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MARSH VEGETATION OF MUTHURAJAWELA

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Abstract

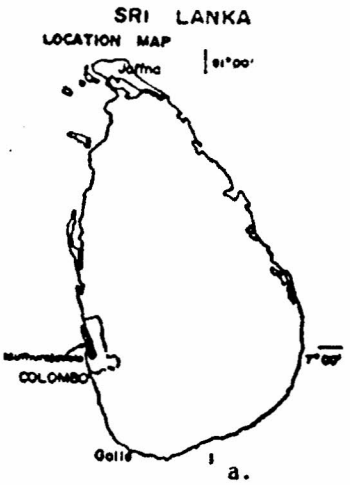
Biologically marshes are among the richest, most productive ecosystems known and among the most interesting. Muthurajawela marsh is one such wet land which has a great effect on maintaining the proper ecological balance of the mangrove vegetation and the fauna and flora of the Negombo lagoon. An attempt is made here to understand the distribution patterns of vegetation, plant species of ecological significance and of special human interest, and to find out, if any, the presence of rare endangered plants. It is hoped that the present study would be an initial step for much more detailed ecological studies of the ecosystem.

Key words: Marsh vegetation, Muthurajawela

1. Introduction

Marshlands are a type of wetland areas that are permanently or periodically ennundated by water. Thus marshlands are restricted to shallow margins of takes and ponds and low, poorly drained lands where water stands for several months of the year. Generally speaking such areas are saturated or covered by water during the growing season of plants and the substrate is exposed during germination of seeds (Smith, 1966). The substrate itself is soft, rich in decaying organic matter mixed with mineral soil. The dominant vegetational types consist of reeds, sedges, grasses and cattails. Historically such poorly drained land areas were considered worthless. Subsequently many of these marshes were filled or drained. Their natural and economic importance have been recognized only recently. In addition to providing necessary breeding habitats for many species of wild life, marshes act as a natural filtration system. These areas trap nutrients, pollutants and prevent them from entering adjoining oceans, lakes or streams. Further they slow down the force of flood waters and permit nutrient-rich particles to settle out. Marshes can act as reservoirs and release water slowly thus preventing floods. As time passes drainage in marshes gradually improves for the vegetation continuously builds up the bottom with debris. Such a condition represents the last filling-in stages of that water body's succession (Smith, 1966). Biologically marshes are among the richest, most productive ecosystems known. Yet they are the least appreciated and the first to be destroyed by filling and drainage.

Muthurajawela marsh is one such wetland as described and the largest marsh on the west coast of Sri Lanka situated North of Colombo city (Fig. 1 b). The main portion of the marsh lies between the Old Dutch Canal on the



DEMARKTION OF SUB-AREAS

01. Tidal channel and mangrove islands
02. Duwa area
03. Kadolkelle area
04. Seagrass bed west
05. Seagrass bed east
06. Open lagoon north
07. Open lagoon south
08. Transition area swamp - lagoon
09. Tarakuliya area
10. Dalature area
11. Tudella area
12. Pamunugama area
13. Pulluhena area
14. Bopitiya area
15. Tummodera area
16. Weligampitiya area
17. Kandana area
18. Uswetikaiyawa area
19. Mattumagala area
20. Balagalla area
21. Mabola area
22. Hendala area
23. Hendala beach
24. Uswetikeiyawa beach
25. Talahena-pitipana beach
26. Talahena- pitipana area
27. Negombo twon
28. Kurana-katunayake area
29. Seeduma area

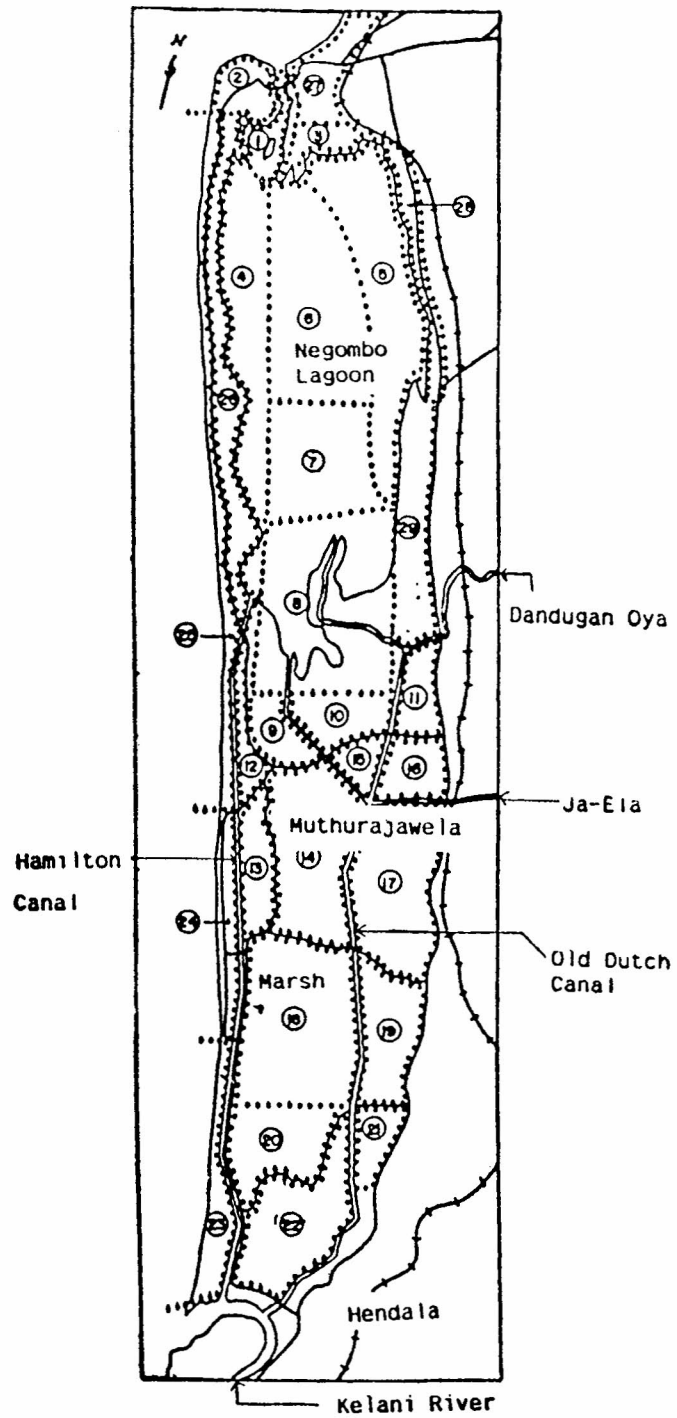


Fig. 1 a. Topography, b. Muthurajawela marsh & Negombo Lagoon divided into sub — areas.

East and Hamilton Canal on the West and extend from Hendala in the South to Ja-Ela in the North covering a land area of ca. 3100 ha. However, on the East of Hamilton Canal due to recent settlements and filling, Muthurajawela marsh (which includes full or part of sub-areas 8, 9, 10, 14, 15, 18, & 20 of Fig 1b) has been now restricted to the small canal oriented in a NS direction as shown in Fig 2. The marsh area between these two boundaries (i.e., the small canal & the Old Dutch Canal) are further disrupted with a number of smaller water canals or Elas (commonly locally referred to as Depa Elas) that roughly run along an East West direction as seen in Fig. 2.

