

## POISONING BY INOCYBE FASTIGIATA

BY

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In this country, where the eating of fungi is much less common than on the Continent, outbreaks of poisoning due to fungi, though possibly not uncommon, are rarely reported in the papers. In 1945 three cases came under my care, all from the same household. The fungi were prepared similarly to fried mushrooms and served as a breakfast dish. They were collected by inexperienced mushroom-hunters whose criterion was based on a fallacy that the skin from the cap of the edible fungus peels readily.

### Description of Cases

*Case 1.*—A woman aged 25 had sudden onset of blurred vision occurring about one hour after having fried fungi for breakfast. Perspiration accompanied by profuse salivation rapidly followed the first symptom. She complained of giddiness and profuse sweating. On examination, within fifteen minutes of the onset of the first symptoms, the pupils were not dilated or constricted but were equal in size and had a sluggish reaction to light. There was profuse sweating and lacrimation. The abdomen was rigid, and generalized tenderness was present. The pulse was slow (56) and irregular, the blood pressure 90/50.

*Case 2.*—A man aged 56 first had symptoms one and a half hours after partaking of fungi, with profuse sweating and diarrhoea. No disturbance of vision was noted by the patient. Salivation and lacrimation were profuse. On examination there was profuse sweating, salivation, and lacrimation. The pupils were equal, neither constricted nor dilated, but there was a sluggish reaction to light. The abdomen showed generalized tenderness but no rigidity. The pulse was rapid (96) and irregular and the blood pressure 132/90 owing to the presence of many extrasystoles.

*Case 3.*—A man aged 27 had initial symptoms of blurred vision an hour after eating fungi, followed by profuse sweating, lacrimation, and salivation. Slight nausea was noted by the patient. On examination there was profuse sweating. The pupils were equal, with a sluggish reaction to light. The heart rate was 100 and regular and the blood pressure 110/60. The abdomen showed generalized tenderness but no rigidity.

Treatment consisted in the immediate administration of 1/50 gr. (1.3 mg.) of atropine sulphate subcutaneously and gastric lavage until the fluid was returned clear, and 2 oz. (56 g.) of magnesium sulphate was left in the stomach. Within two hours all symptoms of poisoning had disappeared; convalescence was uneventful. Electrocardiograms twenty-four hours after recovery of these cases showed no abnormality beyond the presence of extrasystoles in Case 2.

### Discussion

Broadly speaking, severe symptoms after partaking of poisonous fungi can be divided into two main groups: (1) Those with symptoms appearing after a period of incubation of six to twelve hours, or even longer, when the probability is that the patient has eaten *Amanita phalloides* (death cup, deadly agaric). (2) Those with onset of symptoms within one to two hours after eating fungi: the symptoms are due to muscarine, which is contained in *Amanita muscaria* (fly agaric), *Amanita pantherina*, and many species of *Inocybe*. Owing to the rapid onset of symptoms after partaking of fungi it was thought probable that these victims had eaten fungi rich in muscarine. On inquiry it was found that Case 1 had eaten far more of the fungi than either Case 2 or 3, and her symptoms were correspondingly more severe.

Muscarine (Wright, 1937) acts upon the parasympathetic-nerve endings in a similar manner to that of acetylcholine, producing profuse sweating, lacrimation, and bradycardia. These effects are abolished by atropine, which is advised as the specific antidote by Martin-Sans (1933) and Dujarric de la Rivière and Heim (1938) in the treatment of muscarine poisoning.

Similar fungi were collected from the same situation as those which had caused the symptoms, and were identified by the patients. These fungi were sent to Mr. A. A. Pearson, who identified them as *Inocybe fastigiata* (Linn.) Fr. This species of *Inocybe* is recognized by its conical straw-coloured fibrillose cap and olivaceous gills combined with the microscopical characters, which are cylindrical or clavate cells on the gill edge, and bean-shaped smooth spores. The fungus was found in a beech copse growing on chalk downs.

Previous fungus poisonings which have been brought to my notice were cases due to *I. incarnata* (Young, 1925) and *I. patouillardii*. In 1926 Prof. Wiki (Dujarric de la Rivière and Heim, 1938) divided the effects of *Inocybe* into four groups: (1) pronounced muscarine effect (*I. asterospora*, *I. brunnea*, *I. hirsuta*), (2) weak muscarine effect (*I. umbrina*), (3) unstable (*I. jurans*), and (4) without muscarine effect (*I. bongardii*, *I. fastigiata*).

Heim (1931) considers that *I. patouillardii* and *I. fastigiata* have muscarine effects, and this is confirmed by Henry (1931). Loup (1938) shows that *I. fastigiata* is rich in muscarine and that muscarine is stable and is able to remain active in dried specimens for several years. She also points out that Wiki admits a mistake in 1926 when he placed *I. fastigiata* in the group without muscarine effects. In a later work by Wiki and Loup (1938) they place *I. fastigiata* very high in the list of *Inocybe* containing muscarine, 0.2–0.3 g. per kg. being fatal to guinea-pigs; the figures for *I. patouillardii* are 0.2–0.25 g. per kg.

In a very interesting monograph Loup (1938) has examined the poisonous effects of thirty-three varieties of *Inocybe* which are found in Western Europe, and she comes to the conclusion that muscarine is present, in varying amounts, in twenty-two of them. All these twenty-two varieties may cause muscarine poisoning if eaten, but the severity of the symptoms depends upon the amount eaten. Of the three cases described above the most severe symptoms were present in the first, and this patient ate more of the fungi than the others; in the second case symptoms were caused after eating one small-sized fungus. From examination of these cases it is claimed that *I. fastigiata* is capable of causing severe symptoms similar to those of muscarine poisoning.

I am grateful to Mr. A. A. Pearson, of Hindhead, who not only identified the fungus but took great trouble in providing me with the correct references and much literature on this subject.

### REFERENCES

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The American Type Culture Collection (Georgetown University School of Medicine, 3900, Reservoir Road, N.W., Washington, 7, D.C.) has issued a list of the genera represented in its collection. The publication of a full and revised catalogue will be undertaken when the sixth edition of Bergey's *Manual* appears.