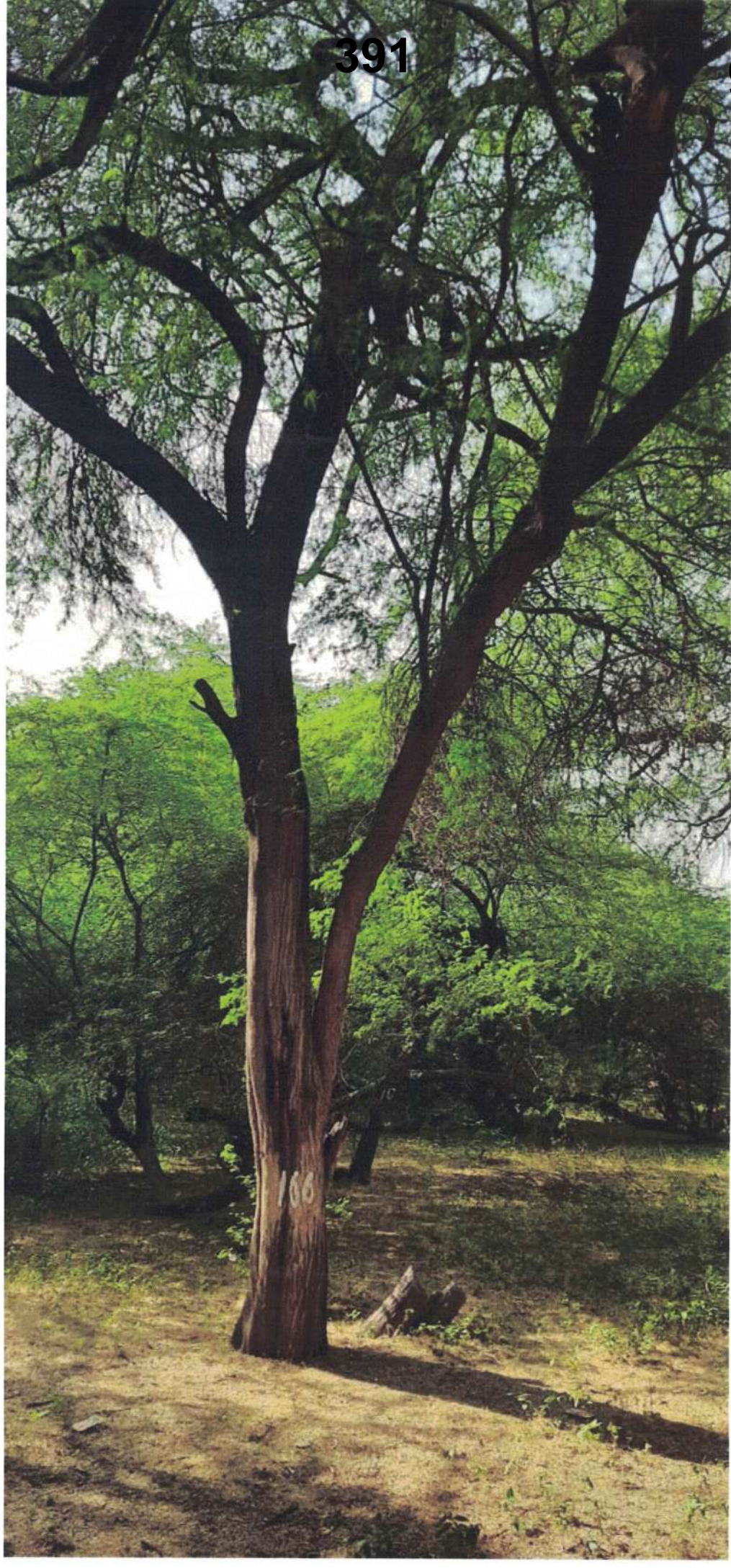
The study proposed included prioritizing preservation and expansion of green infrastructure by transforming vacant lands into urban parks, implementing green mufflers along roads, promoting rooftop gardens, and installing vertical gardens in govt and corporate offices.

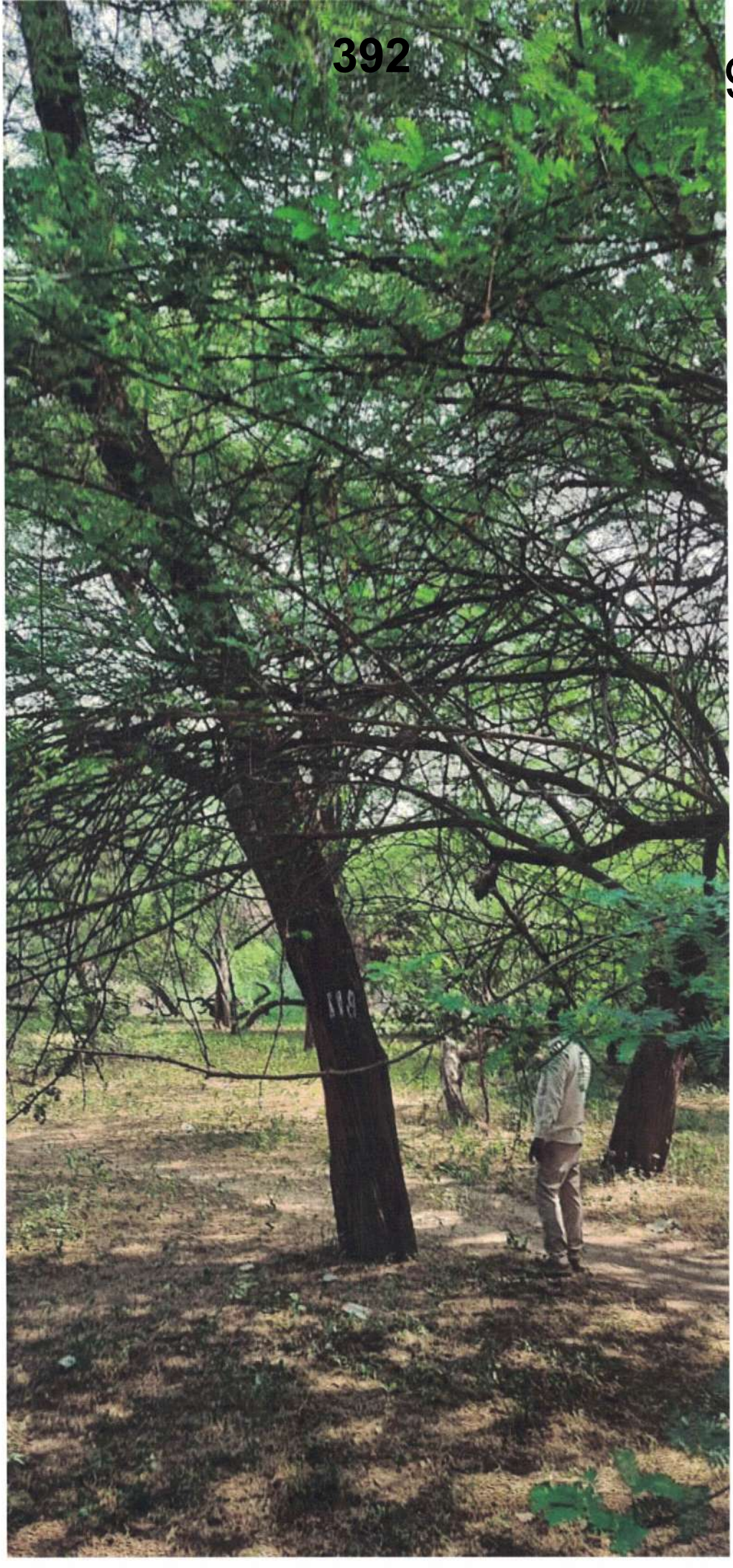
Previous research on urban heat island effect revealed that the built environment had expanded by 5 percentage points between 2010 and 2020, relative to the city's total land area.