Major portion or almost the whole supply of fresh water to the economically and ecologically important Negombo lagoon adjoining North of Muthu rajawela (Fig. 1. b) is supplied through the marsh. Except for the work of Amaratunga (1970) Flowering Plants of Muthurajawela, until now no major study have been undertaken to identify and understand, the vegetation and the ecology of this marsh land. The main objectives of this study is to 1. Identify plant species present in the ecosystem, 2. Identify plant species with special human interest, 3. Identify plant species with special ecological significance, 4. Identify rare endangered plant species, and 5. Identify critical plant habitats.

2. Method of Study

A general extensive plant collection in triplicate was made within Muthurajawela marsh. These plant specimens were dried and identified by making use of "A Revised Handbook to the Flora of Ceylon" and by comparing them with the existing herbarium specimens at the National Herbarium at Peradeniya. One set of specimens will be deposited at the Botany Division, Open University, of Sri Lanka Nawala Nugegoda, the other at the National Herbarium, Peradeniya and the third will be kept for exchange basis. Investigations were carried out in the field by direct communication with the residents in the area and consulting literature available as to the special human interest of plants. Identification of plant species of ecological significance were carried out by field investigation and analyzing the data collected. Rare and endangered plant species were identified with the help of existing literature. Random transact Lines of 100 m were done to determine the vegetation profiles at various habitats. Randomly selected 50 m x 50 m square plots were sampled to determine the cover and dominance of vegetation.

3. Results

Based on the habitats of the plants within Muthurajawela marsh, two broad categories of plants were recognized as follows:-

I) Plants growing in the water bodies and their banks. The water bodies include the (a) Canals & (b) Elas.

II) Plants growing on water logged or marsh-land.

