

INCUBATION PERIOD AND DEVELOPMENT STAGES OF CITRUS FRUIT MOULD¹⁾

By

F. LITTAUER and M. NADEL-SCHIFFMANN

The length of the incubation period and of the stages of development of *Penicillium italicum* (blue mould) and *P. digitatum* (green mould) in fruits of orange (Shamouti, Valencia), lemon and grapefruit were examined during the picking season. The method of applying the fungi was designed to secure maximum infection. Spore-dust was inoculated by needle pricks into the skin of the fruit, through the oil-glands six times (area of 1/2 cm²) to a depth of 2 mm (Albedo).

A. EFFECT OF TEMPERATURE ON THE LENGTH OF INCUBATION PERIOD

See Table 1 (on page 124) and Figures 1—2 (on page 125)²⁾. The diagrams compare the length of incubation period of both fungi on Shamouti and Valencia oranges only. The length of incubation period on lemon and grapefruit resembles that of the Shamouti orange.

The shortest incubation period of both fungi, on all the hosts was 2—3 days at a temperature of 18—27° C.

The maximum temperature for mould was found to be between 32° to 33° C. Mould caused by *P. italicum* appeared at this temperature on all hosts, after 2—3 weeks. The appearance of this rot was not typical but looked like a pliable brown spot around the inoculation point. *P. digitatum* affected only the grapefruit at this temperature and appeared after 4 weeks, as a black spot around the inoculation point.

The incubation period of both fungi at 30°C approximated to that under optimum temperature.

At temperature below 18°C the length of the incubation period increases as the temperature decreases:

at 12°C — in both fungi and on all hosts — 4—6 days

” 8°C — ” ” ” ” ” ” ” — 8—10 ”

” 5°C — the lowest temperature examined, length of incubation period was 14—38 days. At this temperature the incubation period of *P. digitatum* on all hosts lasts longer than that of *P. italicum*. There are also considerable differences among the various hosts.

The degree of ripeness did not appear to have any influence upon the length of the incubation period at optimum temperature. Nevertheless the length of the incubation period was shortest at the end of the season, when the fruit was already fully ripe.

1) Abridged translation from Hebrew.

2) Page numbers in parentheses refer to the Hebrew text.

B. EFFECT OF TEMPERATURE ON THE FORM OF THE ROT
AND ITS RATE OF DEVELOPMENT

The rot looks the same at all temperatures, excepting the highest (30°—33°C). At first it looks like a soft spot, spreading in all directions and after a while the mycelium and the spores appear on it. At high temperature the rot appears as a dry pliable brown blemish.

Both fungi at every temperature and on all hosts, reveal a certain relation between the length of incubation period and the appearance of the mycelium and spores. The longer the incubation period lasts, the longer it takes for the mycelium and spores to appear, and vice versa (Figures 3 and 4 on page 126).

On the other hand, there is a difference between the two fungi in respect of the order of appearance of the mycelium and spores on the surface of the fruit. In *P. digitatum* the mycelium appears before the spores, while in *P. italicum* the two mostly appear together (Figures 3 and 4 on page 126) or the spores may even appear on the fruit surface before the mycelium.