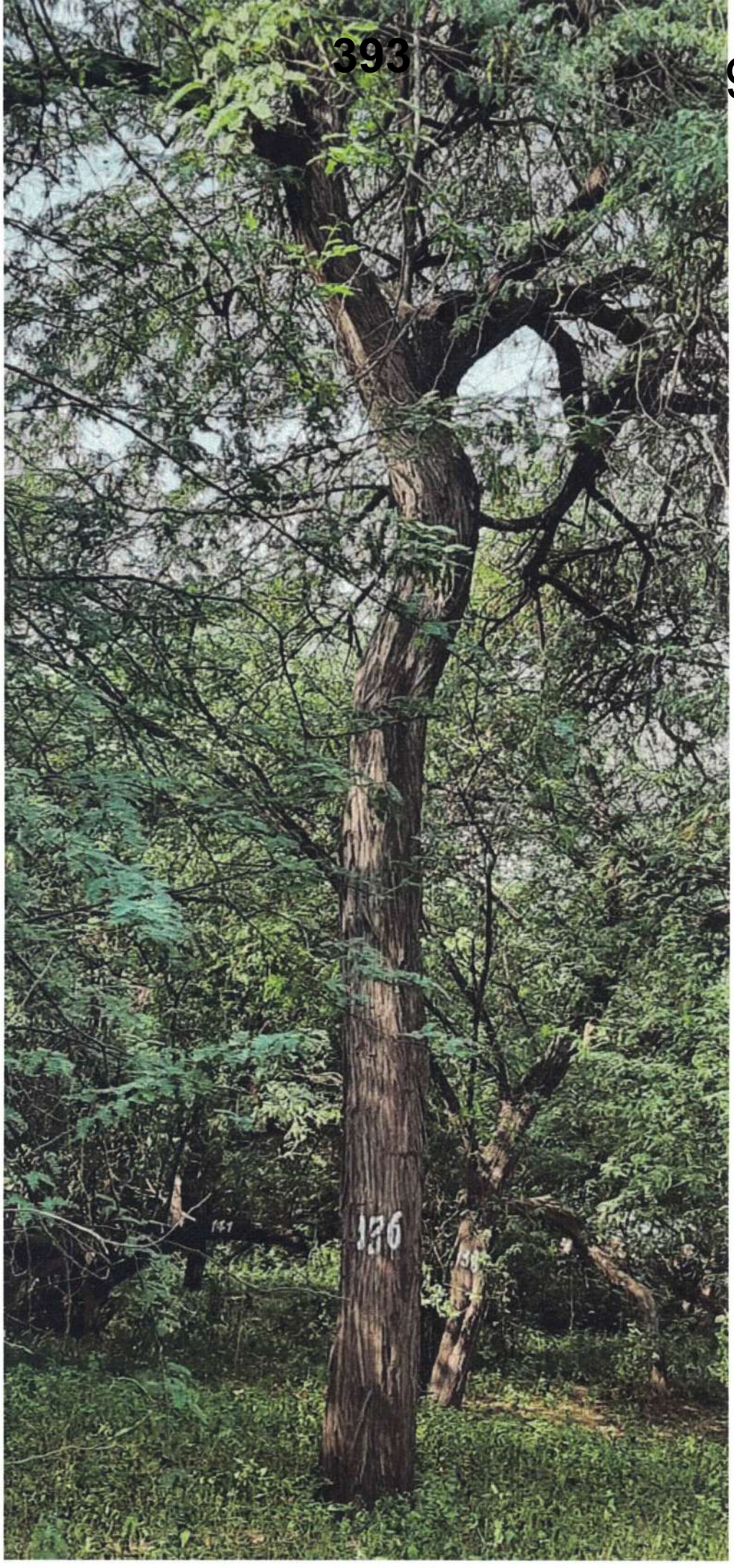


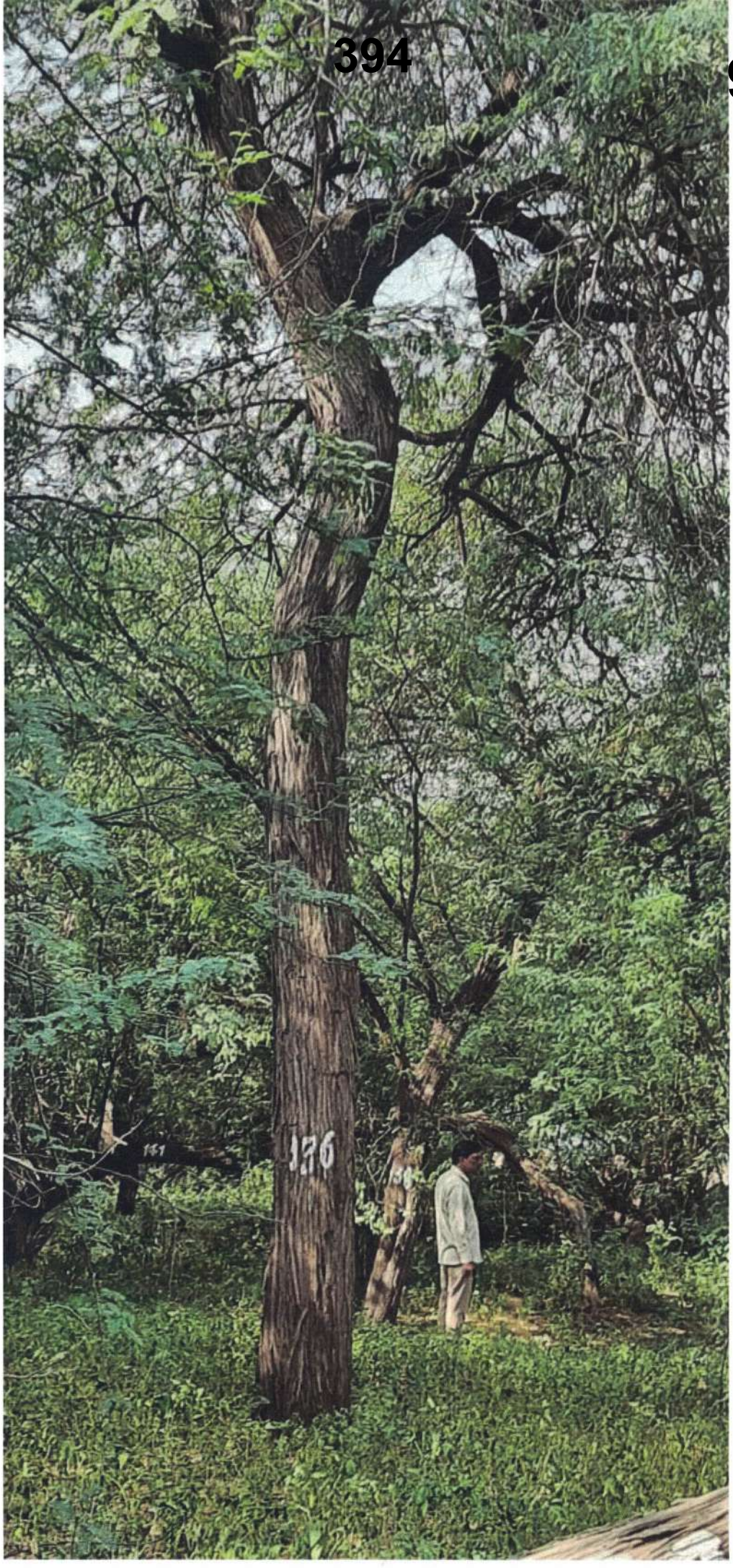