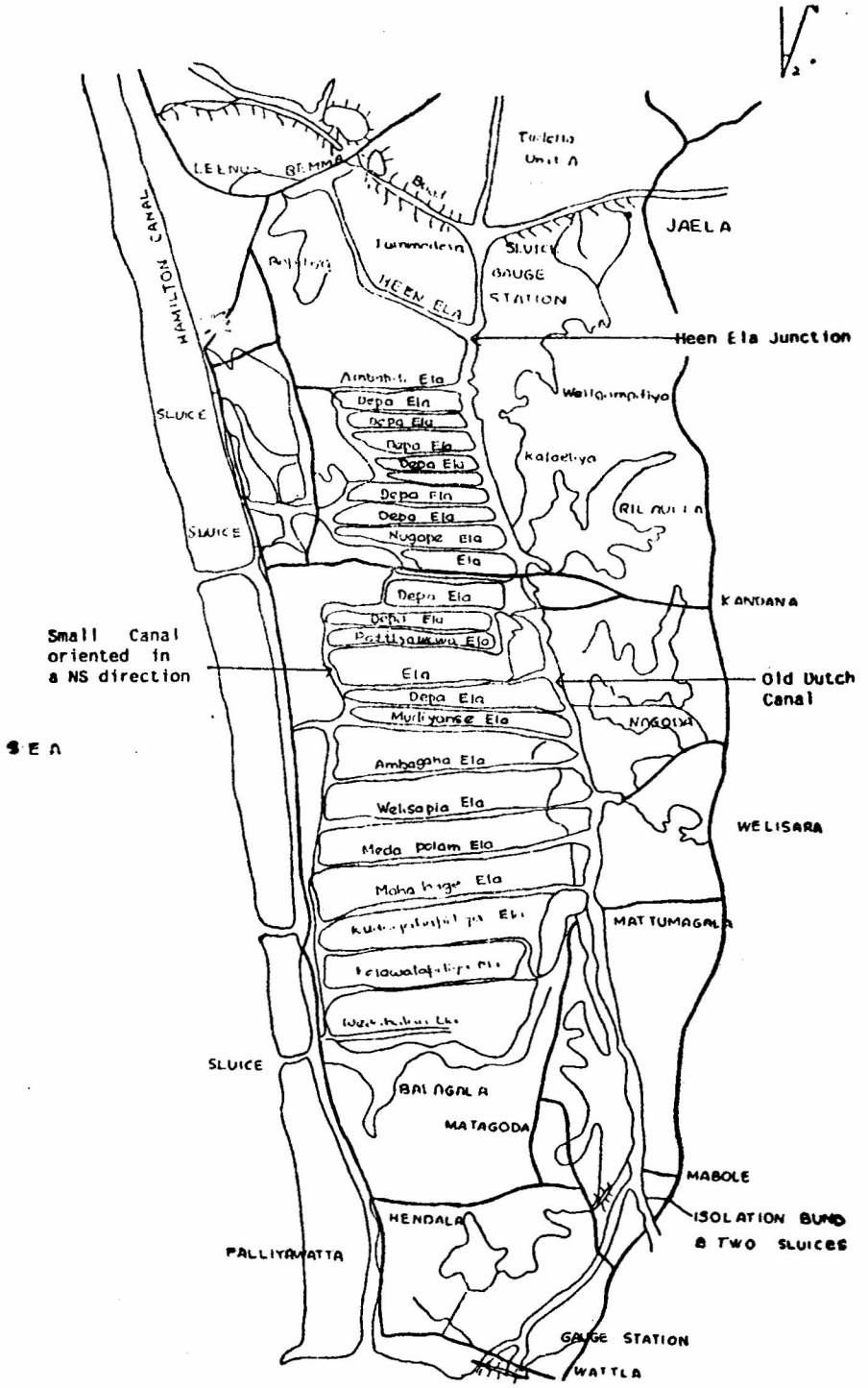


Fig 2. Muthurajawela Marsh with its Canals and Elas

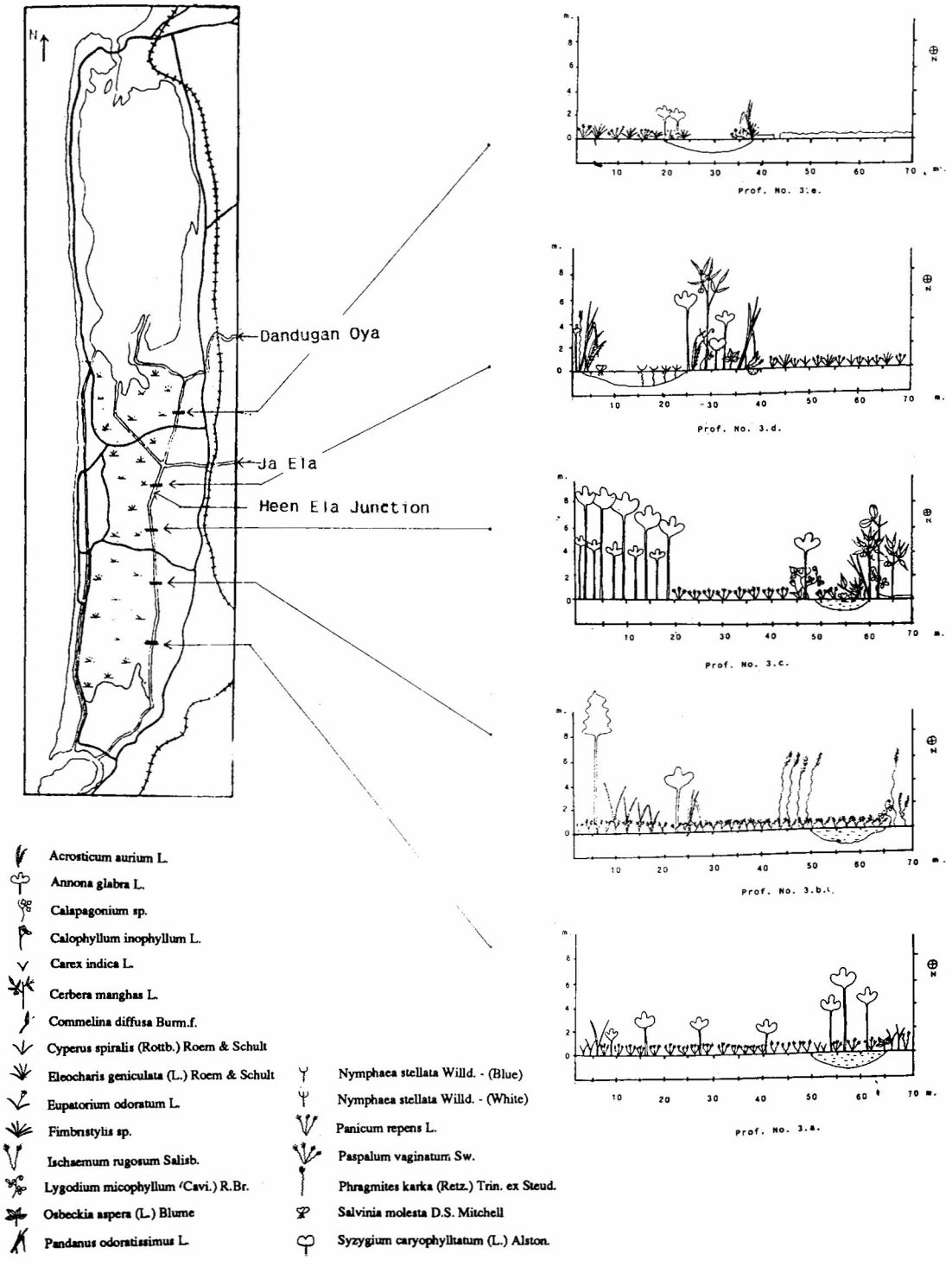
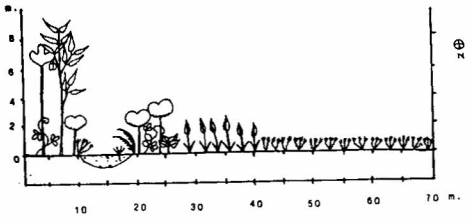
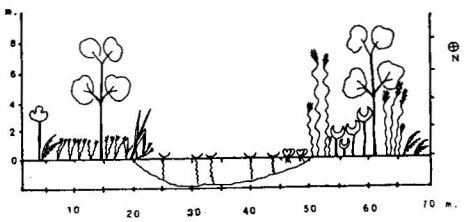


Fig. 3. Shows Vegetation Profiles across the Old Dutch Canal and its banks.



Prof. No. 4.b.

- Acrosticum aurium L.
- Annona glabra L.
- Bruguiera sexangula (Lour) Poir
- Dolichandrone spathesia (L.f.) K. Schum.
- Ischaemum rugosum Salisb.
- Lygodium micophyllum (Cavi.) R.Br.
- Nymphaea stellata Willd.
- Osbeckia aspera (L.) Blume
- Pandanus odoratissimus L.
- Paspalum vaginatum Sw.
- Phragmites karka (Retz.) Trin. ex Steud.
- Salvinia molesta D.S. Mitchell
- Syzygium caryophylltatum (L.) Alston.
- Typha angustifolia L.
- Cerbera manghas L.



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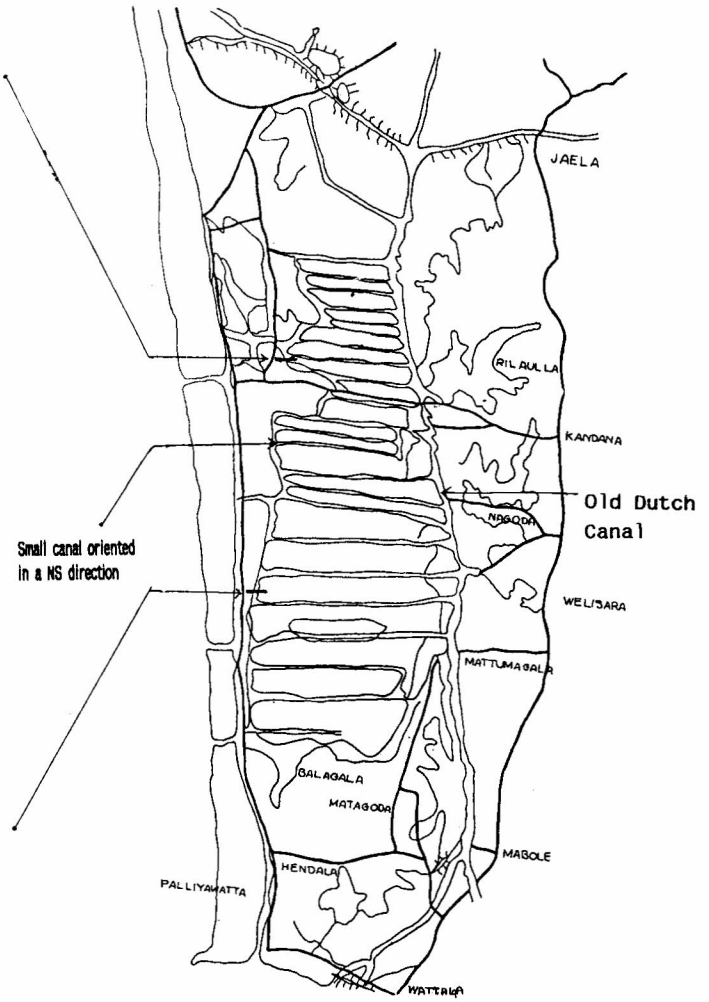


Fig. 4. Shows Vegetation Profiles across the small canal boundaring the West of Muthurajawela and its banks.

3.1 Plants growing in the water bodies and their banks

3.1.1 At present about sixty per cent of the Old Dutch Canal South of Heen Ela Junction is (Fig. 2) filled and covered with vegetation. Plants that cover the canal at various places south of Heen Ela Junction are mostly grasses (e.g. *Panicum repens, Ischaemum rugosum*, sedges (e.g. *Carex indica*), scattered with ferns (e.g. *Salvinia molesta*, as seen in Fig. 3 Prof. No. 3 a, b & c). In places where the canal is not covered with such plants, bottom rooted purple and white manel (*Nymphaea stellata*) are found with scattered free floating *Salvinia molesta.* (Fig 3 Prof No. 3 d)

At many places the banks of the Old Dutch Canal (South of Heen Ela Junction) is covered with mixed vegetation dominated with *Annona glabra* (wel atha) reaching up to heights of ca. 6 m. and *Osbeckia aspera* (Bowitia), *Syzygium caryophyllatum, Cerbera manghas* (Gon kaduru), *Calophyllum inophyllum* (Domba) and a few scattered *Pandanus odoratissimus* (Wetakeyiya) (Fig 3 Prof. No. 3. a, b & c). The growth of climbing *Lygodium microphyllum* (Pamba), makes the vegetation of the banks at these places almost impassable. Compared with the abundance of *L. microphyllum* the growth of other climbing plants such as *Asparagus falcatus* (Hathawariya), *Passiflora foetida* (Balal pahura) and *Leptadenia reticulata* is negligible. At other places of the Old Dutch Canal very often the West Bank is covered with *Carex indica* while the East Bank is covered with plants such as *Panicum repens, Osbeckia aspera* (Bowilia), *Hydrocera triflora* (Diyakundulu). The trees in this area are often attacked by the climbing total parasite *Cuscuta reflexa* (Aga mula nethy wel) and the partial parasite *Dendrophthoe falcata.* The northern part of the canal beyond Thunpath modera the banks are dominated with *Phragmites karka* (Nala-bata) communities found in patches. The rest of the banks are dominated with *Pandanus adoratissimus* (wetakeyiya)(Fig. 3 Prof. No. 3 b & c) *Acrosticum aurium* (Kerankoku) and *Annona glabra* (wel atha) communities. Occasionally *Sonneratia caseolaris* (kirella) reaching up to ca. 20 m., could be seen and these trees may represent fragments of the original vegetation that existed (Fig. 3 b). Vegetation profile of the Old Dutch Canal at various places are illustrated in Fig. 3 Profs, 3. a, b, c, d & e.

