ASSESSMENT OF STATUS OF YELLAMALLAPPASHETTARA LAKE AND VENGAIAHANA LAKE THROUGH DISTRIBUTION AND DIVERSITY OF ANGIOSPERMS

PRAGATHI PAI** ; RAVI, G*; SHRAVANI, R.V.**

* Principal, Hymamshu Jyothi Kala Peetha Composite PU College, # 74, Hymamshu Shastry Road, IV Main, Malleswaram, Bangalore – 560 055; dr.ravi@hymamshu.org

** Pre-university student, Hymamshu Jyothi Kala Peetha Composite PU College, # 74, Hymamshu Shastry Road, IV Main, Malleswaram, Bangalore – 560 055; www.hymamshu.org

OBJECTIVE

- ***Assessment of lakes ecosystems through distribution and diversity of aquatic hydrophytes in Yellamallappashettara lake and Vengaiahana lake.***

INTRODUCTION

- ***Aquatic plants:***
  - ***Adapted to living in aquatic environments***
  - ***Grow in shallow to deep water zones.***
  - ***Can only grow in water or in soil that is permanently saturated with water.***
- ***Importance of aquatic plants in Lake ecosystems:***
  - ***Primary producers***
  - ***Maintain the micro-climate of the region***
  - ***Trap/sequester nutrients and CO_2***
- ***Diversity in aquatic plants:***
  - ***Bio-diversity is an essential characteristics of the aquatic ecosystem***
  - ***Reflects the physico-chemical condition of water.***
  - ***Higher diversity is proportional to good water quality***
  - ***Higher nutrient enrichment (cultural eutrophication) leads to poorer diversity implies poor water quality.***

Study area:

YELLAMALLAPPASHETTARA LAKE : located at 13˚01'27.64"N and 77˚ 43' 55.08"E

VENGAIAHANA LAKE :located at 13˚01'28.96"N and 77˚ 42' 33.69"E

MATERIALS AND METHODS

AREA

- *Bengaluru - capital of Karnataka State is located at an altitude of 920 metres which has expanded as Greater Bengaluru (77°37'19.54" E and 12°59'09.76" N) is a major administrative, cultural, commercial, industrial, and knowledge hub of the state of Karnataka.*

- *The 'City of thousand lakes' has presently ended up as a city of handful decade lakes.*

- ***Yellamallappashettara lake :*** *Near Virgonagar on the road leading from KR Puram to Hoskote.*

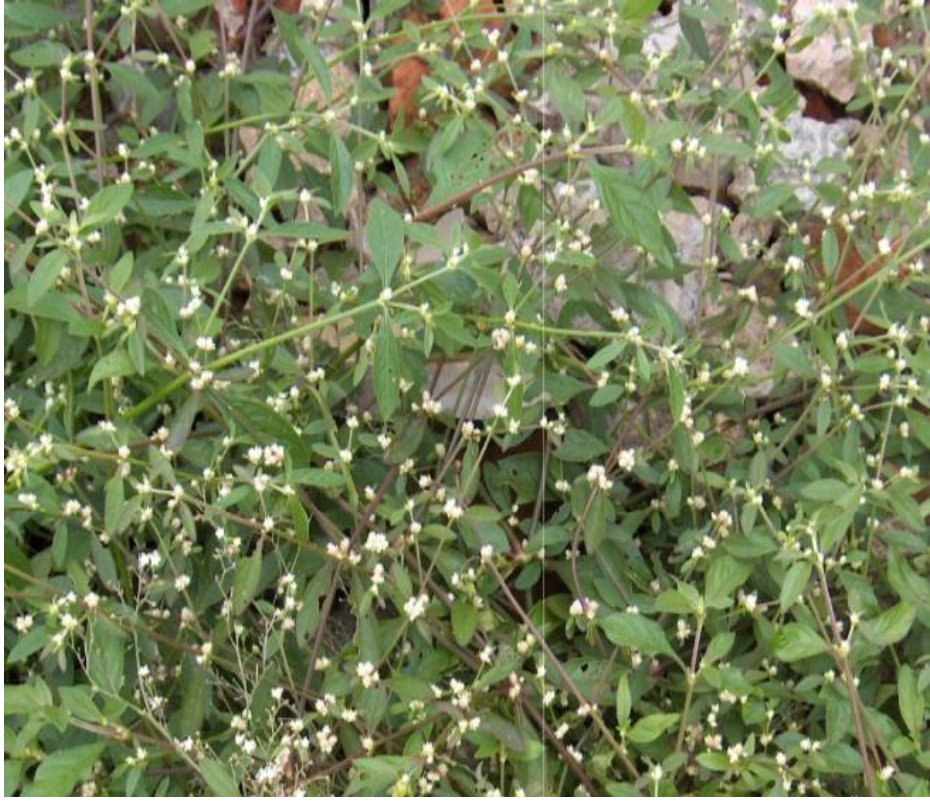
- ***Vengaiahana lake :*** *Near main road after KR Puram bus station and enroute towards Garden City College.*