107

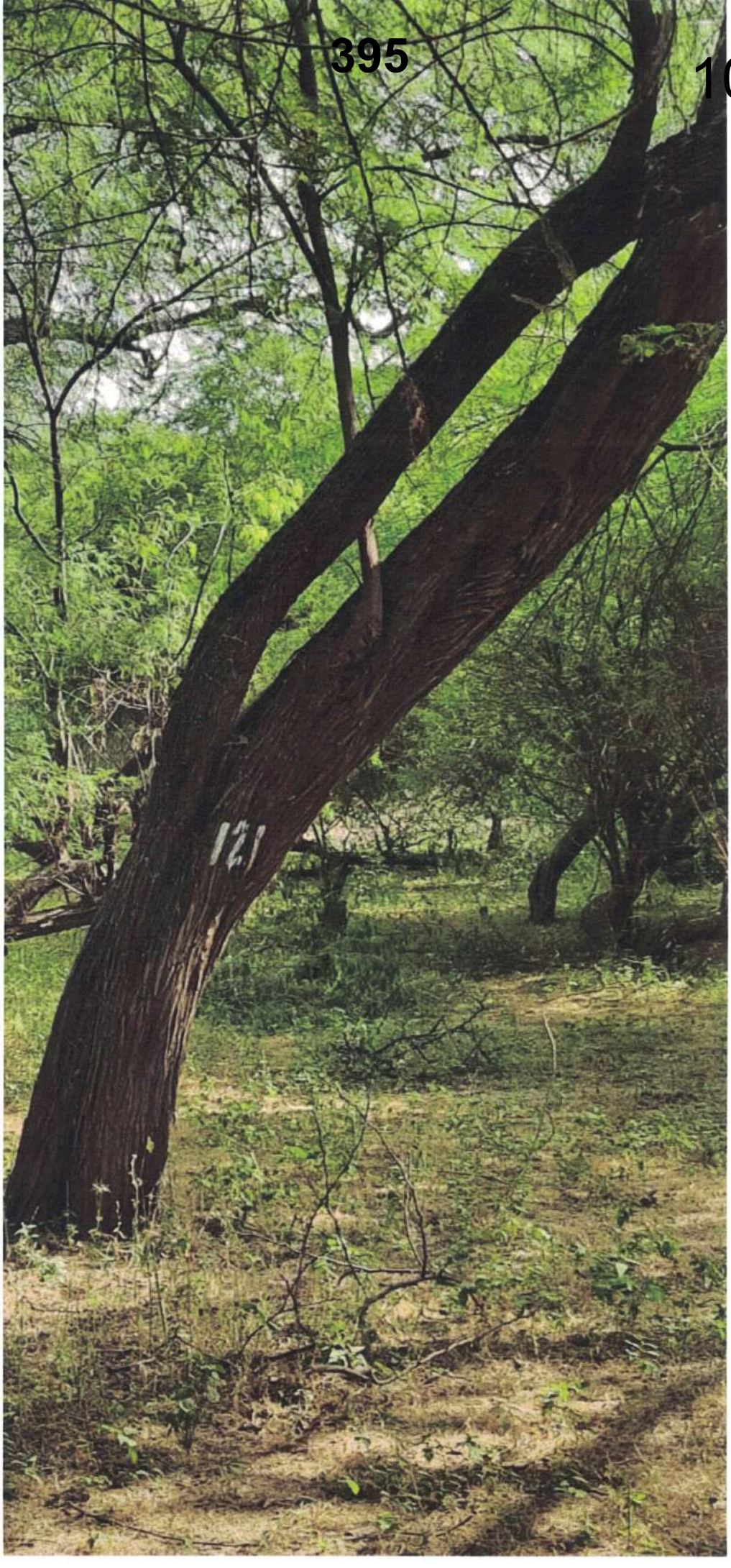

107

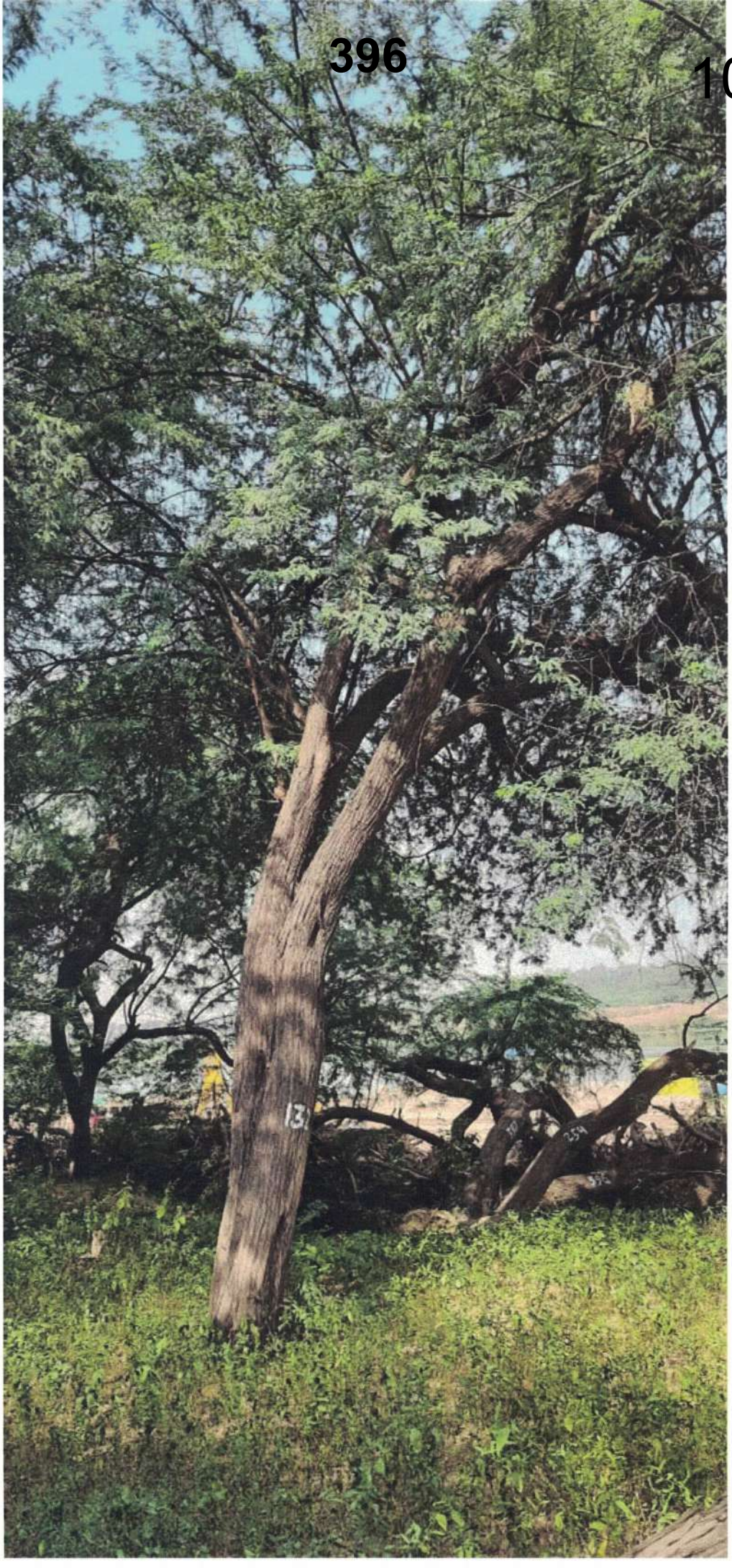