3.2.1 Unlike the Old Dutch Canal, the small Ela that runs along a NS direction demarcating the western side of Muthurajawela marsh is much smaller and less filled or covered with vegetation. Presence of *Salvinia molesta* is relatively less. There is much more abundance of both white and purple manel than that of the Dutch Canal and the banks of the Ela is covered with mixed vegetation of the type *Annona glabra* reaching to heights of ca. 6 m., *Bruguiera sexangula, Acrosticum*

aurium, *Pharagmites karka*, *Dolichandrone spathecea*, and other places along the Ela with *Annona glabra*, *Cerbera manghas*, *Osbeckia aspera*, *Syzygium caryophyllatum*, *Ischaemum rugosum*, *Typha angustifolia* (Fig. 4. a & b). Similar to the trees along Dutch Canal, the trees here too are covered with *Lygodium microphyllum*, *Asparagus falcatus* and attacked by *Cuscuta reflexa* and *Dendrophthoe falcata.*

The smaller Elas (Depa Elas) that run across Muthurajawela marsh is an East-West direction are relatively recently constructed. The bunds of these at various places are used by the villages to cross the marsh. Both white and purple manel are present along with *Aponogeton crispus* (kekatiya) and *Hydrilla verticillata.* The vegetation in the mid portion of the marsh has been disturbed by man and as a result the vegetation profiles along these banks are not significantly different from that of the marsh vegetation (Fig. 5.b) except at places close to the Dutch Canal and the Ela on the West of the marsh (Fig. 5. c and a. respectively).

3.2 Plants Growing on Water Logged or Marsh land

The vegetation within the middle portion of the marsh is quite uniform from about Kerawalapitiya Ela to about Dandugan Oya in the North interrupted only on the two sides of Kandana-Nugape road and Tudella-Bopitiya road due to new settlements (Fig. 6. Profs a, b, c, d, e, f and g) In addition, this uniform vegetation is also interrupted with scattered islands or patches of thick mixed vegetation ranging from about 400-2500 sq. m, the main component of these islands of vegetation being wel atha reaching up to heights of ca. 10 m. and other plants such as *Osbeckia aspera*, *Syzygium caryophyllatum*, covered with *Lygodium microphyllum*, *Passiflora foetida*, *Asparagus falcatus* and a ground cover with *Acrosticum aurium*, *Cyclosorus sp.* These islands of vegetation cannot still be considered as examples of original vegetation types that existed in Muthurajawela for the average age of the wel atha plants do not seem to exceed more than 10 years.

The marshland has a past history of been utilized mainly for paddy cultivation up till 1984 and abandoned due to the seepage of salt water. The remnants of the ridges (Niyara) that was built for this purpose are still visible in most of the area. The ridges (Niyara) in the marsh area are much more prominent due to the growth of scattered *Annona glabra* bushy plants that have grown to an average height of ca. 1-2 m. In addition to *Annona glabra* one may occasionally see plants such as *Cerbera manghas* (Gon kaduru) *Syzygium caryophyllatum* (Lunu dan), *Osbeckia aspera* (Bowitia), and *Premna serratifolia.* Another plant that is encountered very rarely is the endemic Indi (*Phoenix zeylanica*) plants that may reach up to heights of ca. 6 m. For a detailed list of plants present within Muthurajawela marsh refer Table 1.

TABLE 1. GLOSSARY TO THE NAMES OF PLANTS OF MUTHURAJAWELA AND MANGROVES OF NEGOMBO LAGOON

Scientific Name	*Family Name*	*Sinhala Name*	*Sub-area*	*Med Fd Smi Fis Hh*
Abrus precatorius L.	Fabaceae	Olinda	17, 19	+ — — — —
Acanthus ilicifolius L.	Acanthaceae	Ikili, Katu-ikili	8, 10, 9, 18, 14	+ — — — —
Acrosticum aureum L.	Pteridaceae	Kara-koku	20, 18, 14, 15, 9, 10, 8	— + — — —
Aechynomene aspera (L.)	Fabaceae	Maha-diya-siyambala	9, 10	— — — — +
Aegiceras corniculatum (L.) Blanco	Myrsinaceae		28, 29, 26	— — — + +
Agyneia bacciformis (L.) A A. Juss. ex Wight	Euphorbiaceae	Et-pitawakka	18, 9	— — — — —
Anisomeles indica (L.) Kuntze	Lamiaceae	rak-wanassa, Yak wanasa	9, 8	+ — — — —
Annona glabra L.	Annonaceae	Wel atha	8, 9, 10, 15, 14, 18, 20	— — — + +
Aponogeton crispus Thunb.	Aponogetonaceae	Kekatiya	20, 18, 14	+ + — + —
Ardisia humilis Vahl	Myrsinaceae	Balu-dan	18, 9, 10, 15	— — — — —
Asparagus falcatus L.	Liliaceae	Hathawariya	19, 17, 20, 18, 14	+ + — — +
Avicennia marina (Forsk.) Verh.	Avicinnaceae		8, 1, 3, 28, 29, 26	— — — + —
Axonopus affinis Chase	Poaceae	Heen-pothu-thana	20, 17	— — — — —
Bacopa monniera (L.) Westtst.	Scrophulariaceae	Lunuwila	10	+ — — — —
Brachiaria mutica (Forsk.) Stapf	Poaceae	Diya-thna-kola	17, 19	+ — — — —
Bruguiera gymnorhiza (L.) Lam.	Rhizophoraceae	Path-kadol	16, 1, 3, 28, 29, 8, 26	— — — + +
Bruguiera sexangula (Lour.) Poir.	Rhizophoraceae		16, 1, 3, 28, 29, 8, 26	— — — + — +
Carex indica L.	Cyperaceae		20, 18, 14	— — — — +

Scientific Name	*Family Name*	*Sinhala Nama*	*Sub-Area*	*Med*	*Fd*	*Smi*	*Fis*	*Hh*
Ceratoptaris thalicroides (L.) Brongn.	Parkeriaceae	Kuda-maha-warella, Pilihudu oala	14, 10	—	—	—	—	—
Cerbera mangnas L.	Apocrnaceae	Kaduru, Gon-keduru	14, 17	—	—	—	—	+
Ceriops tagal ((Perr) C. B. Rob.	Rhizophoraceae		16, 1, 3, 28, 29, 8, 26	—	—	—	+	+
Cissus quadrangularis L.	Vitaceae	Sive-rassa, Hee-rassa	8	+	—	—	—	—
Clerodendrum inerme (L.) Gaertn.	Verbenaceae	Wal-gurundha	8. 9	+	—	—	—	—
Commelina diffusa Burm. f.	Commelinaceae	Gira-pala	20, 18, 14	+	—	—	—	—
Crinum zeylanicum L.	Amaryllidaceae	Goda manel	15, 9	+	—	—	—	—
Cuscuta reflexa Roxb.	Convolvulaceae	Agamulanathiwel	20, 18, 14, 17, 19	+	—	—	—	—
Cyclosorus sp.	Aspidiaceae		18, 14	—	—	—	—	—
Cyperus arenarius Retz.	Cyperaceae	Mudu-kalanduru	20, 18, 14, 8	—	—	—	—	—
Cyperus corymbosus Rottb.	Cyperaceae	Gal-ehi	9, 10	—	—	+	—	+
Cyperus haspan L.	Cyperaceae	Hal-pan	20, 10	—	—	—	—	—
Cyperus platistylis R. Br.	Cyperaceae		17	—	—	—	—	—
Cyperus radians Nees & Meyen	Cyperaceae		20, 18, 14	—	—	—	—	—
Dendropthae falcata (L. f) Ethingl.	Loranthaceae	Pilila	16, 17, 19	—	—	—	—	—
Derris uliginosa (Willd.) Benth.	Fabaceae	Kala-wal, Kala-wallels	10, 8	—	—	—	—	—
Desmodium heterophyllum (Willd) DC.	Fabaceae	Maha-undupiyali		+	—	—	—	—
Desmodium triflorum (L.) DC.	Fabaceae	Sudu-getadiya, Heenundupiyali	8, 10	+	—	—	—	+
Diacella ensifolia (L.) Dedoute	Liliaceae	Monara-peththan	9, 10	—	—	—	—	—
Diplacrum caricinum R. Br.	Cyperaceae		20	—	—	—	—	—
Dolichandrone spathadea L.f.) K. shum.	Bignoniaceae	Diyadanga	18, 17	—	—	—	+	+

