

## Impact of Water Courses Lining on Water Quality and Distribution of Aquatic Vegetations in Two Egyptian Governorates

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**Abstract :** This study was carried out in lined and unlined watercourses in Beheira and Giza governorates to investigate the effect of water canals lining on water quality and aquatic vegetations. Samples of water and aquatic plants were collected from the examining sites during four seasons in two successive years. The main ecological parameters were recorded and water quality was measured. Results showed that the mean value of water conductivity and total dissolved salts in lined sites was significantly lower than those of unlined ones ( $p < 0.01$ ,  $p < 0.05$ ). In Beheira, the dissolved oxygen concentrations during autumn and winter were higher in lined sites ( $3.93 \pm 1.3$  and  $9.6 \pm 1.1$  ppm, respectively) than those of unlined ones (the same values of  $1.2 \pm 0.6$  ppm). However, it represented by lower values of  $5.77 \pm 6.05$  and  $4.9 \pm 1.8$  ppm in lined watercourses in spring and summer, respectively, comparing with those in unlined ones ( $14.05 \pm 5.59$  and  $5.83 \pm 0.8$  ppm, respectively). Generally, Zn, Pb, Fe, Cd were higher in both lined and unlined sites during summer than the other seasons. However, Zn and Fe were higher in lined sites ( $0.78 \pm 0.37$  and  $17.4 \pm 4.3$  ppb, respectively) during summer than that of unlined ones ( $0.4 \pm 0.1$  and  $10.95 \pm 1.93$  ppb, respectively). Cu was absent during summer in lined and unlined sites and only in unlined ones during spring. Regarding to Giza sites, Cu and Pb were absent in both lined and unlined sites during summer and only in unlined ones during spring. Whereas, Fe recorded higher values in autumn in both lined ( $8.8 \pm 20.1$  ppb) and unlined sites ( $15.16 \pm 3$  ppb) than the other seasons. Present survey study revealed that 13 species of aquatic plants were collected from lined and unlined sites in Beheira and Giza governorates. *Eichhornia crassipes*, *Ceratophyllum demersum*, and *Potamogeton* sp. were the only plant species infested the examined sites during autumn and winter in Beheira. In autumn *C. demersum* was the only plant found in lined sites represented by highly lower significant percentage (12.5% of the all examined sites) compared to the unlined sites (50%). *E. crassipes* was completely absent in the lined sites during the two seasons. In spring, there is only 3 plant species in lined sites compared to 6 ones in unlined. Also, in summer, there is only 2 species in lined sites comparing with 5 in unlined. The percentage of occurrence and density of these plants was highly significant ( $p < 0.01$ ,  $p < 0.001$ ) higher in unlined sites compared to the lined ones during all seasons. A diversity of plant species, *E. crassipes*, *C. demersum*, *Jussias repens*, *Lemma giba*, and *Polygonum serr* were the most abundant in many examined sites during all seasons in Giza. In summer, the percentage of sites containing the two plants *E. crassipes* (83.3%) and *C. demersum* (50%) was highly significant ( $p < 0.001$ ) higher in unlined sites compared to the lined ones (50% and 0.0%, respectively). It concluded from the results that watercourses lining may play a significant role in preserving water with a good quality and reduces the distribution of aquatic vegetation which rendered the current of water.

**Keywords :** aquatic plants, lining of watercourses, physicochemical parameters, water quality

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