166

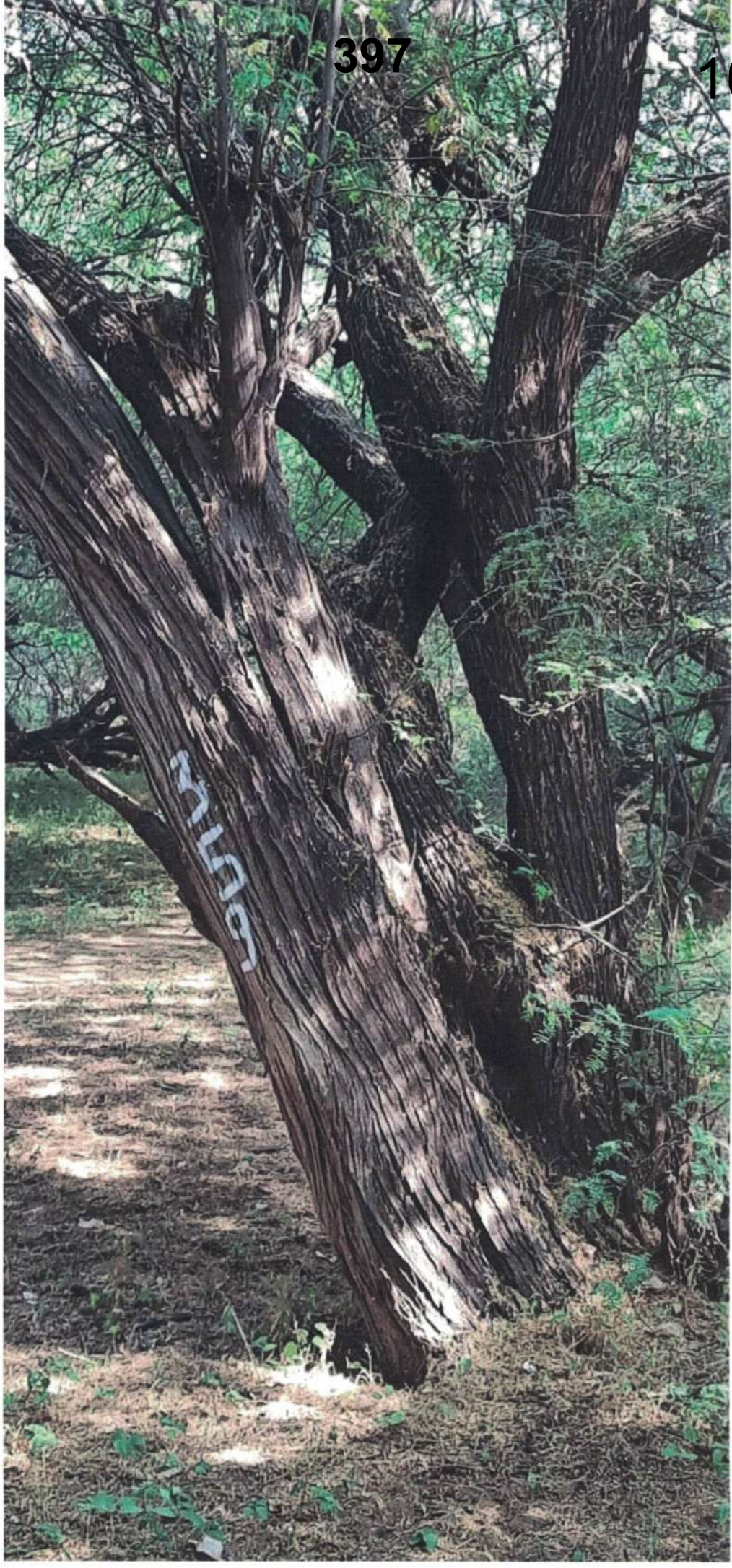


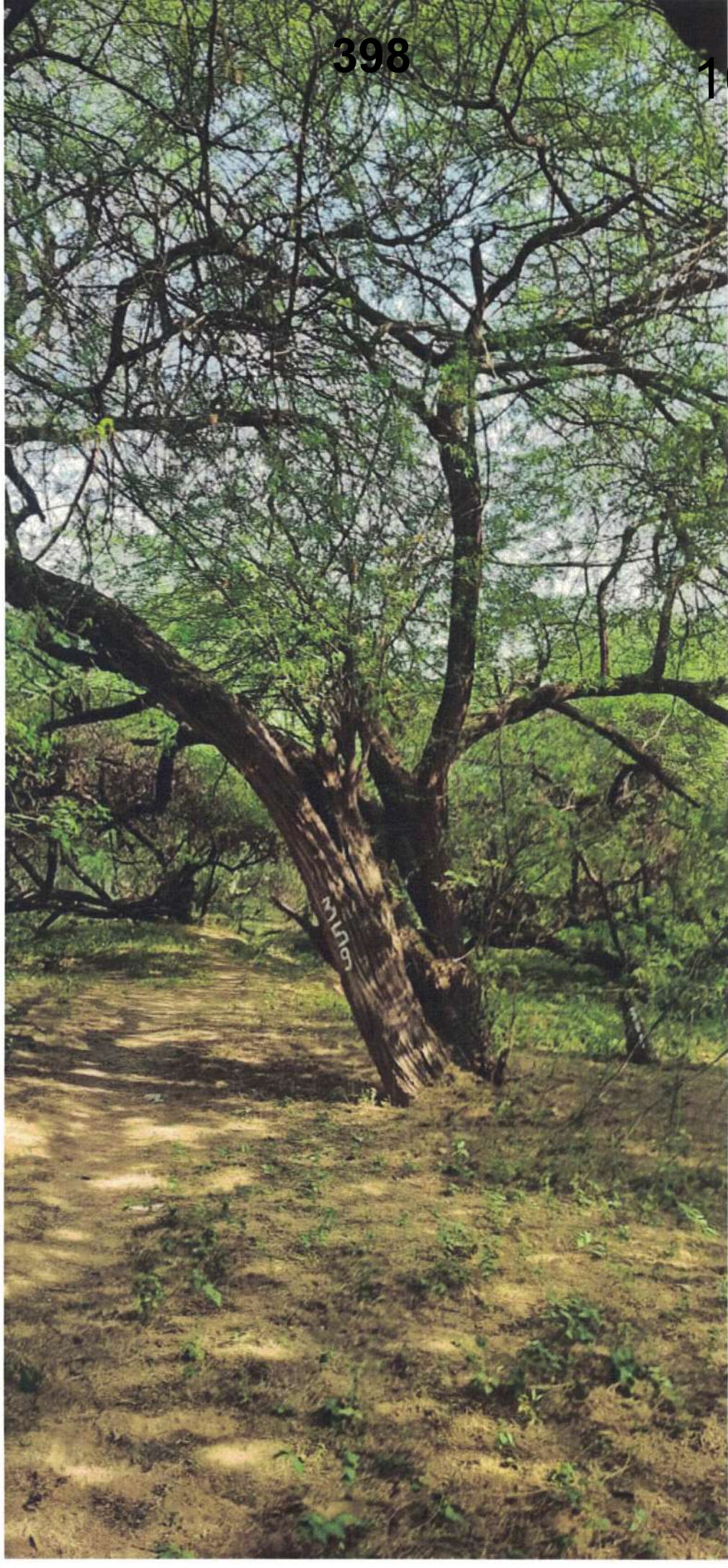

