

## NOTES ON FRUIT DECAYS OF THE FEIJOA (*Feijoa sellowiana* Berg.)

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The feijoa, a fruit now rather common in Southern California, is likely to increase in popularity on account of its unique qualities, and because of its season of ripening.

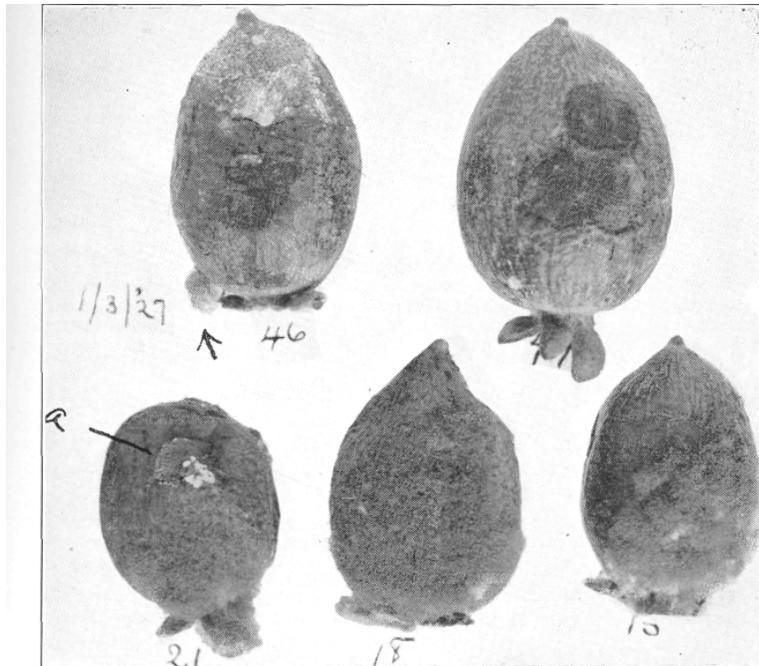
The plant is a sturdy grayish evergreen shrub, acceptable as an ornamental and in cold tolerance somewhat comparable with the olive. It is less delicate and exacting than the orange. Botanically it is allied with the myrtles, and is rather closely akin to the true guavas.

The fruit is usually smaller than a hen's egg, and its texture is somewhat similar to a fig but with a tougher skin. The flavor is unique, being refreshing, sweet and very spicy and aromatic. The name "pineapple guava" is unfortunate since it suggests rather an elastic imagination than the real flavor of the ripe fruit.

The season of ripening is late autumn and early winter -between the summer fruits and those of winter. As with the latter, cool weather does not prevent the development of high flavor and quality.

During the past winter a set of fruits was kindly sent to the writer by Dr. H. J. Webber of the Citrus Experiment Station, Riverside, for study. Observations were made on these fruits to get a preliminary idea of the principal decay fungi which are capable of attacking the feijoa. The fruits were kept under observation in moist chambers in the laboratory at room temperature and allowed to undergo natural spoilage. Cultures were made from various decaying areas and fungous colonies. Certain of the fruits were partly sterilised by wetting with alcohol, and when dry were inoculated with several fruit decay fungi.

From the work carried out several ideas developed. By all odds the most menacing feijoa decay fungus is the common gray mold, *Botrytis cinerea*. More than 35 per cent of the fruits developed automatic infections. Growth of the fungus was vigorous and sporulation copious. The decay produced is not very clearly bounded and the rot is not very soft nor conspicuous but flavor and quality are quickly lost. Older phases are tough. Weather in California during the ripening season of feijoas will usually be cool and often rainy, and as the fruits tend to drop, it may be very difficult to prevent serious loss of feijoas from Botrytis rot. It had previously been observed that feijoas in dry air might become infected with Botrytis, and become slightly withered and tough and completely lose flavor and quality, but not show any surface growth of mold.



Three lower fruits with gray mold. Botrytis rot (*Botrytis cinerea* Pers.) induced by artificial inoculation. At "a" an automatic colony of *Penicillium expansum*, apple green mold. Upper left (46) inoculated with black mold, *Rhizopus* sp., which shows at the left, but somewhat injured in handling. An unidentified fungus has developed automatically at the stem end. Fruit at upper right has three colonies of the anthracnose or wither tip fungus, which developed automatically.

—Courtesy University of California Agr. Exp. Sta.

A number of nearly ripe feijoas were inoculated in wounds with *Botrytis* spores and placed in moist chambers. Every inoculation was successful; the fungus grew vigorously and caused rapid rot of the fruit. *Botrytis* is very abundant in California during cool and wet weather, and may attack the succulent tissues of almost any kind of plant, especially if injured, weakened or partly frosted. No control suggests itself but prompt gathering of fruit, especially that which has fallen, and to hasten its ripening by appropriate treatment should help to avoid loss.