Scientific Name	*Family Name*	*Sinhala Name*	*Sub-area*	*Med*	*Fd*	*Smi*	*Fis*	*Hh*
Eleocharis carebraea Blak.	Cyperaceae		20, 18, 14	—	—	+	—	+
Eleocharis dulcis (Burm. f.) Trin. ex Hensch.	Cyperaceae	Boru-pan	20, 18, 14, 9, 10	—	—	+	—	+
Eleocharis geniculata (L.) Roem. & Schult	Cyperaceae		18, 14	—	—	+	—	+
Eleocharis lankana T. koyama	Cyperaceae		18, 14	—	—	+	—	+
Eleocharis spiralis (Rottb.) Roem & Schult.	Cyperaceae		10, 15, 9, 20	—	—	+	—	+
Emilia sonchifolia (L.) DC.	Asteraceae	Kadupara, Bu-kandupara	20, 18, 14.	+	—	—	—	—
Eriocaulon sexangulare L.	Eriocaulaceae	Kokmota	9, 14	—	—	—	—	—
Eupatorium odoratum L.	Asteraceae		8, 9	—	—	—	—	—
Fuirena ciliaris L.	Cyperaceae	Cyperaceae	9, 10, 14, 18, 20	—	—	—	—	—
Fuirena umbellata Rottb.	Cyperaceae		9, 10, 14, 18, 20	—	—	—	—	—
Glochidion zeylanicum (Gaertn.) A. Juss.	Euphorbiaceae	Hunu-kirilla	9, 14, 18	—	—	—	—	—
Halophila ovalis (R. Br.) Hook. f.	Hydrocharitaceae		8	—	—	—	+	—
Hanguana malayana (Jack.) Merr.	Flagellariaceae		10, 17	—	—	—	—	—
			10,17	—	—	—	—	—
Hibiscus tiliaceus L.	Malvaceae	Beli patta	8	+	—	+	+	+
Hydrilla verticillata (L.f.) Royle	Hydrocharitaceae		20	—	—	—	—	—
Hydrocera triflora (L.) Wight & Arn.	Balaminaceae	Diya-kundalu, wal-kundalu	9, 10	—	—	—	—	—
Hygrophila salicifolia (Vahl) Nees	Acanthaceae		18, 14, 15	—	—	—	—	—
Indigofera tinctora L.	Fabaceae	Nilawari	3, 10	—	—	—	—	—
Tsachne globosa (Thunb.) Kuntze	Poaceae	Batadella	17, 19	—	—	—	—	—

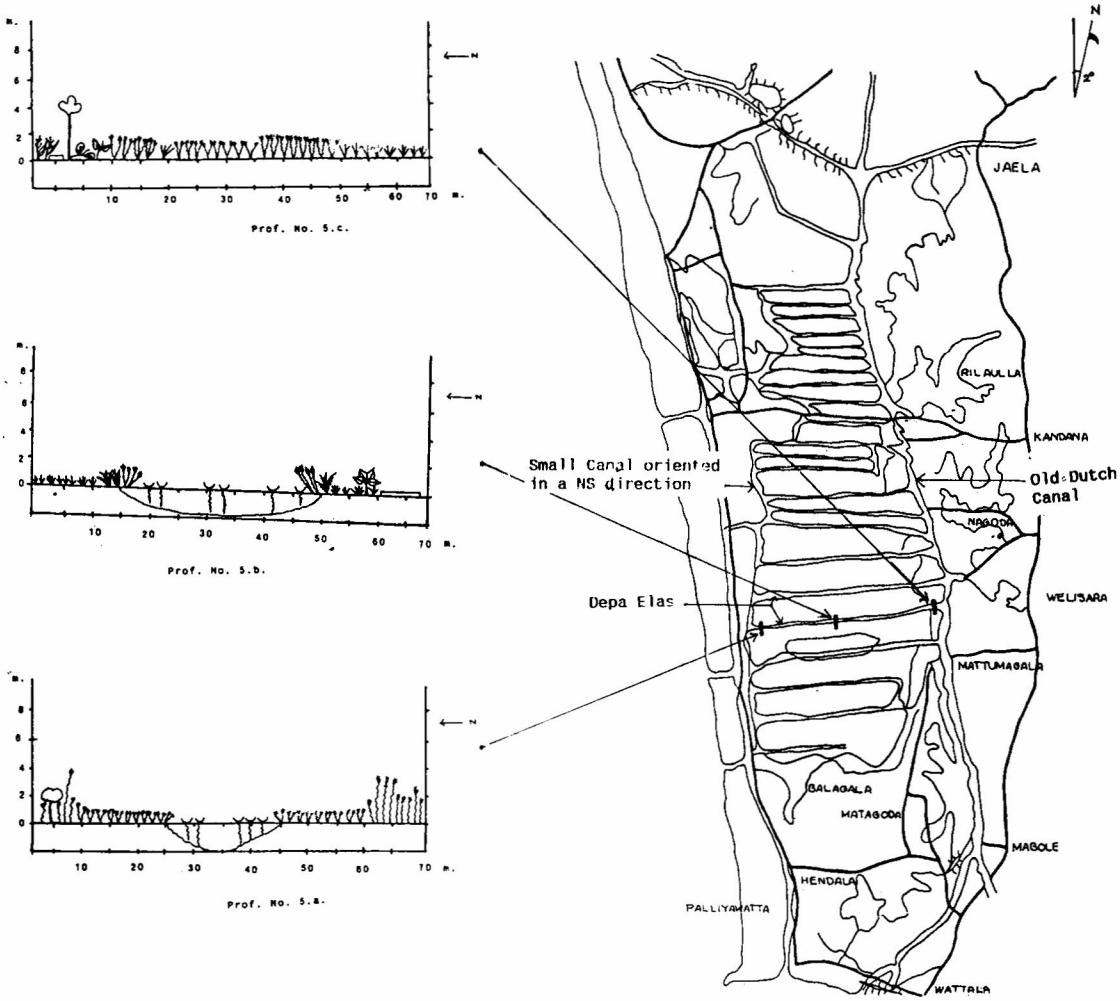
Scientfic Name	*Family Name*	*Sinhala Name*	*Sub-area*	*Med*	*Fd*	*Smi*	*Fis*	*Hh*
Ischaemum rugosum Salisb.	Poaceae	Kudu kedu	20, 18, 14	—	—	—	—	—
Ixora coccinea L.	Rubiaceae	Rathambala, Rathmal	8	+	—	—	—	—
Jatropha curcas L.	Euphorbiaceae	Rata Endaru, Weta Eranau	8	+	—	—	—	+
Jussiaea peruviana L.	Onagraceae		17, 19	--	—	—	—	—
Jussiaca repens L.	Onagraceae	Beru-diya-nilla	20, 14, 18	—	+	—	—	—
Jussiaea suffruticosa L.	Onagraceae	Bera-diya-nilla	19, 17, 10	+	—	—	—	—
Jussiaea tenella Burm. f.	Onagraceae		17, 19	—	—	—	—	—
Lantana camara ver. Aculeata (L.) Moldenke	Verbenaceae	Katu-hinguru, Gandhapana, Gendhepana	3	—	—	—	—	—
Lepironia articulata (Retz.) Domin.	Cyperaceae	Elu-pan, Eta-par	9, 14	—	—	—	—	+
Leptadenia reticulata (Retz.) Wight & Arn.	Asclepiadaceae		18, 20, 14	—	—	—	—	—
Lepturus radicans (Steud) A. Camus	Poaceae		9	—	—	—	—	—
Limnophila heterophylla (Roxb.) Bentn.	Scrophulariaceae		20	—	—	—	—	—
Lindernia tenuifolia (Colsm.) Alston	Scrophulariaceae		10	—	—	—	—	—
Ludwigia perennis L.	Onagraceae		19, 17	—	—	—	—	—
Lumnitzera racemosa Willd.	Combretaceae	Beriya	1, 3, 8, 28, 29, 26	—	—	—	+	+
Lygodium micriphyllum (Cavi.) R. BR.	Schizaceae		18, 14, 16, 17, 19	—	—	—	—	—
Melochia corchorifolia L.	Sterculiaceae	Galura	10, 9, 17, 19	—	—	—	—	—
Mikania scandens (L.) Willd.	Asteraceae		15, 12, 13	+	—	—	—	—
Mimosa pudica L.	Fabaceae	Nidhikumba, Dhadinnaru	8, 10	—	+	—	—	—
Monochoria vaginalis Burm. f.) Kunth	Ponterderiaceae	Jabara	17, 19	—	—	—	—	—