136

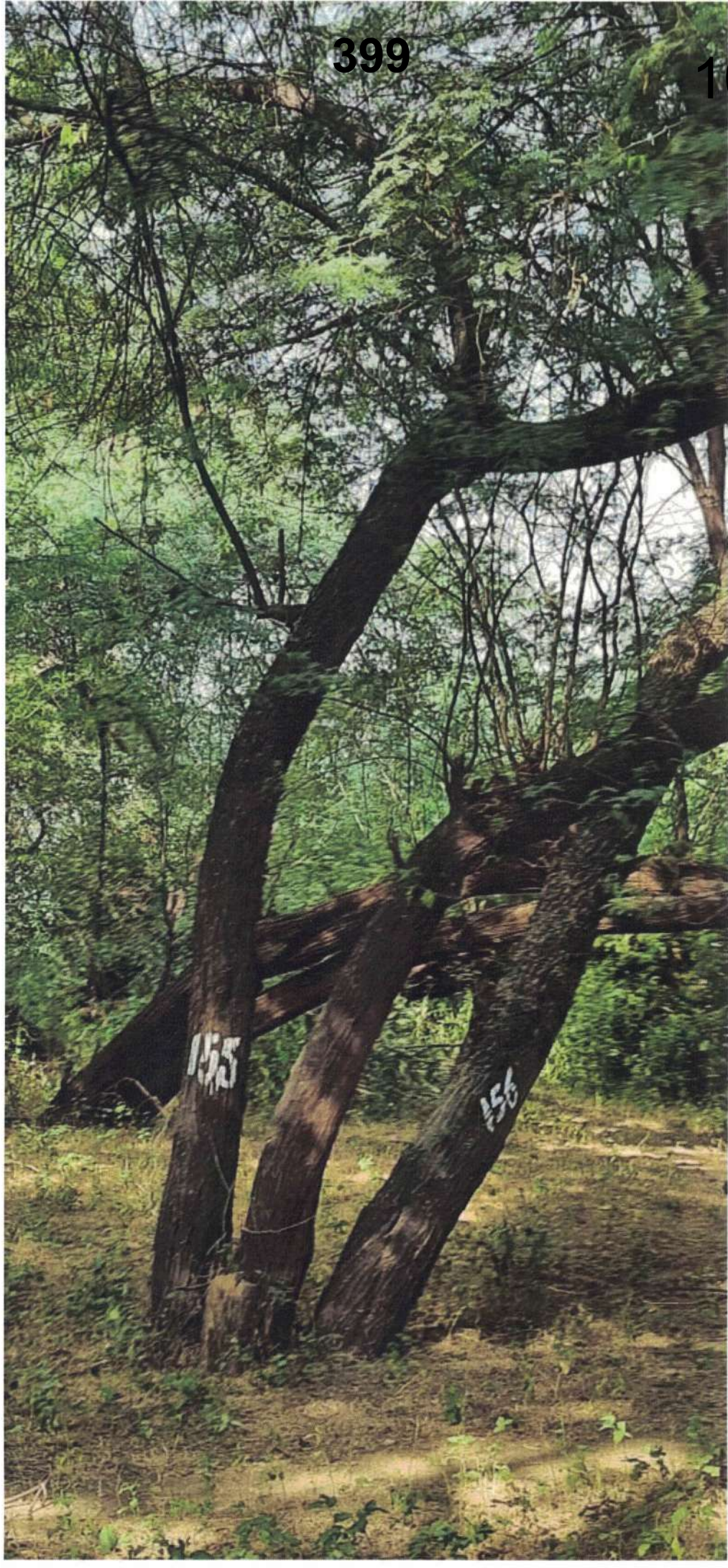

176