METHOD OF COLLECTION:

- *The Yellamallappashettara lake and Vengaiahana lake were surveyed during the random periodic visits in the month of June and July 2014.*
- *Referred flora to identify the plant sample*
- *The plants were also collected from these lakes for the preparation of herbarium specimens.*


VENGAIAHANA
LAKE

1. Alternanthera paronycioides (smooth chaff flower):



Identification

- Perennial herb with white papery flowers
- Stems are densely hairy.
- Stalkless flower-heads are ovoid to spherical, often hairy at base.
- Tepals are white.
- Stamens are 5, with yellow anthers.

Uses

- Used as ornamental plants.

2. Alternanthera philoxiroides (alligator weed)

Identification

- Perrenial herb
- Stems are long, branched, and hollow.
- Leaves are simple, elliptic, and have smooth margins.
- Have whitish, papery ball-shaped flowers that grow on stalks.

Disadvantages

- Invades waterways.
- Can reduce water flow and quality by preventing light penetration and oxygenation of the water.

Uses

- It is used as a cultivated vegetable by some ethnic communities.

3. Polygonum lanigerum (pink knotweed)

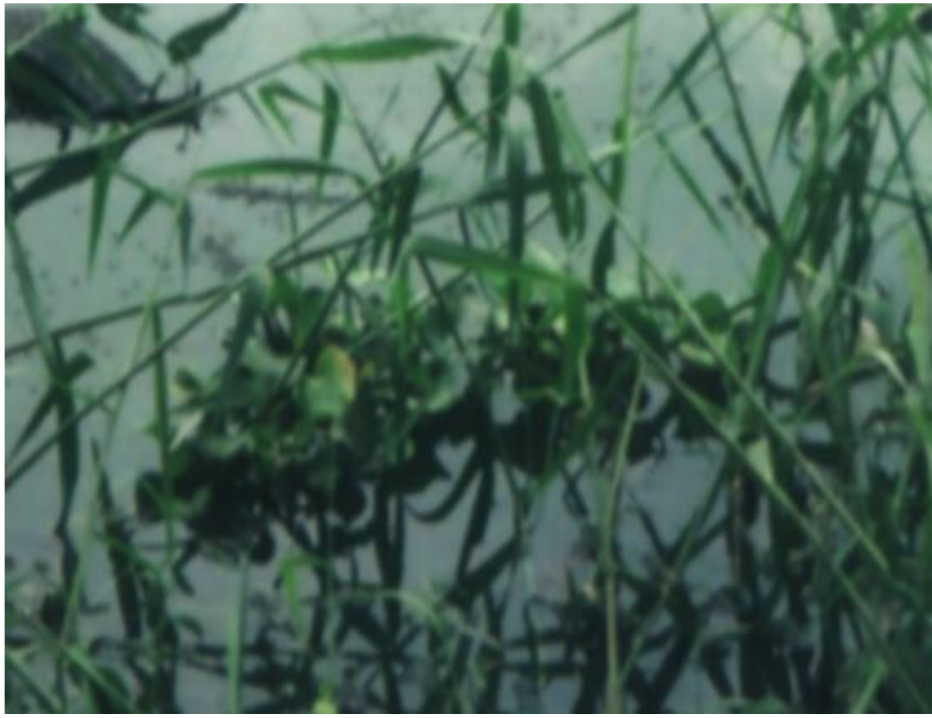
Identification

- Non-woody perennial.
- Aquatic, growing as floating plants in ponds.
- The smooth-edged leaves.
- The stems are often reddish or red-speckled.
- The small flowers are, pink, white, or greenish.