Scientific Name	*Family Name*	*Sinhala Name*	*Sub-area*	*Med*	*Fd*	*Smi*	*Fis*	*Hh*
Morinda tinctoria Roxb.	Rubiaceae	Ahu	8	+	—	—	—	—
Mungannia gigantea (Vahl) Brueckn.	Commelinaceae		20, 18, 14	—	—	—	—	—
Murdannia vaginata (L.) Brueckn.	Commelinaceae		20, 18, 14	—	—	—	—	—
Myriophyllum indica Willd.	Haloragidaceae		20	—	—	—	—	—
Nymphaea lotus L.	Nymphaeaceae	Olu	20,18, 14	+	+	—	—	—
Nymphaea stellata Willd.	Nymphaeaceae	Kumudu, Manel, Nilupul (White)	20, 19, 14	+	+	—	—	+
Nymphaea stellata Willd.	Nymphaeaceae	Kumudu, Manel, Nilupul (Blue)	20, 18, 14	+	+	—	—	+
Nypa fruticans Warmb.	Arecaceae	Gim pol	8	+	—	+	—	—
Oryza sativa.	Poaceae	Uru-wee	17, 19	—	—	—	—	—
Osbeckia aspera (L.) Blume	Melastomataceae	Bowitiya	20, 18, 14	—	—	—	—	+
Pandanus odoratissimus L.f.	Pandanaceae	Weta keiya	14, 15, 10, 08, 18	—	—	+	—	—
Panicum repens L.	Poaceae	Atora	20. 18, 14	—	—	—	+	+
Paspalum va inatum Sw.	Poaceae	Lunu-atora	10, 14	—	—	—	—	—
Passiflora foetida L.	Passifloraceae	Balal-pahuru	18	—	—	—	—	—
Phoenix zeylanica Trim.	Arecaceae	Indi	18	+	+	+	—	+
Phragmites karka (Retz.) Trin. ex Steud.	Poaceae	Nala-gas, Wal-uk, Val-uk	20, 16 14, 15, 9, 10, 8, 28	—	—	+	+	+
Polygonum baroatum L.	Polygonaceae	Ratu-kimbulsenna	17, 19	+	—	—	—	—
Pothos scandens L.	Araceae	Pota-wel	14, 17	+	—	—	—	—
Premna latifolia Roxb.	Verbenaceae	Maha midi	18, 9, 17, 19	+	—	—	—	—
Premna segratifolia L.	Verbenaceae	Midi	14	+	—	—	—	—
Pycreus polystachyos Rattb.	Cypraceae		17, 19	—	—	—	—	—
Rejoua dichotoma Roxb.) Gamble	Apocynaceae	Divi Kaduru	16, 10, 14	+	—	—	—	—
Rhizophora mucronata Lam	Rhizophoraceae	Ela-adol, Kadol	16, 1, 3, 28, 29, 8, 26	—	—	—	+	+
Rhynchospora rubra (Lour.) Makino	Cyperaceae		17, 8, 10	—	—	—	—	—
Ricinus communis L.	Euphorbiaceae	Endaru, Eradu	8	+	—	—	—	+

Scientific Name	*Family Name*	*Sinhala Name*	*Sub-arca*	*Med*	*Fd*	*Smi*	*Fis*	*Hh*
Sacciolepis indica (L.) Chase	Poaceae		20	—	—	—	—	—
Salvinia molesta D. S. Mitehell	Salviniaceae		17, 19	—	—	—	—	—
Samadera indica Gaertn.	Simaroubaceae	Samadara	9	+	—	—	—	+
Schoenoplectus grossus (L.f) Palla.	Cyperaceae		20, 18, 14	—	—	+	—	+
Scleria ncesii Kunth	Cyperaceae	Bakamunu-thana	17, 19	—	—	—	—	—
Sonneratia caseolaris (L.) Engl.	Sonnraertiaceae	Kirilla	17, 1, 3, 26, 29, 8, 28	—	+	—	+	+
Sphenoclea zeylanica Gaertn	Sphenocleaceae		10	—	—	—	—	—
Struchium sparganophorum (L.) Kuntze	Asteraceae		12, 13, 16, 20	—	—	—	—	—
Syzygium caryophyllatum (L.) Als.	Myrtaceae	Heen-kdan, Dan	18, 14, 9	+	—	—	—	—
Tephrosia purpurea (L.) Pers.	Fabaceae	Katu-pila, Kathura-pila,	8, 10	+	—	—	—	—
Typhya angustifolia L.	Tphaceae	Hambupan	20, 18, 14, 5, 10, 9, 8	—	—	—	—	+
Urena lobata L.	Malvaceae		17, 19, 10	—	—	—	—	—
Utricularia flexuosa Vahl.	Lantibulariaceae	Diya pasi	12, 13	—	—	—	—	—
Wedelia chinensis (Osbeck.) Merr.	Asteraceae	Ranwankikirindi	20, 18, 14	+	—	—	—	+
Xyris indica L.	Xyridaceae	Ran-mottu	20	—	—	—	—	—
Zoysia matrella (L.) Mett.	Poaceae		8	—	—	—	—	—

Note :

MED : Plant used in native medicine
FD : Plant used for food
SMI : Plants used or has potential in small industries
FIS : Plant used for fishing purposes
HH. : Plant used by village as firewood, fencing or other house hold use.