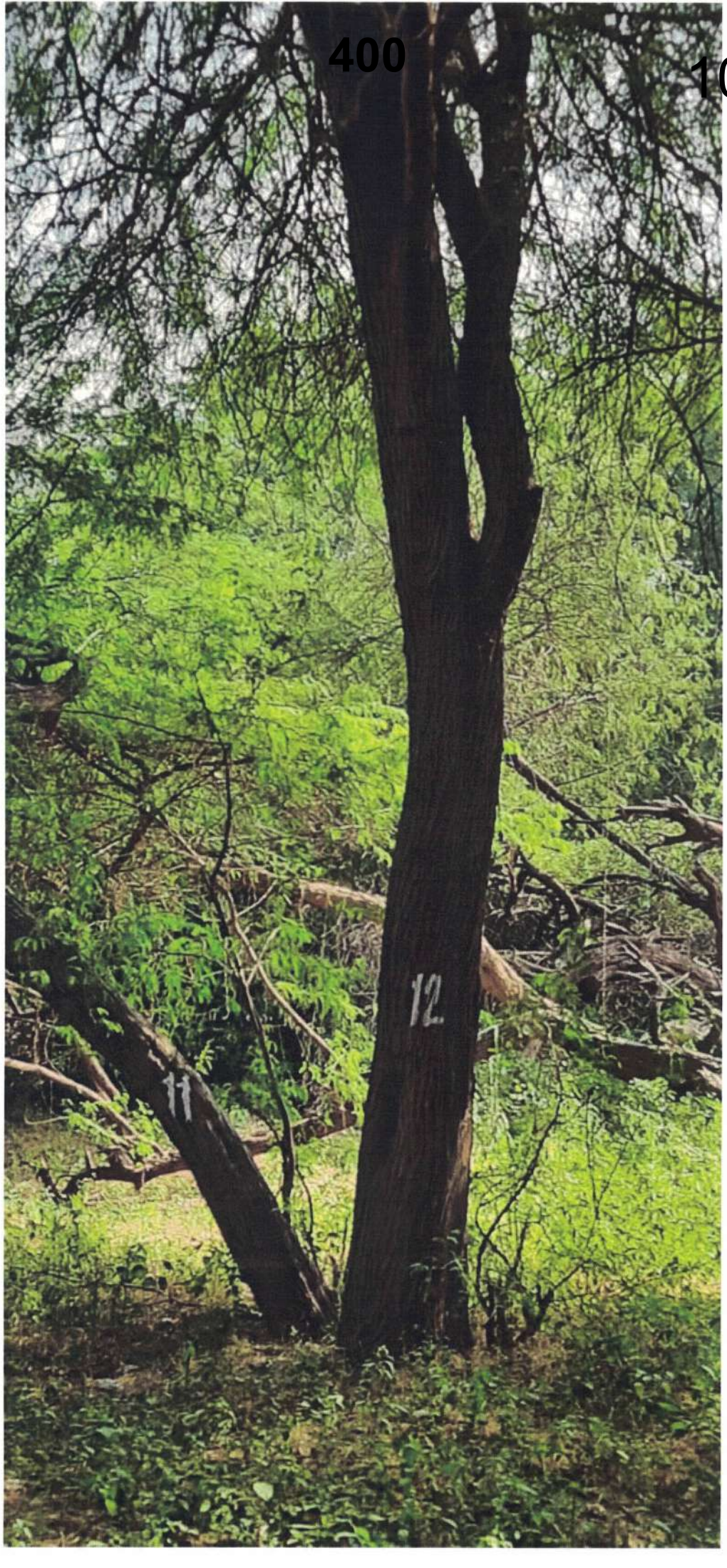

395
100

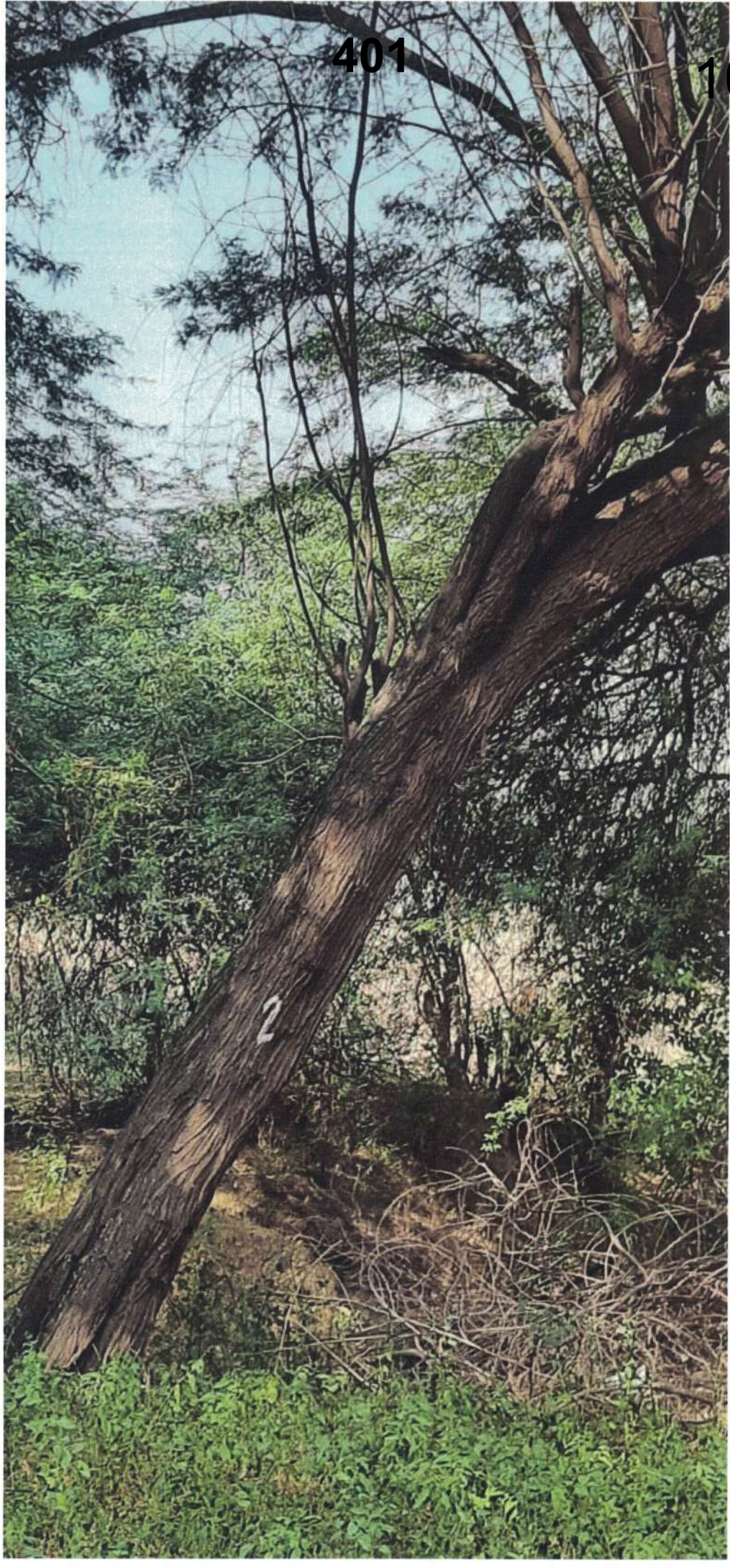

13

