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Fructification and sporulation of Laetiporus sulphureus in the urban environment

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Basidiocarps of sulphur fungus Laetiporus sulphureus (Bull.: Fr.) Murrill were produced from May to October in 1–4 waves in three model towns of Nitra, Žilina and Zvolen in Slovakia during 1984–1986 and 1991–1992. Basidiospores were released in two main waves (May–June and August–September). The mean of measured values was 6.5×10^2 basidiospores discharged from 1 mm^2 of hymenophor in the course of 24 hours.

Key words: Laetiporus sulphureus, urban ecosystems, sporulation, fructification

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V priebehu rokov 1984–1986 a 1991–1992 sa sledovala fruktifikácia a uvoľňovanie bazídiospór trúdnika Leatiporus sulphureus (Bull.: Fr.) Murrill v Žiline, Nitre a vo Zvolene. Plodnice sa tvoria v 1–4 produkčných vlnách a bazídiospóry sa uvoľňujú v dvoch hlavných vlnách (máj–jún a august–september). Z 1 mm^2 hymenoforu sa za 24 hodín priemerne uvoľní 6.5×10^2 bazídiospór.

INTRODUCTION

Beside of the practical use of sporulation studies in plant protection (Gáper 1990), their theoretical contribution is also important for better knowledge of species ontogenesis (Ingold 1971). The data on sporulation are at the same time useful for taxonomic purposes, for it is possible to collect fruitbodies during the period of their pressumed spore production (Pouzar et Kotlaba, 1988). Last but not least the results of sporulation studies are a valuable contribution to the knowledge of allergy.

Only qualitative aspect of release of airborne basidiospores from the polypore fungus, *Laetiporus sulphureus* (Bull.: Fr.) Murrill was studied (Nuss 1986, Soukup 1987). Up to present time there are no data from the urban environment.

MATERIAL AND METHODS

Fructification and release of basidiospores from naturally produced basidiocarps of polypore fungus *Laetiporus sulphureus* (Bull.: Fr.) Murrill were observed in three towns of Žilina, Nitra and Zvolen during 1984–1986 and 1991–1992. Methods described by Gáper (1993) were used. Sporocarps samples were taken 1–4 times in a month from March to October. Basidiospores were counted in Burger chamber.

RESULTS

Fruitbody consistency of sulphur fungus *Laetiporus sulphureus* (Bull.: Fr.) Murrill is relatively soft and therefore its decomposition is enough quick. So, release of airborne basidiospores from these fruitbodies is much more shorter in relation to time than of those species with tougher sporocarps. And on the other hand, ripening of fruitbodies and duration of sporulation depends more on temperature and some other factors. Every observed year was different in the manifestation of sporulation. In spring 1984 old fruitbodies were collected in Žilina, but no spores fell out of them. In 1985 no new fruitbodies were produced and the rest of fruitbodies from the spring 1984 (they were the remnants from the year 1983) had been decomposed. Only in 1986, in mid–May a big wave of fruitbodies appeared (Fig. 1). They sporulated and fructificated till the beginning of July. During July a new wave of fruitbodies appeared and its spore liberation lasted approximately 4 weeks but simultaneously with the end of this wave another one appeared, however time of its sporulation was less intensive and shorter in that time. Fruitbodies of the second wave decomposed to the end of the season, while those of the last one remained and lasted till the next spring.

The year 1984 was not favourable for fructification of sulphur fungus in Žilina too. In 1985 at the end of September only one wave of fruitbodies appeared which sporulated not very markedly during cca two weeks. Sporulation was recorded only 25th of September (in total 92–888 spores were counted). In 1986 even 4 waves of fruitbodies appeared in Nitra; the last one at the beginning of September but that one did not sporulate (Fig. 2). As there were only small differences between individual waves, it was not always possible to determine exactly, which fruitbodies belonged to which wave and the sporulation of the younger wave could superimpose the older one. Fruitbodies from spring and summer waves, after having discharged the spores, decomposed during the vegetation period. Year 1991 was unfavourable for fructification in Zvolen. In spring from March to April only old sporocarps were estimated. No spores were counted. Maybe, they could not ripen for late fruitbody production in last year or they ripened and during the winter discharged their spores into the environment. In 1992 two fructification waves (in May–June and August–

