

CYCLIC SUCCESSION IN SALT MARSH VEGETATION INVOLVING *HALOSARCIA INDICA* AND *SALICORNIA BRACHIATA* IN SRI LANKA

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Salt marsh vegetation is a type of marine vegetation found closer to the sea, which is regularly inundated by sea-water and composed of deep mud and peat. In Sri Lanka this area is dominated by dense stands of halophytic plants: *Halosarcia indica* (synonym: *Arthrocnemum indicum*), *Salicornia brachiata* and *Suaeda* spp. (Dassanayake and Fosberg, 1987).

Halosarcia indica (*Arthrocnemum indicum*) is a perennial herb with woody base. It has prostrate and erect shoots, becoming corky with age (Figure 01). *Salicornia brachiata* is an erect annual herb with much branched shoots. Woody base is not commonly found (Figure 02).

When consider the vegetation dynamics of salt marshes in Sri Lanka these two species (*H. indica* and *S. brachiata*) show a characteristic sequential change called cyclic succession (Pemadasa *et al.*, 1979).

Cyclic or non-directional succession means small number of species replaced by each other over short period of time (Glenn-Lewin *et al.*, 1992). This cyclic succession begins without any large environmental interruption, which is required for other successions. Each species follow a series of phases *viz*; pioneer, building, mature and degenerate (Watt, 1947; Kershaw, 1975).

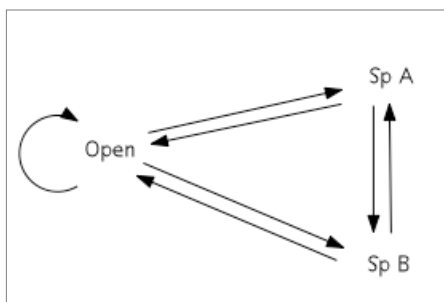


Figure 03: Graphic Model of Cyclic Succession (http://en.wikipedia.org/wiki/Cyclic_succession)

During the pioneer phase, starting with *H. indica* as an example, first plant begins to grow from seeds, which are blown in by the wind or washed in by sea. In the second phase (building phase), pioneer species grow, ages, and alters its surroundings where they enter into the mature phase. Further, in this phase the first species may develop space and second species start to germinate. During the final degenerating phase, the firstly grown dominant species degenerates and dies, paving way to the second species to dominate (Figure 03).

The phase development of *H. indica* incorporated with the 'hummock and hollow' cyclic change of environment. When *H. indica* begin to grow as a pioneer plant, sand particles brought in by the wind accumulates around its seedlings and get trapped. Eventually this results in the development of hummocks and *H. indica* enters into its next phase. When *H. indica* is in its building and mature phases other plants cannot grow or colonize well. The erect branches maintain the general level of the hummock. Wind erosion is prevented by the prostrate shoots that cover the entire hummock (Figure 04 and Figure 05).



Figure 01: *Halosarcia indica* Figure 02: *Salicornia brachiata*

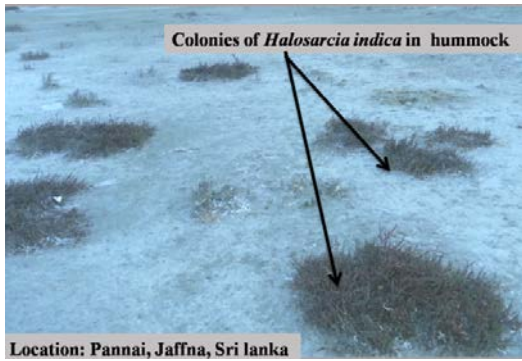


Figure 04: Colonies of *Halosarcia indica* in hummock

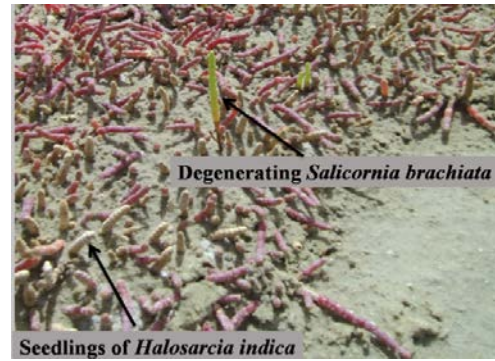


Figure 05: Pioneer phase of *Halosarcia indica*

However, shoots of *H. indica* become less firm and produce smaller branches when the plant is ageing. Therefore the centre of old hummock becomes moderately open. But the boundary of open area is covered by well branched, properly growing shoots and these prevent the wind erosion (Figure 06 and Figure 07).