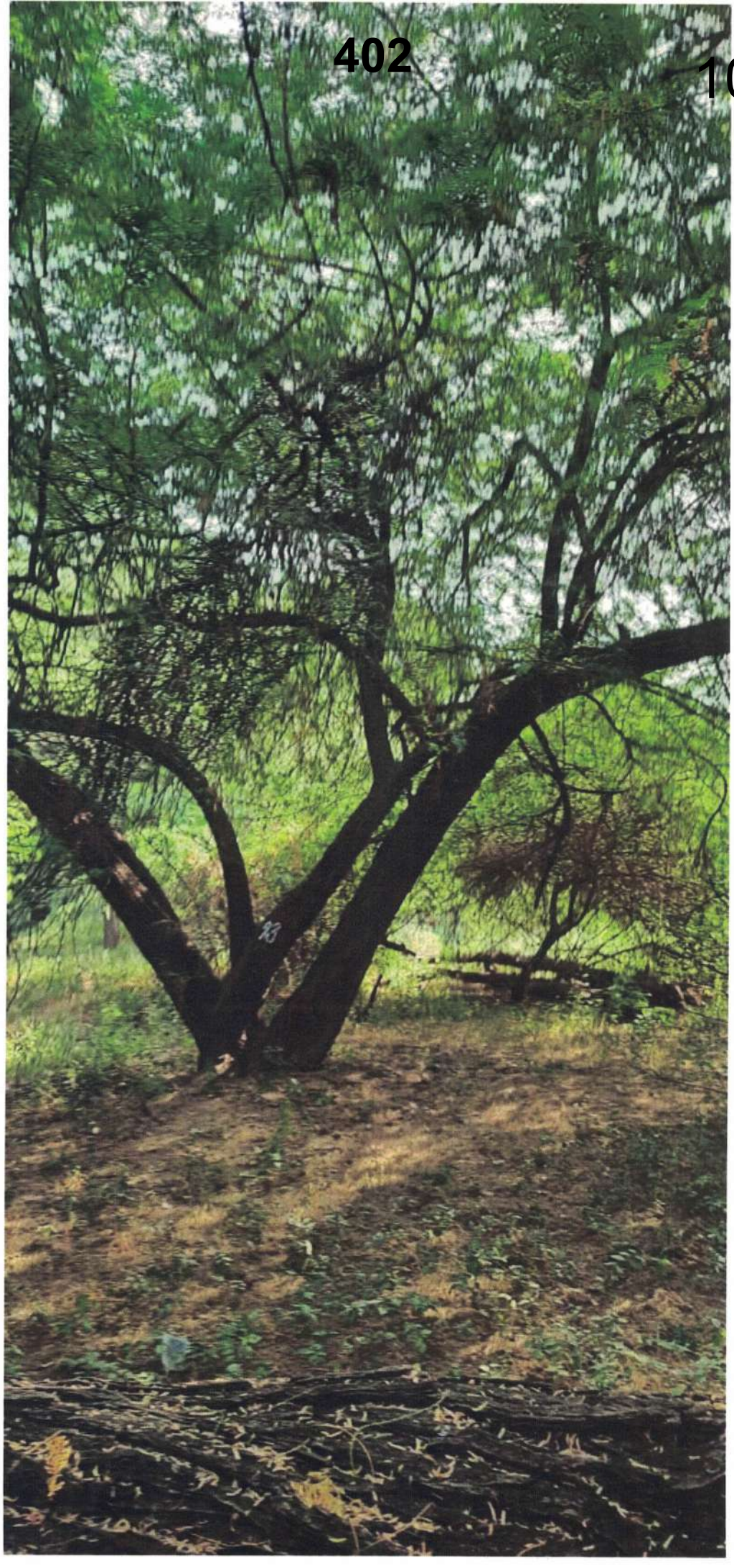


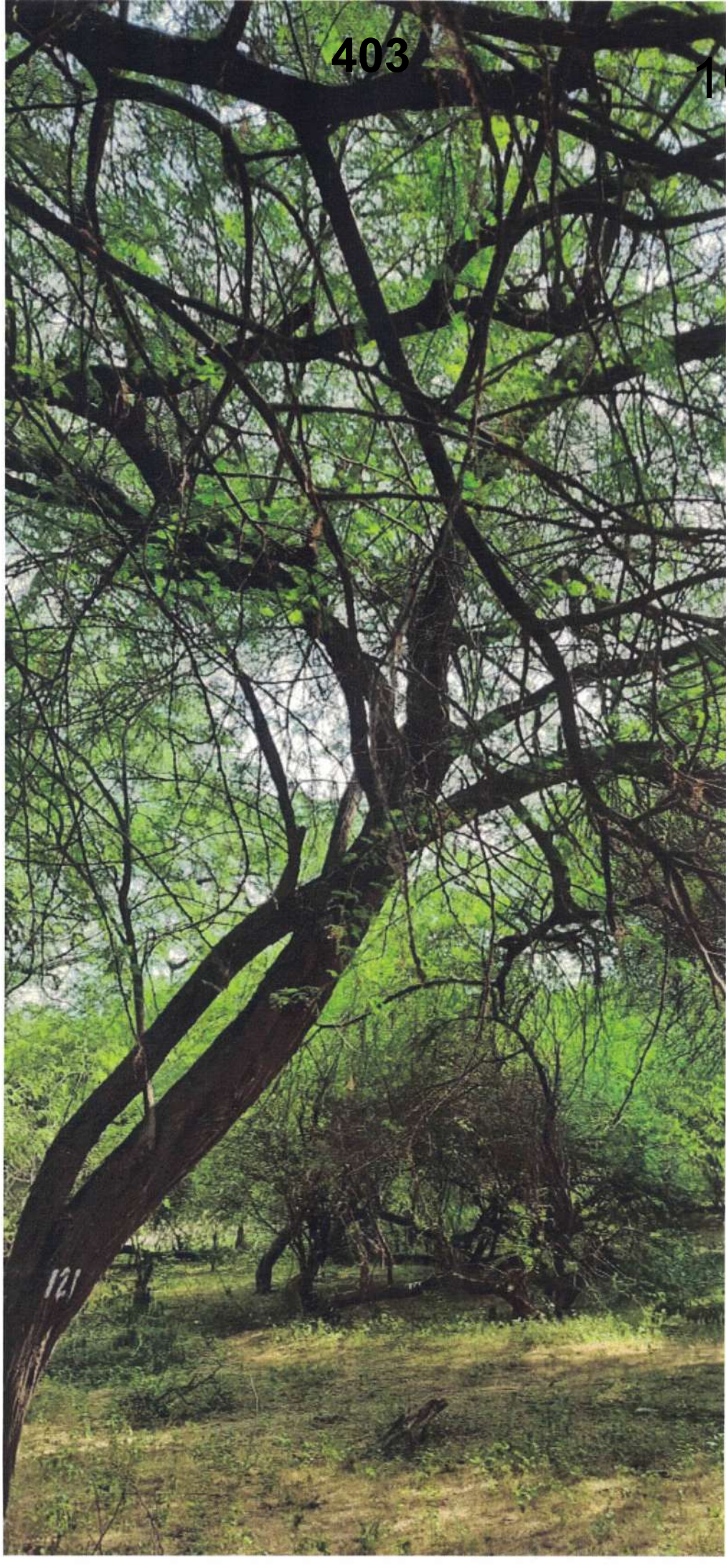


