Four-Layered Membrane in the Plastids of Galls of *Cuscuta australis*

It is well known that plastids are delimited by a double membrane, enclosing a light space¹.

Such a type of membrane was also observed in plastids of *Cuscuta australis* stems². On the contrary, the plastid observed in the galls produced on *Cuscuta* stems following egg deposition by *Smicronyx*, a galligen Curculionida, are delimited by 2 double membranes, as shown in Figure 1.

The gall can be divided into 3 zones, where plastids can vary from a type with a very reduced lamellar system to a type having the typical ultrastructure of actively synthesizing organelles³.

However, all the plastids, whatever their degree of development, show the above-mentioned 2 double membranes. These 4 delimiting membranes are arranged in such a way as to form 2 double membranes, i.e. they are coupled 2 by 2. The distance between the inner and the outer membranes of the 2 pairs of membranes is almost the same as that observed between 2 normal delimiting membranes; on the contrary, the distance between 2 membranes of each pair is very reduced, as shown in Figure 2.

Fig. 1. Chloroplasts, of the inner zone of the gall, of *C. australis*, delimited by a four-layered membrane. $\times 38,000$. Inset $\times 105,000$.

Fig. 2. (1) Particular of gall chloroplast showing the four-layered membrane. $\times 158,000$. (2) Same particular of gall chloroplast of *C. australis* with the four-layered membrane. $\times 54,000$. (3) Particular of normal stem plastid of *C. australis* showing a double membrane. $\times 54,000$.

Riassunto. Nelle cellule delle galle dei fusti di *Cuscuta australis* (causate da un curculionide) sono presenti plastidi che, indipendentemente dal loro grado di sviluppo, sono delimitati da 4 membrane, appaiate 2 a 2. La distanza fra la membrana più esterna e quella più interna è molto simile a quella che si osserva fra le normali doppie membrane dei plastidi, mentre le membrane di ogni coppia sono molto più ravvicinate.

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¹ A. FREY-WYSSLING and K. MÜHLETHALER, *Ultrastructural Plant Cytology* (Elsevier Publications, Amsterdam 1965).

² G. LAUDI, *Caryologia* 17, 139 (1964).

³ G. LAUDI, *G. Bot. ital.*, in press (1968).