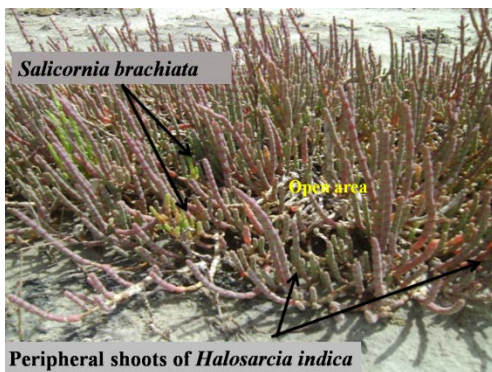


Figure 06: Building and early mature phase

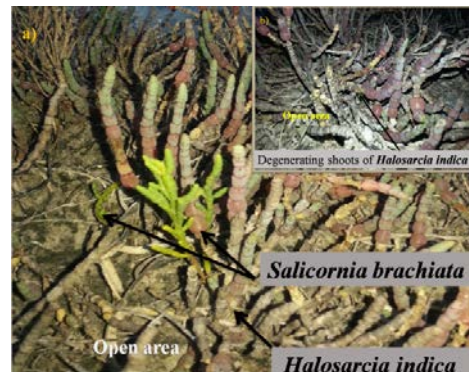


Figure 07: a) Mature and degenerate phase, b) Degenerating shoot of *Halosarcia indica*

The open areas created by the death of the older shoots of *H. indica* are colonized by the second species *Salicornia brachiata* associated with *Cynodon dactylon*. These do not prevent wind erosion and therefore eventually hummock begins to erode, where the hummock becomes more or less flattened and hollow. This initiate a new cycle which goes through the same sequence of pioneer, building, mature and degenerate phases (Figure 08 and Figure 09) (Pemadasa *et al.*, 1979).

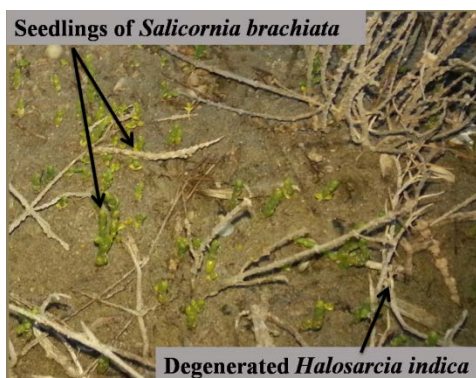


Figure 08: Colonization of *Salicornia drachiata*

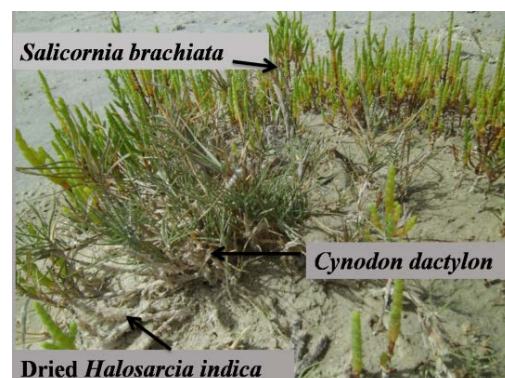


Figure 09: Established colony of *Salicornia brachiata*

Note: This cyclic succession was observed and photographs were taken during my field visits (June 2013-Feb 2014) in Jaffna peninsula at Pannai area.

Acknowledgement

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