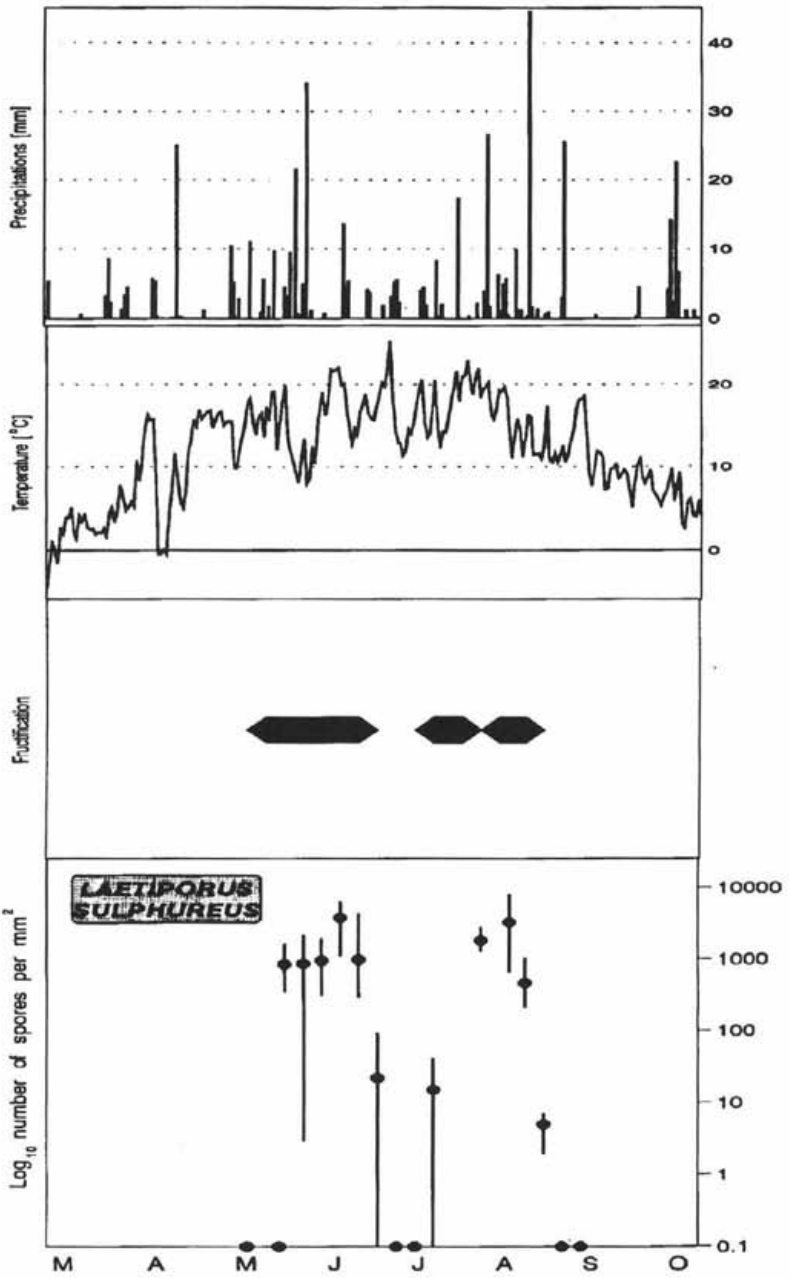

Fig. 1. Spore production and scheme of fructification of Laetiporus sulphureus with marked daily precipitation depths and with average day-time temperatures in the town of Žilina in 1986.

September) were recorded (Fig. 3). Basidospore liberation was very intensive at the end of both June and August.

The dependence on weather is enough unclear. Fig. 1. represents season 1986 in Žilina. Here intensive sporulation seems to be reached at even-tempered average day-time temperatures and smaller rainfall intensity in August. But similarly it seems that lower temperatures could this sporulation to induce. In the contradiction to this, an intensive sporulation was recorded in the same season in June at rising temperatures, but after heavy rains. The similar preconditions are valid for both Nitra and Zvolen (Figs. 2, 3). It is interesting that in Nitra the last wave of fruitbodies did not sporulate (Fig. 2) when the observation was done.

