論　　説

花粉とブライン・シュリンプの卵の耐熱性

Heat-resistance of pollen grain and resting egg of brine-shrimp

Yozo IWANAMI

It has been found by Iwanami (1～6) that the pollen grains of various plants and the resting eggs of brine-shrimp retained the viability in organic solvents such as acetone, ethyl ether and petroleum benzin. In these tests, the pollens and the eggs soaked in organic solvents were dried with the aid of an aspirator in room temperature. However, some organic solvents such as a kind of alcohol and pyridine are hard to volatile and the materials soaked in the solvents are hard to dry at room temperature. If the pollens and the eggs have heat-resistance, they can dried in oven without losing the ability before the cultivation. With the object of checking up this point, heat-resistance of the pollen grain and the resting egg of brine-shrimp was studied.

Material and method

The pollen grains of *Camellia japonica*, *Erythrina cristagalli* and *Cyclamen persicum*, and the resting eggs of brine-shrimp(*Altamia salina*) were used. About 100mg pollens which had been collected from freshly opened anthers and stored in a plastic bottle with silica gel for 2 days and 200 eggs were spread on each piece of small filter paper and put in ovens adjusted to various temperatures (70°～101°C). After certain minutes, each of the filter paper having pollens or eggs was taken out of the oven.

The pollen grains were sown on the surface of culture medium(sucrose 10%, agar 1%) in a straight line as described in other paper(7) and cultured for 40 hours at 26°C. The eggs were immersed in 2 ml artificial sea water in a small petri dish and cultured for 4 days at 26°C. The length of pollen tubes and the rate of hatching out of the eggs were measured by the aid of a small projector (Olympus sp-150) and average values of 3 experiments were shown in graphs.

Results and discussion

As shown in Fig.1, the pollen grains of *Camellia*, *Erythrina* and *Cyclamen* had fairy high heat-resistance. For example, pollens kept at 70°C for 60 minutes and kept at 90°C for 10～15 minutes germinated normaly and grew long pollen tubes. It is norticeable that the *Camellia* pollens which had been kept at 77°～80°C for 10 minutes grew longer pollen tubes than untreated ones (see top of Fig.1). This acceleration of the pollen tubes may be caused by losing the inhibitor in *Camellia japonica* pollens by heating.

The resting eggs of brine-shrimp also had high heat-resistance, namely, the eggs which had been put in ovens and kept at 70°～80°C for 60 minutes and kept at 85°C for 10 minutes hatched out normaly and 80% eggs kept at 93°C for 10 minutes hatched out. Same results have been obtained by Iwasaki and Nakanishi, Japanese zoologists (8).

Biological Institute, Yokohama City University, Kanazawa-ku, Yokohama, Japan

These findings show that the pollens and the resting eggs soaked in hard volatile solvents can be dried in hot condition. Photograph 1 of Fig.3 shows that the pollen grains of *Camellia japonica* which had been stored in cold n-butanol for 12 months and dried in a oven at 80°C for 5 minutes germinated normaly and grew as long pollen tubes as fresh pollens, and photograph 2 of Fig.3 shows that the resting eggs of brine-shrimp which had been soaked cold n-butanol for 10 months and dried at 80°C for 10 minutes hatched out normaly. These results suggest that many other hard volatile organic solvents can be used for the storage of pollens and eggs.

Summary

Pollen grains of *Camellia japonica, Erythrina cristagalli* and *Cyclamen persicum* which had been put in ovens and kept at 80°C for 20 minutes germinated normaly and grew as long pollen tubes as fresh ones, and *Camellia* pollens kept at 77°~80°C for 5~15 minutes grew longer pollen tubes than untreated pollens. The resting eggs of brine-shrimp (*Altemia salina*) kept at 80°C for 60 minutes hatched out normaly and eggs kept at 90°C for 15 minutes hatched out half of them. These findings show that the pollens and eggs soaked in solvents hard volatile can be dried in hot condition to test their viability.

