Notes on the Development of the Fruit-bodies of Four Malayan Species of *Amanita* (Basidiomycetes)

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Abstract

The development of the fruit-bodies was observed under natural conditions in the forest. Those of *A. elata*, *A. princeps* and *A. virginea* took 12–14 days to reach maturity when they persisted for merely 1–3 days. Expanded fruit-bodies soon became fly-blown and this hastened their decay. *A. elata* and *A. princeps* fructify early in the fungus season, as do most Malayan species, but *A. virginea* appears towards the end of the season. The presence of these species is revealed only for a few days twice each year.

Introduction

These observations were made in 1929–1931. The species used to fructify in roughly the same places every year in the Singapore Botanic Gardens Jungle and at Bukit Timah Forest Reserve, as if they were mycorrhizal, though I could not associate them with particular trees. However, this fact enabled me to disturb the humus gently in the likely spots and discover the young primordia. When to look for them was a few days after heavy rain had soaked the ground after the drier months of January–February and July–August (Corner, 1935). These species were described by Corner and Bas (1962).

Amanita elata (Mass.) Corner et Bas

From 22 March and 22 September 1930 I watched the successful development of 6 fruit-bodies in the Singapore Botanic Gardens Jungle. They reached, eventually, overall heights of 70–95 mm with pilei 25–80 mm wide. Several other fruit-bodies which I began to measure rotted off before the stem emerged from the volva. Measurements were made at about 8 a.m. daily. On day 1, the unopened volva was 8–10 mm high, 4–5 mm wide. By day 3, it had grown to 16–25 mm high, 9–13 mm wide. At 8 a.m. on day 4, the volva had ruptured, evidently during the night, and the stem had begun to project the pileus; the overall height was 26–63 mm but the convex pileus was merely 14–20 mm wide; the volva had ruptured into flat pieces on the unopended and pale umber pileus. On day 5, four fruit-bodies A–D were fully expanded, 70–78 mm high with plane pilei 30–60 mm wide. Two fruit-bodies, E and F, were *c.* 80 mm high with half-open pilei 30–46 mm wide. On day 6, fruit-bodies A–D were the same but E and F had fully expanded, 80–95 mm high with plane pilei 36 and 80 mm wide respectively. On day 7, A–D were dead. On day 8, E and F had collapsed by 4 p.m.

Full expansion from the volva had taken 48–72 hours and seemed to occur mainly during the night. The plane pileus persisted sporing for some 50–60 hours. From the incidence of heavy rain at that time, I judged that the mycelium had taken *c.* 10 days

to develop the primordia to their state on day 1. The full life of the fruit-body, therefore, would be 14–15 days with a sporing period of *c.* 2 days or 50–60 hours.

The largest fruit-bodies that I recorded for this species had stems 13 cm long and pilei 9 cm wide. Such fruit-bodies might require an extra day for development and enjoy another day of sporing.

Amanita sp. aff. **A. fritillaria** (Berk.) Sacc.

On 15 March 1931 I marked two young fruit-bodies of this species in the Singapore Botanic Gardens Jungle. They were expanding with overall height 30 mm and pilei 11 mm wide. They expanded fully overnight and next morning were 73 mm high with plane pilei 38 mm wide. They lasted, evidently sporing, in this state for *c.* 36 hours before collapsing.

Amanita princeps Corner et Bas

In March and September 1930, I watched the development of 18 specimens of this lofty species. It grew in the deep shade of Fern Valley in Bukit Timah Forest Reserve. My observations were made at 3–4 p.m. The youngest specimens found were enclosed in the volva 15–21 mm wide. In 2 days the volva had enlarged to 32–48 mm wide. The next day, which was day 4 in the sequence, the volva had ruptured, evidently at night, and the stem had reached its full height 15-25 cm but the pilei were only one quarter to half open with the intact veil still covering the gills. On day 5, the pileus was fully expanded, plane or concave, 10–19 cm wide. The fruit-bodies then persisted for some 36–48 hours before becoming rotten. Many flies and small beetles had crawled over the expanding pilei to lay their eggs, and larvae together with the heavy rain hastened the demise of the fruit-bodies. Early development up to the rupture of the volva probably took some 12 days. In my experience this conspicuous fungus could be seen merely on 3–4 days, twice a year in March and September.

Amanita virginea Mass.

This fungus is unlike other species of the genus in the Malay Peninsula because it fruits towards the end of the fungus season after 2–3 months of rainy weather. The fruit-bodies are not to be found in the usual run of fungus about March and September but in May or November–December. In 1929 I watched the development of 10 fruit-bodies which came up in the Singapore Botanic Gardens Jungle in the second half of November and in the first half of December. Four of these failed to grow beyond an early stage when the primordia were merely a few days old. The others conformed to the sequence shown in Table 1.

The primordia took 8–10 days to develop from 10–15 mm high to the fully expanded state. The sporing period from the rupture of the veil to the collapse of the fruit-body varied from 30–70 hours. The expanded fruit-bodies were soon swarmed over by little flies, and how long they would last clearly depended on the extent to which they were fly-blown.

In 3 fruit-bodies the veil began to rupture about noon but was not fully broken and detached until 4 hours later. In one case the veil ruptured during the night. The veil split irregularly and fell to the ground in fairly large pieces.

It seemed likely that the primordia 10–15 mm high were not more than 3–4 days old. All the primordia and the freshly expanded fruit-bodies had very firm, turgid and compact texture. On section, a pale amber fluid issued from the cut surface, especially of the pileus and stem-apex.

Table 1
Fruit-body development of *Amanita virginea*

Day 8 a.m.	Height overall mm	Pileus width mm	
1	10–15	9–10	pileus a small hump
2	20	14	
3	25	18	
4	38	23	
5	45	30–35	
6	60	40–45	
7	75–85	50–55	
8	90–100	75–85	veil rupture
9	105–140	135–145	
10	110–150	150–190	fully grown

References

Corner, E.J.H. (1935). The seasonal fruiting of Agarics in Malaya. *Gard. Bull. Str. Settl.*, IX: 79–88.

_____ and Bas, C. (1962). The genus *Amanita* in Singapore and Malaya. *Persoonia* 2: 241–304.