Acrosticum aurium L.
Annona glabra L.
Cyperus spiralis (Roth.) Roem & Schult
Hanguana malayana (Jack) Merr.
Ischaemum rugosum Salisb.
Jussieae repens L.
Mikania scandens Willd.
Nymphaea stellata Willd.
Osbeckia aspera (L.) Blume
Panicum repens L.
Phragmites karka (Retz.) Trin. ex Steud.
Schoenoplectus grossus (L.f.) Palla
Syzygium caryophyllatum (L.) Alston.

Fig. 5. Shows Vegetation Profiles across Elas that are oriented in a NW direction.

Pl. No. 6.a.

- Annona glabra
- Lygodium micophyllum
- Panicum repens + Ischaemum rugosum + Isachne globosa

Pl. No. 6.b.

- Annona glabra + Flagellaria indica + Carex indica
- Carex indica + Polygonum barbatum + Fimbristylis sp. + Annona glabra + Cyclosorus sp. + Isachne globosa.

Pl. No. 6.c.

- Carex indica
- Hydrocera triflora
- Ischaemum rugosum + Fimbristylis sanguinea + Hydrocera trifolia + Schoenoplectus grossu
- Isachne globosa
- Lepironia articulata

Pl. No. 6.d.

- Carex indica + Isachne globosa + Fuirena umbellata + Lygodium micophyllum
- Cyperus spiralis + Schoenoplectus grossus
- Ischaemum rugosum
- Lepironia articulata
- Panicum repens + Ischaemum rugosum + Isachne globosa

Pl. No. 6.e.

- Acrosticum aurium
- Cyperus spiralis + Schoenoplectus grossus
- Ischaemum rugosum
- Phragmites karka
- Schoenoplectus grossus

Pl. No. 6.f.

- Acrosticum aurium
- Annona glabra + Acrosticum aurium
- Annona glabra + Flagellaria indica + Carex indica
- Ischaemum rugosum
- Panicum repens
- Phragmites karka
- Typha angustifolia

Pl. No. 6.g.

- Fimbristylis sp.
- Isachne globosa + Ischaemum rugosum + Panicum repens + Eleocharis geniculata
- Panicum repens
- Paspalum vaginatus.

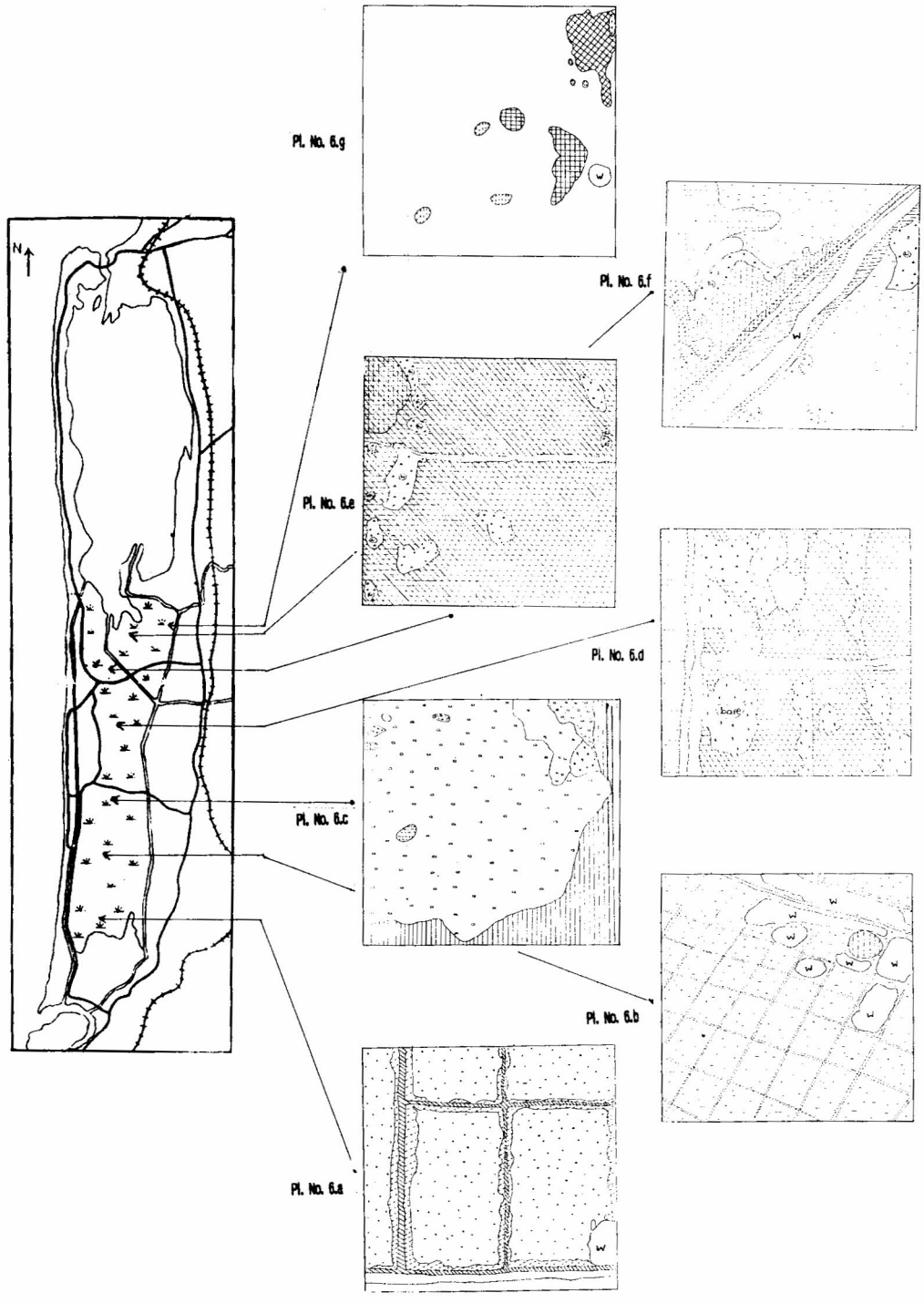


Fig. 6. Shows the vegetation cover patterns of Muthurajawela.

Size of each plot is 50 x 50 m

4. Discussion

4.I. General

If not for the influence of man, Muthurajawela Marsh under natural conditions would have, no doubt, gone through different successional changes and would have exhibited a completely different vegetation pattern today. Brohier described thus: "Tradition tells that this swamp was cultivated in the time of the Kings of Kotte not long before the coming of the Portuguese (1518), and that it was a waving mass of paddy producing the best rice" (CEA, 1989). Since then the colonial rulers and the successive governments of Sri Lanka attempted to reclaim this marsh for paddy and for various other cultivations without much success. Even today one could still see the remnants of the ridges ("Niyara") that were prepared for paddy cultivation and trenches ("Agal") in certain places for coconut plantation in the recent past. The construction of the two main canals caused the seepage of sea water thus causing the area to become saline. As a result agricultural activity decreased gradually leading to its abandonment ultimately in 1984. In addition to this other activities of man have disturbed the natural development of the flora of Muthurajawela. Until recent times, reclamation of land for new settlements along the fringes of the marsh, exploitation of fire wood, dumping of waste material along the canals, setting fire to the vegetation periodically, exploitation of peat, distillation of illicit liquor are only some of the disturbances the marsh vegetation were/are faced with. Under such conditions, biologi cally it is not possible to expect a natural vegetation in Muthurajawela marsh. Thus it could only be considered as a secondary type of vegetation that has a history of only a few decades. However, even at this stage, it would not be too late to observe the natural development of successional vegetation stages as with time if this marsh-land is left undisturbed and it would be of great interest not only biologically but also educationally.

