EFFECT OF LIGHT ON THE SPORULATION OF TWO STRAINS OF *EPICOCCUM NIGRUM*

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Swan and Barnett (1) showed that light was required for the formation of conidia in *Epicoccum nigrum* Link. Ponchet, et al. (2) also reported a light requirement for sporulation in this species. Stevens (3) suggested the use of *E. nigrum* as an experimental tool to demonstrate an absolute requirement for light to initiate sporulation.

Although the isolates previously studied showed a light requirement, it should be noted that *E. nigrum* is a species that demonstrates a great deal of variability (4, 5, 6). Schol-Schwarz (6) showed that spore development and structure were the only constant factors in every strain; and Mulder and Pugh (5) stated that cultural characteristics varied depending on the medium, the temperature, and the strain being studied.

In a recent paper, Bonnell and Levetin (4) reported on the effects of different carbon and nitrogen sources on the growth and sporulation of two strains of *E. nigrum*. The two strains differed in cultural characteristics, abundance of conidia, and nutritional preference. One strain, the mycelial strain, produced a floccose aerial mycelium with scattered sporodochia and showed the best growth and reproduction on synthetic media containing starch and sodium nitrate. The other strain, the sporulating strain, formed a sparse mycelium, grew more rapidly, and had numerous, small, and more evenly distributed sporodochia. For the sporulating strain glucose appeared to be the preferred carbon source, and both sodium nitrate and asparagine were satisfactory nitrogen sources (4). The present study was undertaken to determine if these two strains of *E. nigrum* possessed the light requirement reported for other strains of this species.

The two strains used were isolated as air contaminants in February 1977 as previously reported (4) and cultured on potato dextrose agar (PDA) and four synthetic media. The synthetic media contained $MgSO_4$, 0.5 g; KCl, 0.5 g; K_2,HPO_4, 1.0 g; 2 m*l* micronutrient solution (3); 15 g agar; and deionized water to bring the volume to one liter. Each medium also contained either glucose (10 g) or starch (9 g) and either sodium nitrate (2.6 g) or asparagine (2 g).

Using methods previously described (4), media were inoculated and cultures incubated for 9 or 14 days in continuous light, in continuous darkness, or under a 12 hr light-dark photoperiod. Cultures receiving light were exposed to an illumination of 75-foot-candles supplied by a Luxo combination fluorescent-incandescent lamp. At the end of the incubation period the total number of spores per colony was determined as described (4).

The mycelial strain showed a light requirement only when grown on PDA (Table 1). On all the synthetic media spores were produced in darkness and under both light treatments. As previously reported (4) starch was found to be the preferred carbon source for this strain. Colonies grown on starch media formed more conidia than colonies grown on glucose media especially in the absence of light.

The sporulating strain produced spores abundantly under all conditions and on all media (Table 2). Although glucose media consistently resulted in greater sporulation, there were numerous conidia formed in darkness on all media.

This study shows that these two strains of *E. nigrum*, unlike those previously described (1, 2) lack a light requirement for the initiation of conidia. This illustrates that the light requirement, like so many other characteristics of *E. nigrum*, shows variability with the strain being studied.

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REFERENCES

1. D. C. SWAN and H. L. BARNETT, Proc. West Virginia Acad. Sci. 35: 46-50 (1963).
2. J. PONCHET, J. C. PIONNAT, and G. AUGE, Ann. Phytopathol. 4: 119-131 (1972).
3. R. B. STEVENS (ed.), *Mycology Guidebook*, Univ. Washington Press, Seattle, 1974, pp. 454-455.
4. B. S. BONNELL and E. LEVETIN, Mycologia 73: 238-243 (1981).
5. J. L. MULDER and G. J. F. PUGH, Int. Biodet. Bull. 7: 69-71 (1971).
6. M. B. SCHOL-SCHWARZ, Trans. Brit. Mycol. Soc. 42: 149-173 (1959).

TABLE 1. *Effect of light on the formation of conidia in* Epicoccum nigrum *mycelial strain*[a]

Medium	Average No.[b,c] of Conidia/Colony × 10^{-6}		
	Continuous light	12-hr Light-dark photoperiod	Continuous darkness
Glucose-asparagine	2.26 ± 0.20	4.77 ± 0.45	0.74 ± 0.08
Glucose-sodium nitrate	3.50 ± 0.32	5.42 ± 0.61	0.29 ± 0.02
Starch-asparagine	6.00 ± 0.39	4.09 ± 0.20	4.32 ± 0.32
Starch-sodium nitrate	9.12 ± 0.55	14.62 ± 0.74	4.45 ± 0.19
PDA	2.54 ± 0.18	1.90 ± 0.08	0.00 ± 0.00

[a]14 days incubation
[b]Mean ± standard error
[c]$N = 10$ (two spore counts from each of five replicate colonies)

TABLE 2. *Effect of light on the formation of conidia in* Epicoccum nigrum *sporulating strain*[a]

Medium	Average No.[b,c] of Conidia/Colony × 10^{-6}		
	Continuous light	12-hr Light-dark photoperiod	Continuous darkness
Glucose-asparagine	53.13 ± 3.19	59.50 ± 4.37	29.71 ± 2.77
Glucose-sodium nitrate	18.20 ± 1.63	34.40 ± 2.06	33.77 ± 2.36
Starch-asparagine	6.38 ± 0.50	6.79 ± 0.41	22.08 ± 1.19
Starch-sodium nitrate	1.37 ± 0.12	2.64 ± 0.21	6.16 ± 0.27
PDA	25.20 ± 1.11	21.90 ± 1.06	11.70 ± 0.49

[a]9 days incubation
[b]Mean ± standard error
[c]$N = 10$ (two spore counts from each of five replicate colonies)