The non Lessepsian migration of *Ruppia maritima* to the Suez Canal

M.S. FARGHALY

Head Marine Science Dept., Univ. Suez Canal, ISMAILIA **(Egypt)**

The Suez Canal had been considered as the possible passway for many species of benthos to migrate between the Red Sea and the Mediterranean, a phenomenon known as "Lessepsian Migration" proposed by POR (1978).

The marine plants of the Suez Canal was the subject of investigations since 1908. Recently ALEEM (1980), and FARGHALY (1985), discussed the seaweeds of the canal.

A new record of a benthic plant in the Suez Canal had been published by FARGHALY and DENIZOT (1988) identified as *Ruppia maritima* L. after ASCHERSON *et al.*, 1907, and considered as a new invader to the Suez Canal. Further observations and investigations had been carried out by the author in both the Great Bitter Lake of the Suez Canal and the Bardawill Lake north Sinai, in the Eastern Mediterranean, in order to clarify the ecology, and the possible passway permited this plant to migrate and colonize a part of the Lake bottom. These efforts may answer the question : from where this plant came ? and to which extent it will spread over the bottom of the Lake ?

The ecological results obtained for two years investigations proved that the Bitter Lakes play an important role on the migration of benthic plant and animal species via the Suez Canal. They could been a reservoir for some and a barrier for others.

The hydrography of the Lakes followed for three years during (1988-1991), reflected the following figures :

1.- Water temperature of the Lakes was always lower than the corresponding air temperature by about 0.5-7°C. The maximum temperatures were in July and August reaching about 30.5°C, while the minimums were in January and February being arround 15°C.

2.- An Electric Power Plant of moderate size and capacity in the northeastern corner of the Great Bitter Lake cause an increase in water temperature of about 3-9.5°C in an area of about 5km^2.

3.- The salinity of the Lakes water had high values; minimum of about 40‰ and maximum of about 46‰.

These figures and investigation on other parameters; PH-0^2 nutrients gave indications that the hydrographic conditions in both Bardawill and Bitter Lakes are more or less similar. These findings make it possible to think about the transportation of *Ruppia* seeds by some migrant birds transiting the small islets of the Great Bitter Lake after landing on the Bardawill bancs.

Ruppia maritima L. had extended during the last 3 years on the bottom neer the EPP spreading over an area of about 1 km. On other growth or colonization had been observed along the Suez canal or on the gulf of Suez or the Eastern Mediterranean.

In conclusion of these results we consider this plant as a new "non Lessepsian migrant" to the Suez Canal due to the changes in the hydrographic conditions and thermal pollution caused by the EPP of Abo-Sultan in the Great Bitter Lake of the Suez Canal .

The extention of this plant in the Bitter Lakes may affect the seagrass beds of *Halophila stipulacea* and therefore the ecosystem based on.

REFERENCES

ALEEM A.A., 1980.- Contribution to the study of the marine algae of the Red Sea. IV -The algae and seagrasses inhabiting the Suez Canal. *Bull. Fac. Sci., K.A.U.*, Jeddah, 4, 31-89.

ASCHERSON P. & kRAEBNER P., 1907.- *In* ENGLER A. : Das Pflanzenreich, 31 (IV, 11) : 142-145, *Leipzig,Verlag von Wilhelm Engelmann*.

FARGHALY M. S., 1985.- Remarks on the marine vegetation of the Suez Canal. *Proc. Egypt. Bot. Soc. Conf.* Ismailia, Egypt.

FARGHALY M.S. & DENIZOT M., 1988.-*Ruppia maritima* in the Bitter Lakes (Suez Canal). *Natur. mons.* Bot., 53 : 71-73.

POR F.D., 1978.- Lessepsian Migration. *Ecological studies* , 23, 228p.

The seaweeds in the Suez Canal 120 years after its first opening and their potential utilization

M.S. FARGHALY

Head of Marine Science Dept., Univ. Suez Canal, ISMAILIA **(Egypt)**

The Suez Canal is considered as one of the most important path ways in the world for commercial trade as well as for the migration of plants and animals between the Red Sea, one of the youngest seas, and the mediterranean, one of the oldest.

