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SUMMARY

This work was planned in order to employ *Malus domestica* genome as a sensitive monitor for the genotoxic effect induced by the environmental cantaminants. To achieve such a purpose 7 locations display differential environmental stress were selected and pollen mother cells (PMCs) and pollen grains from trees grown on these locations were collected and tested for chromosomal changes and pollen fertility. The seven tested locations are :

1- kom hammada .
2- Kafr El-Zaiat.
3- Kafer El-Dawar.
4- Aboqair.
5- Rashed.
6- El-Mahmoudia .
7- El.sahray

Cytological examination of pollen mother cells and pollen grains was performed in two successive years i.e., 2001 and 2002 as well.

Two selected heavy metals i.e., lead and cadmium were detected in leaves of Apple trees. The results obtained would be summarized as follows :

1- In the first year of study (2001) cytological examination revealed that there were different types of chromosomal changes. These types are :
   1- Stickines.
   2- lagging
   3- micronucles.
   4- microcyte
   5- Asynchronization.

The tested locations can easily be arranged in the following rank according to the abnormal chromosomal behaviour :

Abo qair > Kafrelzaiat > Kafr Eldawar > Rashed > Kom hammada > El. sahray > EL. mahmodia

2- Pollen fertility estimated cytologically by the well known technique aceto-carmine showed that pollen fertility ranged from 83.2% for the location 4 to 95.5 for the location 6 .

3- The tested locations could be arranged according to pollen fertility, in the following rank :

a- For the First year (2001).

EL. Mahmodia > El. Sahray > Kom hammada > Rashed > Kafr Eldawar > Kafrelzaiat > Abo qair

b- For the second year (2002).

EL. Mahmodia > El. Sahray > Kom hammada > Rashed > Kafrelzaiat > Kafr Eldawar > Abo qair

4- The results showed that chromosomal behaviour in PMCs collected from different locations was proven to be similar to that obtained for pollen fertility.

5- Cytological examination of pollen mother cells as well as pollen grains that carried out in the second year (season) of the study (2002) showed that the same trend that previously noted in 2001.

6- Detection of heavy metals was shown the following results :

a – Lead : 2.78; 5.19 ; 8.87; 9.45 ; 4.52 ; 1.01and 2.05 ppm for the tested locations kom hammada , Kafr El-Zaiat , Kafr Eldawar , Abo qair , Rashed , EL. Mahmodia and El. Sahray respectively.

b- Cadmium : 0.15; 0.20; 0.16; 0.21; 0.14; 0.06 and 0.09 ppm for the tested locations. kom hammada , Kafr El-Zaiat , Kafr Eldawar , Abo qair , Rashed , EL. Mahmodia and El. Sahray respectively.

7- The level of the tested metals in leaves of *Malus domestica* was found to be in accordance with the chromosomal behaviour and pollen fertility as well.

8- Comparing the data obtained from the two years, no seasonal fluctuation was observed .

Although apples are poorcytological matierial, since the chromosomes are small and meiotic stages are not easily located and preparations are rather difficult to interpret, the present investigation revealed that pollen mother cells as well as pollen grains are considered to be an adequate material for studying the genotoxic effect of environmental contamina contaminant.

The present investigation recommends the use of pollen mother cells and pollen grains as well of higher plants in biosafety and risk assessment for the genotoxic effect (s) induced by environmental contaminants.