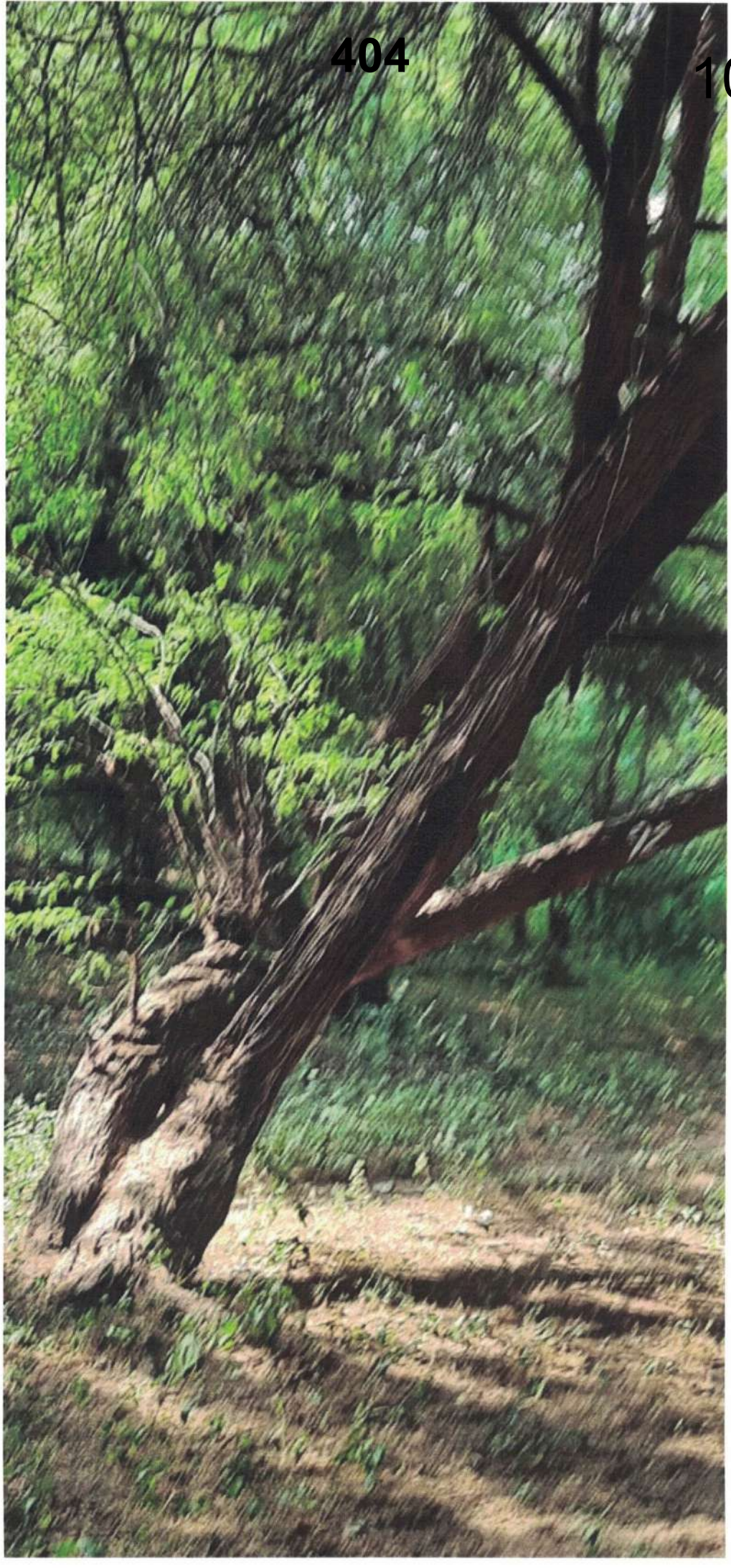

155
156


400
105
12
11


2




121



//TC//