DISCUSSION

Laetiporus sulphureus (Bull.: Fr.) Murrill produces relatively a small amount of basidospores. It has 1–4 production waves but the sporulation lasts only for a short period of time. Of course, some basidospores, especially with vague outlines (most probably unmature ones) were agglutinated and it was impossible to count them. This phenomenon occurred in mature basidiospores too, but only occasionally. We therefore suppose that spores were discharged only from some tubes and that would point out to unequal liberation of spores from hymenophore of fruitbodies in some cases. And so even these at first sight purely theoretical problems show the many sideness and complications in the study of sporulation.

The example of sulphur fungus can confirm the opinion of Soukup (1987) that on year fruitbodies sporulate in favourable conditions already 1–3 weeks after fungal primordium creation. Similarly Nuss (1986) recorded spore liberation in May and June. As fruitbodies had been produced only during this period, Nuss (1986) could not gain information on this species sporulation during the later periods of the year.

In this paper samples taking method enabling the study of greater amounts of fruitbodies were used. Thus the deficiency proceeded from methods studying only a small number of fruitbodies was eliminated. The study of a sufficient number of fruitbodies made possible to give a pictures of spore liberation on the whole territory not only of an individual fruitbody.

Fruitbodies that liberate and do not liberate basidiospores in the same time period, grow in the urbanised landscape too. In such case urban and natural environments are closely connected when dealing with possible transfer of spores.

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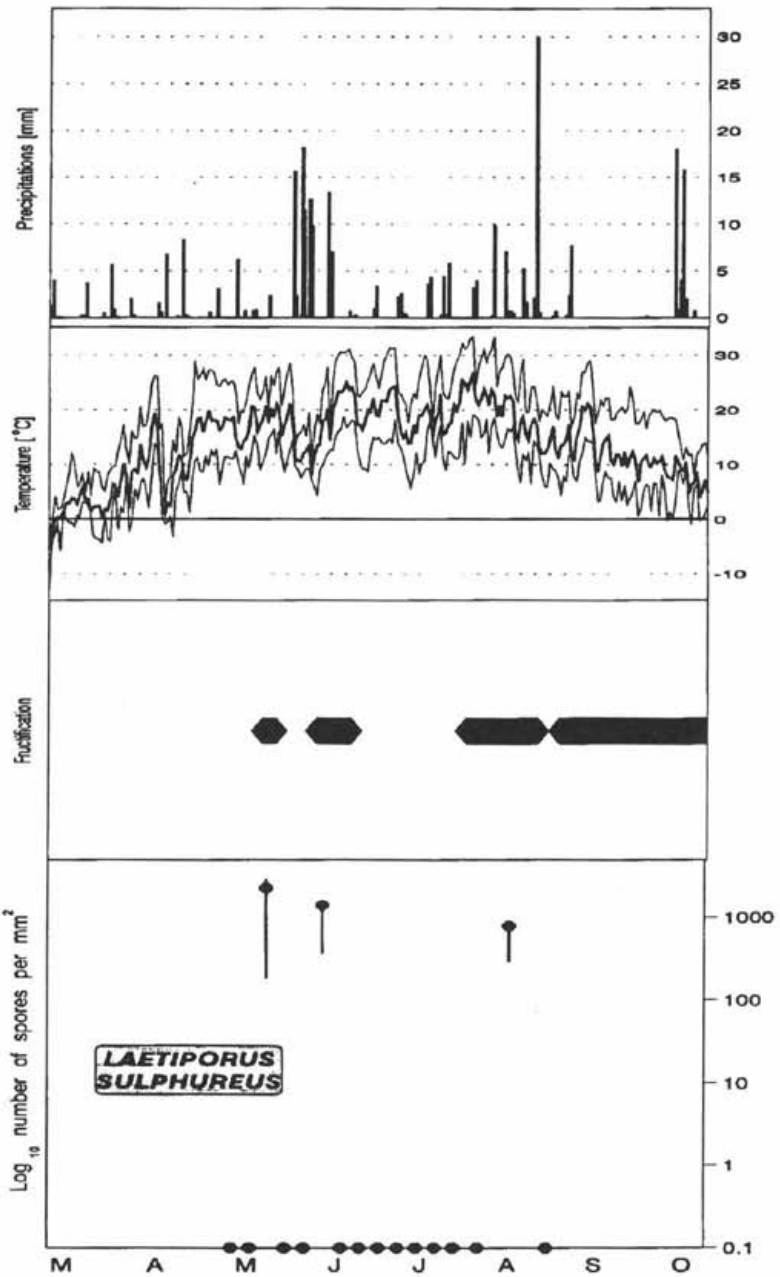