As mentioned earlier almost the whole supply of fresh water which helps to maintain the proper salinity of Negombo lagoon filters through Muthurajawela marsh. Thus the ecological balance of the mangroves along the fringes of the lagoon and the Negombo lagoon would depend on the ecology of Muthurajawela marsh. One could say that these three eco-systems the marsh, mangroves and the lagoon are inseparable and interdependent for their survival. Tampering with any one of these ecosystem could have consequence on the others. As mentioned in the "Coastal Environmental Management Plan for the West Coast of Sri Lanka (UN Pub. 1985) careful investigation should be conducted on the impact of lagoon fishery and the quality of water in the lagoon before any developmental projects of Muthurajawela marsh are undertaken.

One of the popular water bodies in the area is the old Dutch Canal completed by the Dutch in the 15th century to transport cargo back and forth from Negombo lagoon to Kelani river. The canal has been in use for many. years then neglected in the recent past and as a result sedimentation has settled in. From field observations and observations made from the profiles (Fig. 3 Prof. No. 3 a, b and c) it is evident that at present, about sixty percent of the canal south of Heen Ela Junction is filled and covered with vegetation. At many places the cover of vegetation is so dense that one could cross over by foot with care (Fig. 3 Prof. 3 a, b and c) Further at many other places specially between Kalaeliya and Nagoda (Fig. 2) the vegetation is interrupted due to illicit distillation of liquor. This practice has not only polluted the water but destroyed the development of vegetation. The banks of the canal are probably destroyed with intention and made impassable. Beyond Thunpath Modera towards the north the water is relatively clear and flowing (Fig. 3 Prof. 3 a, b & c).

The vegetation within the water logged or marsh land is uniform (Fig 6, Plot a, b, c, d, e, f & g) with dominant plant communities being combinations of sedges and grasses with scattered *Hydrocera triflora, Acrosticum aurium.* However, there is a change in the dominance and the cover of these plants within the communities. Such a variation pattern could be attributed to the changes in salinity or the soil conditions or both that prevail.

4.2 Plant species with special human interest

There are a number of plants in Muthurajawela that are used by people and may be of potential value. One of the most common plants in the area is *Annona glabra* (Wel atha) which is a recently introduced plant species with aggressive spreading qualities. It is reported by the residents in the area that when the vegetation of the marsh is set on fire mainly for the purpose of catching tortoise these plants get singed and later the branches are collected for fire wood. In addition *A. glabra* poles are commonly used for fencing around houses. Another common plant is *Phragmites karka* (Nala-bata) which is used by fishermen in the Dandugan oya area to make Kraals (Maskotu) and by others to make flutes. The two species *Typha angustifolia* (Nambu pan) and *Lepironia articulata* (Elu-pan) are popularly used in making mats, out of which mats of *Lepironia articulata* are considered superior to that of the other. Elu-pan is found growing more commonly in sub-areas 15, 10 and part of 18 (Fig. 1). In addition to these two species *Cyperus corymbosus* (Gal-ehi) which thrives well in Muthurajawela is also used for making mats. Gal-ehi is occasionally more or less cultivated, because its straight culms provide desirable material for making a kind of rough mat. A common article used in the kitchens to store and cover food referred to as "Ahthulpath" are constructed with the use of *Carex indica* which is also a common species of sedge in the marsh. The leaves of the endemic *Phoenix zeylanica* (Indi) is popularly

used in the weaving of hats in other areas where it is found. However, this plant is quite rare in the marsh and would be worthwhile to protect. *Premna serratofolia* (Midi) is a popular plant used in native medicine. It is reported by Jayaweera (1982) that the bark of this plant contains the alkaloids Ganuarine and Premnine. Decoctions of the plant is used in the treatment of rheumatism and neuralgia. Decoctions of the leaves are given for flatulence and the root is an ingredient of drugs administered for fever. *Asparagus falcata* (Hathawariya) is also a popular and an important plant in native medicine and in addition the extracts of the leaves are used as an ingredient in the preparation of porridge. The ripe fruits of *Sonneratia caseolarisis* (Kirella) are eaten while the roots of the plant are used for making bottle corks. Some of the vegetables that grow in the marsh are *Ipomoea aquatica* (Kankun), *Centella asiatica* (Gotu-Kola), *Aponogeton crispus* (Kekatiya) and *Nymphaea lotus* (Olu). The young fronds of the common *Acrosticum aurium* (Kerankoku) could also be used as vegetable. *Rhizophora mucronata* (Kadol) even though is not a common plant within the marsh than around Negombo lagoon is a plant popularly used for the extract of tannins used for dyeing materials. Considering the total of 129 plants collected and identified from Muthurajawela marsh it is seen that a total of 44 species are used for native medicinal purposes, 11 species for food, 13 species are used or have the potential to be used in small industry, 14 species are used by fishermen for various purposes and 39 species are used by villagers in the area for home requirements, as firewood or as fencing material. For uses of these plant species and for the localities of these plants see Table I.

4.3 Plant species with special ecological significance

The high occurrence of parasitic plant forms on the trees of Muthurajawela area specially the banks of small canal on the East and the Old Dutch canal (include boundaries of sub-areas 20/23, 16/23, 16/24, 14/13, 16/19, 14/17, 15/16) indicate high activity of bird life for these parasitic plants are dispersed mainly by birds. The vegetation within sub-areas 9 & 10 (Fig. 1.) with combinations of mixed vegetations, large water bodies and large scattered *Acrosticum aurium* patches and communities of grasses with sedges seems to be favourite places for birds in the area. Preserving such areas would be of ecological interest.

National Aquatic Resources Agency (1988) in its "Negombo and Muthurajawela An Integrated Development Perspectives" and Central Environmental Authority (1989), in its "Introductory Document for Ecological Survey and assessment of Muthurajawela Marshes and Negombo Lagoon" points out that Salvinia and water hyacinth clog most of the water bodies. However, in the present study only *Salvinia molesta* and rare amounts of Water hyacinth was observed to if at all clog the Southern part of the Dutch Canal.

4.4. Rare endangered plant species

Most species of plants found in the area are marsh specific. However, up till this work no complete inventory of plants of this area has been prepared. Amaratunga (1970) and National Aquatic Resources Agency (1988) lists 63 species of flowering plants from Muthurajawela marsh. In this present study nearly 129 species of vascular plants have been collected and identified belonging to 48 families (see Table 1) and none of them are endemic to Muthurajawela marsh. Some plant species such as *Drosera burmanni* and *D. indica* reported by Amaratunga (1970) from moist grassy patches were not observed to be present in the marsh during the present study. This could be attributed to the fact that the marsh had been subjected to heavy influence of man. Out of the 129 species of plants only three species are endemic to Sri Lanka. These species *Phoenix zeylanica, Eleocharis lankana* & *Fimbristylis zeylanica* are rare within the marsh and could be seen in sub-areas as seen in Table I. Even though they are rare within the marsh they cannot be considered as endangered species of Sri Lanka.

5. Conclusion

The vegetation of Muthurajawela has been tampered in the past, mainly for agricultural purposes and setting of fire periodically. Even though the present vegetation is of secondary origin and uniform with a variety of plant species it is still an interesting ecosystem of marsh vegetation. In addition this ecosystem has a great effect on maintaining the proper ecological balance of the mangrove vegetation and the fauna and flora of the Negombo lagoon. Further, because of the uniform vegetation of Muthurajawela marsh it is not possible to pin point a particular area for conservation based on its unique vegetation. However, it would be worth while preserving what is left of Muthurajawela marsh to enable the evolutionary processes to go on, maintaining genetic diversity and provide protection to plants and other living organisms. This would no doubt provide opportunity for the coming generation to understand the implications of proper land use.

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