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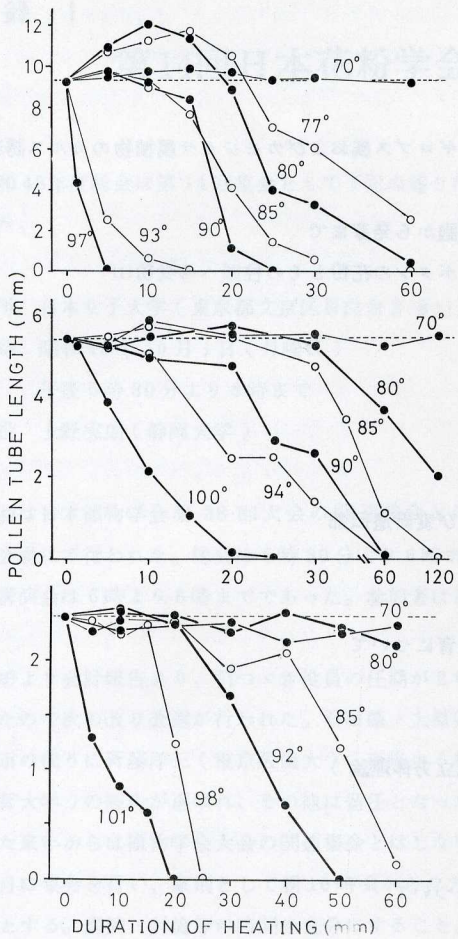


Fig.1 Effects of heat on pollen tube growth of three kinds of pollens. Figures on lines of the graphs show the degree of temperatures (c) in ovens in which the pollens have been put and kept.
Top····*Camellia japonica,* Middle····*Erythrina cristagalli*
Bottom····*Cyclamen persicum*

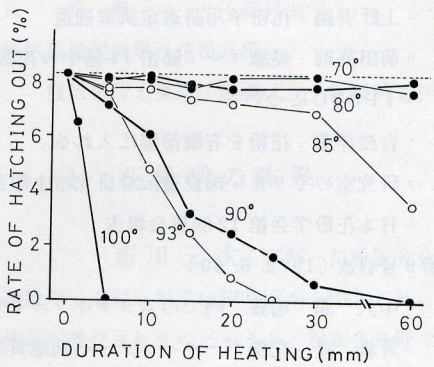
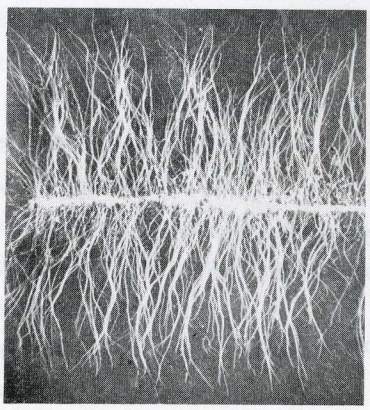


Fig.2 Effects of heat on hatching out of the eggs of brine-shrimp. Figures on lines of the graph show the degree of temperatures (c) in ovens in which the eggs have been put and kept.



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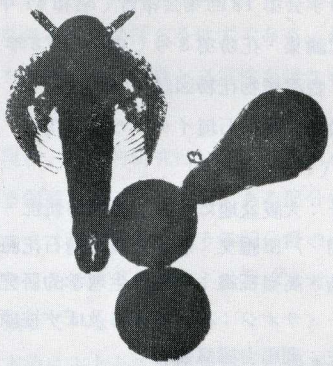

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Fig.3 Photograph 1 shows that *Camellia japonica* pollens soaked in cold n-butanol for 14 months and dried at 80°C for 5 minutes grew as long pollen tubes as untreated ones, and photograph 2 shows that the eggs of brine-shrimp soaked in cold n-butanol for 10 months and dried at 80°C for 5 minutes hatched out normaly.

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◦Ｉ.Ｃ.Ｐについて
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