Uses

- Used as food by the larvae of some Lepidoptera species.

4. Eicchornia crassipus (water hyacinth)



Identification

- Free-floating perennial aquatic plant
- Broad, thick, glossy, ovate leaves.
- Freely hanging roots are purple-black.
- Attractive flowers, mostly lavender to pink in colour with six petals.

Disadvantages

- Known as TERROR OF BENGAL
- Blocks sunlight from reaching native aquatic plants.
- Starves the water of oxygen, often killing fish.

Uses

- Excellent source of biomass.

YELLAMALLAPPASHETTAR LAKE

1. Amaranthus spinosus (spiny amaranth)

Identification

- Annual herb with sometimes red tinged erect stems.
- Leaves ovate to rhombic-ovate, elliptic.
- Flowers green, in axillary clusters.

Uses

- The leaves of this plant have been used in the diet.

Disadvantages

- Has spines that can cause injury to the mouths of grazing animals and few cases of poisoning in cattle.

2. Nelumba nucefera (Indian lotus)

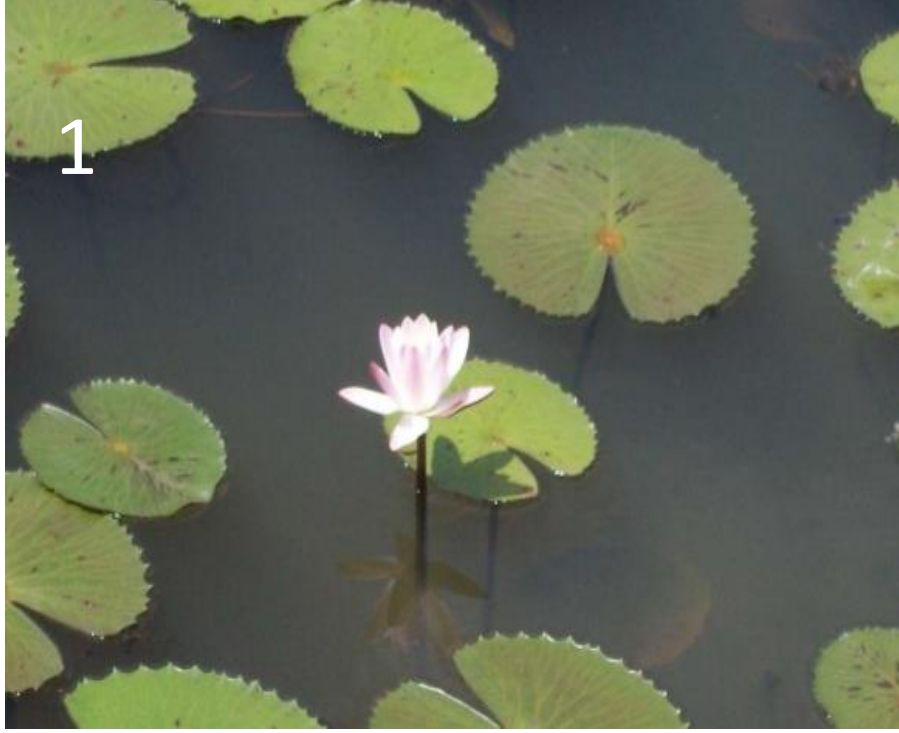
Identification

- The leaves float on top of the water surface.
- The leaves may be as large as 60 cm in diameter.
- The flowers are usually found on thick stems.

