the grade 4 coloration. When females demonstrated the mating posture, arching the back and raising the tail, males bobbed the head without extending the gular fold (the male courtship behaviour[3]). Soon after the animals were paired, the challenge and threat postures accompanying combats were in most pairs observed only for a short while. Then one of the cage mates would turn pale. This state usually continued until the other was painted green. The cage was so small that the 2 lizards stayed very close to each other, but no more aggressive behaviour was observed. In 10 pairs, the average score of dominant partners in 7–8 days was significantly larger than that of the subordinate (table). The size of lizards seems not to be related to the dominance in the pair. The initial body length, tail length and weight in the dominant partner group averaged 132 ± 10 mm, 180 ± 53 mm and 78.5 ± 18.4 g, respectively, while those in the subordinate mate group were 133 ± 7 mm, 174 ± 44 mm, and 83.1 ± 11.4 g, respectively.

When dominant partners were painted green, the grade of coloration continued high for a few days and then fell slightly with some ups and downs. On the other hand, the subordinate nonpainted cage mates showed a rapid rise in colour grade, which lasted until the termination of the experiment. However, individual differences in this group were so great that no statistical significance was found in difference between scores before and after painting their partners. During the observation period of 7–8 days, no distinct aggressive behaviour occurred even when both painted and nonpainted lizards exhibited the grade 4 coloration. Nonpainted lizards displayed no male courtship behaviour to their painted partners, which, of course, showed no female mating posture. However, they responded to females approaching from the outside of the cage by the head bob, which had never been seen before. The average scores of both groups after painting were almost same (table). A typical time course of the changes in a pair is shown in the figure.

Discussion. Visual information appears to play an essential role in the social life of the rainbow lizard. Like traffic signals in human society, the rainbow lizard recognizes another to be approachable or not by its coloration. The head colour seems most important to discriminate the sex, social status and psychophysiological states. A cock lizard usually displays the typical brilliant coloration as long as no disturbance exists. If a stronger male approaches, the weaker has to change its skin colour to pale or even dark to guarantee its safety. Pale or dark males are no longer attacked by the stronger males. This is also the case with the coloration for sleep.

However, if the stronger male showed a green-painted head, the weaker behaved like a dominant cock lizard, supposedly mistaking the partner for a female or a weaker male. Such a change gradually affected the psychophysiological state of the painted lizard, forcing it to resign the dominant status. It is of interest that the reversal of the status, although not well established in the 7–8 day observation period, was achieved without fights. Explanations are at present not available as to why painted lizards showed no aggression to their bright-headed cage mates.

The internal regulatory mechanism of colour change and territorial behaviour, triggered by visual inputs, is still unknown in the rainbow lizard. The fact that colour grades of cock lizards are greatly reduced by castration and restored by testosterone administration[5] may suggest an involvement of the neuroendocrine system in the control of coloration and, possibly, of behaviour.

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Oriented mycelium growth of the fungus *Poria vaillantii* (DC) Sacc. in mixed culture with spruce callus

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Summary. Metabolites with inhibiting action, which are secreted into the substrate by the spruce callus, provoke in the fungus *Poria vaillantii* a subsequent production of aerial mycelium bundles. Their orientation, right-handed negative chemotropism with a certain deflection from the callus, is included in this reaction.

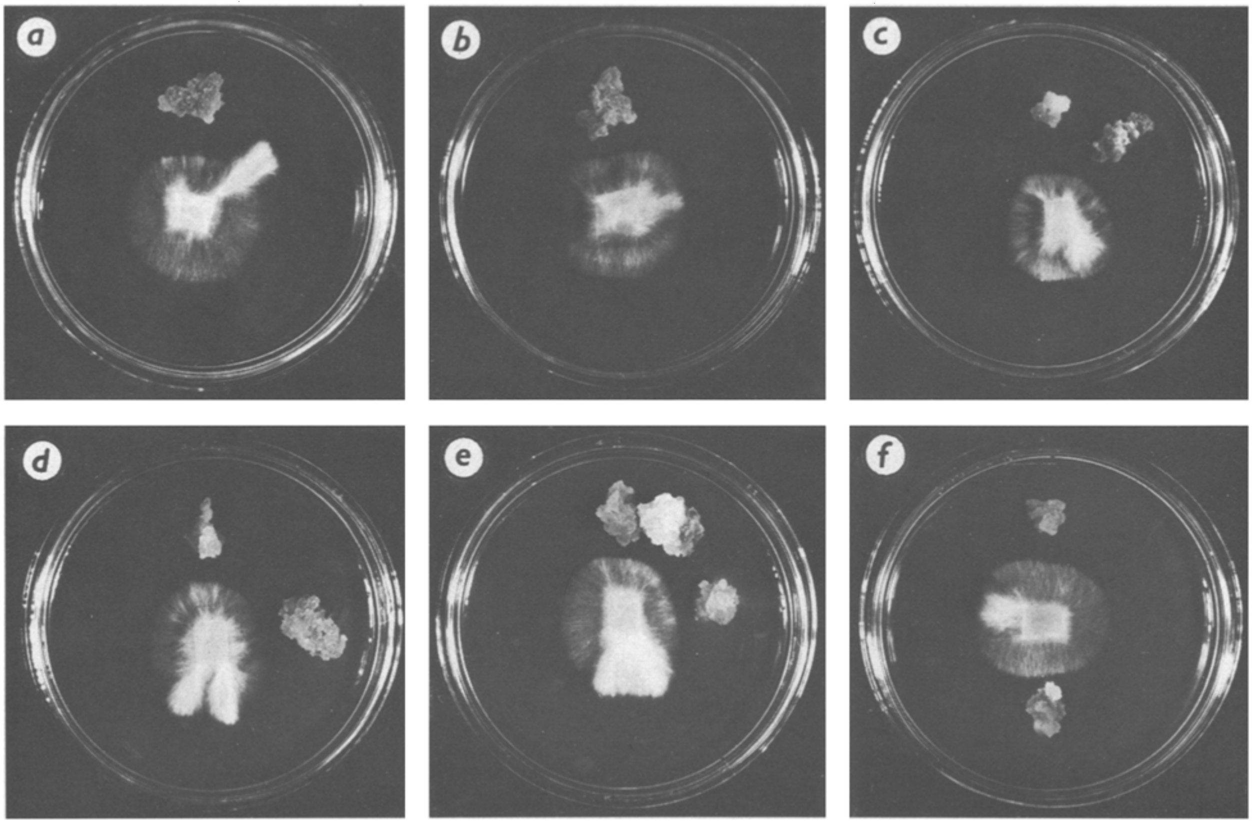
In many fungi, the longitudinal hyphal aggregation of surface mycelium appears[1]. In the course of time, rhizomorphes are formed from this aggregation. In nature, the rhizomorphes are common in some species of wood-destroying fungi and serve partly for the propagation of infection[2,3] and partly for the translocation of nutrients[4]. The origin and formation of longitudinal aggregations of hyphae can well be investigated in vitro in mixed culture with living spruce callus, which mostly inhibits the growth of wood-destroying fungi[5]. Under these conditions, the aggregations of hyphae originating from the surface mycelium exhibit a certain growth orientation.