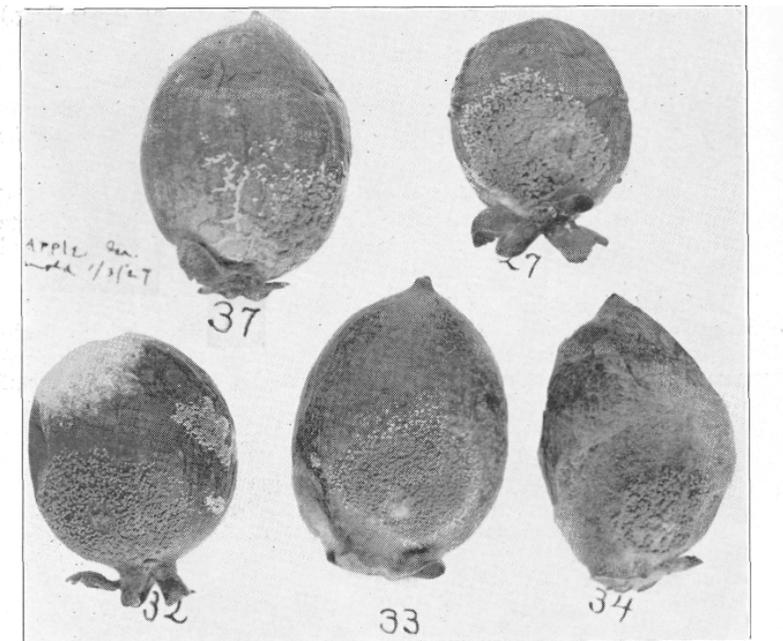
Apple green mold, *Penicillium expansum* Lk., is apparently the second fruit rot fungus of importance for feijoa. Slightly more than 50 per cent of the fruits studied developed this fungus, and Some fruits developed several colonies. This mold appears at a more advanced stage of ripeness than *Botrytis*, the colonies are smaller and do not so quickly involve the whole fruit. The rot produced is softer and more moist than *Botrytis* rot. Fruits artificially inoculated with spores from rotting apples all produced a rot similar to that occurring spontaneously. Control measures aside from general sanitation are not suggested. Black mold or bread mold, *Rhizojpus* sp's., which is the most active and destructive agent in the spoilage of succulent ripe fruits such as berries, peaches, and avocados occurred in only 3 per cent of the fruits studied. A small number of artificial inoculations all succeeded, but growth of the fungus was not as vigorous as usually occurs on watery fruits, and other molds apparently interfered with the black mold in all cases. Orange green mold, *Penicillium digitatum*, was not observed as occurring spontaneously, but was inoculated into fairly sound fruits which were nearly ripe. Less

than half of the inoculations were clearly successful, other molds developed spontaneously in the fruits and interfered with the orange green mold. The rot produced is not striking, somewhat moist, light brown and developing slowly. This is evidently not a serious menace to feijoas. Orange blue mold, *Penicillium italiam*, gave results almost identical with those secured with orange green mold, possibly the blue mold developed slightly better than the green. A peculiar feature was that the yellowish feijoas appeared to be somewhat more susceptible than the green fruits to both the blue and green molds.

Cotton rot mold, *Sclerotinid sclerotiorum* or *S. libertiana* was not recognised in the fruits under observation for spontaneous rots. Six fruits were artificially inoculated but without success; further experiments might give; different results.

Miscellaneous molds appeared in considerable variety as the fruit progressed in spoilage, these were partially identified but the lateness of the season and the lack of available fruits for inoculation discouraged further study for this year. One fruit developed three colonies of wither tip fungus (*Colletotrichum gloeosporioides*). Wither tip rot on feijoa produces a very striking rot in small slowly spreading, sunken round spots. If many infections should appear on the fruit, spoilage from this cause might be a serious matter.

It is apparent that control of ripening processes is one of the important features to be developed if the feijoa is to become an important market fruit.



Apple green mold, *Penicillium expansum* Lk., on feijoa, induced by puncturing fruit with a needle infected with apple mold spores. Color of the tufts of fungus spores is first white, then greenish. No. 32 has two smaller automatic infections of the same fungus at the right. This fruit also has an automatic infection with an unidentified white mold at the stem end. No. 33 shows automatic infection with a dark cottony mold, probably *Alternaria*, about the calyx. No. 34 has an automatic infection of *Botrytis*, which has surrounded the *Penicillium* and limited its spread. In No. 37 there is a cracking of the skin and emergence of the fungus tufts in the cracks.

—Courtesy University of California Agr. Exp. Sta.