Uses

- Decorative purposes and for dried flower arranging.

3. *Nymphaea pubescens Willd* (Hairy water lily)



Identification

- Having erect perennial rhizomes.
- Its leave blades are round above the water and heart-shaped below
- The flowers are quite large, about 15 cm in diameter when fully open.

Uses

- Antioxident effect.

4. Nymphaea nouchali (blue star water lily)

Identification

- Day-blooming nonviviparous plant with submerged roots and stems.
- Usually violet blue in color with reddish edges.
- Flower look star-shaped from above.
- The leaves are round and green on top.

Uses

- Medicinal plant in Indian Ayurvedic medicine.
- An ornamental plant.

5. Nymphaea rubra (red water lily)

Identification

- Beautiful floating plant.
- Flowers are intensely red or rose-coloured.
- Leaves are around, sharply toothed.
- The lobes of the leaves diverge away from each other.

Uses

- Extracts of the rhizomes and flowers, have anti-diabetic and anti-inflammatory effects.

LITERATURE AND SEASONAL SURVEY

- *Literature survey of Flora of Bangalore District (Ramaswamy and Razi-1973), Flora of Karnataka (Saldanha) and Flora of Karnataka (Sharma et al-1984, BSI) has no citation of Yellamallappashettara and Vengaiahana Lake in the floras.*

- *The seasonal survey of Yellamallappashettara lake during 2014 shows 20 families, 30 genera and 34 species (Table II & Table III) when compared to 24 families, 42 genera and 47 species found from 2005-2010.*

- *Vengaiahana Lake survey during 2014 shows 22 families, 38 genera and 43 species (Table I & Table III) when compared to 23 families, 35 genera and 40 species found from 2005-2010.*

- *Since 2005, there is a progressive decline in the number of species due to the increased human activities due to rapid urbanisation at the outskirts of Bengaluru.*

- *At present Yellamallappashettara and Vengaiahana Lake has Hygrophila auriculata (Schum.)Heine, Alternanthera paronychioides A. St.-Hil, Alternanthera philoxeroides (Mart.) Griseb., Alternanthera sessilis (L.) DC., Amaranthus spinosus L., , Persicaria glabrum L. Colocasia esculenta (L.) Schott, Eichhornia crassipes (Mart.) Solms, Typha domingensis Pers.and Ludwigia perennis L.*

- *The changing profile in the lake is depicted by the absence of many sensitive aquatic angiosperms and the sustenance of only the rigid invasive species of angiosperms.*

RESULTS

IMP Wetland Plants: Bio indicators			
		Lake 1 V	Lake 2 Y
1	***Alternanathera philoxiroides***	++	+++
2	***Alternanthera paronicoides***	++	+++
3	***Alternanthera sessilis***	++	+++
4	***Eichhornia crassipus***	++	+++*
5	***Cyperus alopecuroides***	+	++
6	***Typha angustfolia***	++	+++
7	***Pistia striata***	-	+

INDEX	
Minimum	+
Medium	++
Maximum	+++
Absent	-

Table- III : Angiosperm distribution in the two lakes during 2014						
Lakes	***Monocotyledons***			***Dicotyledons***		
	Family	***Genera***	***Species***	***Family***	***Genera***	***Species***
Vengaiahana lake(V)	*6*	*7*	*8*	*14*	*23*	*26*
Yellamallappashettara lake(Y)	*7*	*12*	*13*	*15*	*26*	*30*

INFERENCE

- Higher abundance of aquatic plants in *Yellamallappashettara lake(Y)* ➔ *higher nutrient enrichment that poses* ***threat to lake ecosystem***

- *Proliferative growth of aquatic plants* →
  - *-lead to lower Dissolved Oxygen levels and consequent fish kills*
  - *-Blocks sunlight – create anoxic environments*
  - *-Blocks the air-water interface – do not allow algal growth – disruption of lake productivity*
  - *-Higher decomposition of aquatic plant parts – higher bacterial oxygen demand – inhabitable lake ecosystem for different tropic levels*

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THANK YOU