Fig. 2. Spore production and scheme of fructification of Laetiporus sulphureus with marked daily precipitation depths as well as with average day-time, minimum and maximum temperatures in the town of Nitra in 1986.

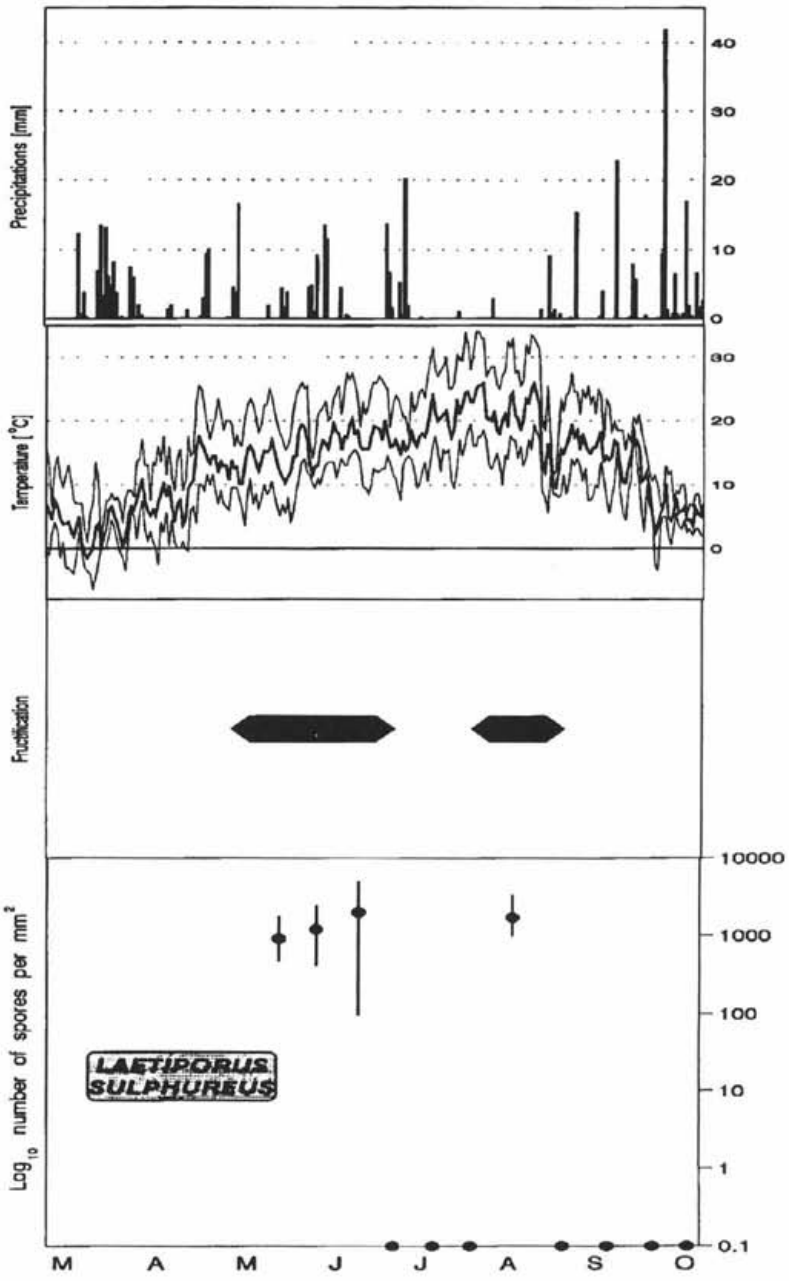

Fig. 3. Spore production and scheme of fructification of Laetiporus sulphureus with marked daily precipitation depths as well as with average day-time, minimum and maximum temperatures in the town of Zvolen in 1992.

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