In the present paper, we intend to demonstrate how this growth orientation is manifested in the fungus Poria vaillantii.

Material and methods. In 1974 the callus culture of *Picea excelsa* Link. was derived in our laboratory from the hypocotyl of a spruce seedling on the medium by Durzan et al.[6] The callus culture is maintained on Brown and Lawrence medium[7] with the addition of 5 mg α-napthylacetic acid and $0.1\ \mathrm{mg \cdot l^{-1}}$ benzylaminopurine, by passaging for 4 weeks. This medium was put into Petri dishes of 9 cm in diameter. The callus, which had been grown for 3 weeks from the last passage, was inoculated in the distance of about 3 cm from the centre of each dish. The callus inoculum was placed into Petri dishes in following variants:

1. The dish contained only 1 inoculum (figure, a, b). 2. The dish contained 2 inoculi which were placed a) on radii, forming an angle of 45° (figure, c), b) on radii forming an angle of 90° (figure, d), c) on the same diameter, but on the opposite parts of the dish (figure, f). 3. The dish contained 3 inoculi placed next to each other on radii forming an angle of 45° (figure, e).

Each variant was established in 3 repeatings. After 24 days of callus growth, the fungus *Poria vaillantii* (DC)



The growth response of arizing bundles of aerial mycelium of the fungus *Poria vaillantii* to the presence of spruce callus.

Sacc. (strain No. 4 from the collection of the Department of Plant Biology, J. E. Purkyně University, Brno) was inoculated to the centre of the dishes. The mycelium used for inoculation was taken with malt-agar substrate of a size of about 1×1 cm from the margin of the colony grown for 10 days. The distance between the inoculum of the fungus and callus was 2.5 cm in all cases. The mixed cultures prepared in such a way were incubated at 22°C in darkness.

Results and discussion. The first 2 or 3 days after inoculation to the mixed culture with spruce callus, the fungus grew by fine hyphae on the surface of the medium equally around the inoculum. The 3rd or 4th day after inoculation, a thick bundle of aerial mycelium hyphae usually began to grow from the malt-agar cube. If 2 bundles grew, then the 2nd one was delayed (by 8 h to 2 days) and was always localized on the right (clockwise) from the first bundle (figure, c, d).

The same orientation was exhibited by the hyphae bundles with respect to the spruce callus. The figure shows the state 5 days after inoculation. If only 1 callus was placed on the dish, then the bundle of the growing aerial mycelium was deflected from the callus by 45° at least (figure, a) and by 90° at most (figure, b), but always to the right. If 2 or 3 calluses were placed on the dish, then the callus which was situated most to the right was decisive for the direction of aerial mycelium growth. The first bundle of hyphae grew on the right again and at an angle of 90° at most (figure, c, d, e). Another situation occurred if 2 calluses situated on the opposite sides from the fungus inoculum were in one dish. In this case the callus deciding the direction of aerial mycelium growth was that which was larger or which was better in growth. In the figure, f, the callus placed near the lower side of the dish grew better. Therefore the bundle of aerial hyphae grows to the right. If the callus on the opposite side of the dish grew faster or was larger, then it became decisive for the growth of the aerial mycelium.

In our previous experiments, we have found that *Poria vaillantii* is inhibited by the spruce callus only during the first growth stages, when it still grows by a fine mycelium on the surface of the nutrient medium. The attack of the callus appears after forming a sizable aerial mycelium[5]. The production of the first bundle of aerial mycelium is induced by the initiation of inhibiting action of the spruce callus upon the fine surface mycelium. First it detects the inhibiting metabolites which are secreted into the substrate by the callus, and then it causes a subsequent production of the bundles of aerial mycelium. Their orientation, right-handed negative chemotropism with a certain deflection from the inhibitor, is included in this reaction.

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