The Canal authority is intending now a days to start the second phase of the development which include the widening and deepening of this water body. These changes will affect the distribution of the marine fauna and flora of the Canal and will change its ecological adaptation in many ways.

It is of great importance to speculate the actual status of the Seaweeds, one of the major bases for the nutrition of many groups of animals, before the changes of Canal features.

More than 180 species of seaweeds had been collected from the Canal, 163 km, in the period between 1983-1991. The red algae constitute about 40% of the flora, while the greens was found to be about 30% and the brown is about 16%. The blue greens complete this list by about 14%. The distributional pattern of these algae along the Suez canal were established as they colonize the canals banks and the Lakes bottoms.

FARGHALY (1985) had divided the Canal into four major parts ; the northern part, the Timsah, the Bitter Lakes and the southern part. Six years latter we can illustrate the seaweed vegetation as follows :

A) The northern part :

About 120 species of seaweeds belonging to the four groups could been collected along the year ; 60% of indopacific origin and about 15% are not reported from the other parts of the Canal. In this part the dominance was for the red algae followed by the green.

B) The Timsah Part :

Investigations were carried out on water quality and growth of seaweeds in five different sites along 20 km in this part, for 14 months during (1985-86) FARGHALY *et al.* (1988), and followed to 1991. These investigations conclude that this part of the Canal play a negative role in the migration of the Red Sea species of algae to the north. The hydrographic conditions caused by the large amount of drainage water from the adjacent lands is the barrier for such migration. About 80 species had been identified in this part ; 46% red, 28% green, 15% brown and 11% blue green.

C) The Bitter lakes :

The Bitter lakes plays a reservoir role for the migration of Seaweeds from the Red Sea to the north. Extensive collections made all over the lakes banks and the hydrographic conditions were recorded during two years (1988-1989). These studies gave a distributional pattern of about 110 species of Seaweeds ; 50% red, 28% green, 16% brown and 6% blue green.

The electric power plant of Abu Sultan in the northeast of the great Bitter Lake raise the water temperature of about 9°C which could be the attraction power for many species found for the first time in the Canal in this study.

D) The Southern part :

This part do not differ greatly than the northern part of the gulf of Suez in the percentage of the groups ; 45% red, 25% green, 15% brown and 15% blue green. About 100 species had been collected from this part.

The seaweeds of the Suez Canal colonize any hard substrate in four major belts :

1) The first belt at high water level of blue greens associated with Diatoms. Some filamentous green algae was found occasionally in summer.

2) The second belt below the high water mark extended to about 30 cm. This belt is composed mainly of green algae with small red ones. Epiphytes could be found in some parts of the Canal.

3) The third belt start about 40 cm below the low water mark and extend to 40-60 cm where macro-red algal communities has well developed growth. In some parts of the Canal brown associate with red algae.

4) The fourth belt start at 100 cm depth and include red algal communities. This belt is variable according to the stations.

These observations agrees with and complete ALEEM's (1983).

A large number of these algae are know to be of economic importance and containing natural products of economic value. Other species reported to be pollutions monitors. During the ecological studies to understand the distributional patterns of the flora, the potential utilization of the important species were estimated.

Some species of red Brown and Green algae had been used as minors of the sandy Sinai desert soil. Three crops were tested using this minor. The results proved that seaweeds could be good minors for sandy soil to grow the most popular leguminous in Egypt, broad beans.

REFERENCES

ALEEM A.A., 1983. - The Suez Canal as a habitat and pathway for marine algae and seagrasses. *Proc. Mabhith - John Murray Int. Symp.*, Egypt, 3-6 Sept. 1983, 901-918.

FARGHALY M.S.,1985. - Remarks on the marine vegetation of the Suez Canal, *Prc 4th Egypt. Bot. Soc. Cong.*, Ismalia, Egypt.

FARGHALY M.S., EL-MANAWY I. and DENIZOT M., 1988. - Floristic and seasonal variations of the seaweed communities in the lake Timsah (Suez Canal). *Naturalia monspeliensia*, ser. Bot., 53, 75-108.