3 Results and Analysis

3.1 Spawn run, pinhead initiation, and harvesting time

Spawn rate had a highly significant effect on the duration of mycelial colonization and the developmental stages that followed it (Table 1). Raising the spawn rate from 4% to 12% progressively shortened the spawn run period, though the rate of improvement clearly diminished beyond 10%. T_4 and T_5 were statistically at par across all three timing parameters, pointing to diminishing returns beyond the farmer-practice spawn rate (see Section 4.1 for interpretation).

Table 1 Effect of spawn rate on spawn run, pinhead initiation, and first harvest

Treatment	Spawn run (days)	Pinhead initiation (days)	First harvest (days)
T_1 (4%)	24.5 ± 0.47^{a}	29.2 ± 0.52^{a}	34.6 ± 0.55^{a}
T_2 (6%)	21.8 ± 0.47^{b}	26.4 ± 0.52^{b}	31.7 ± 0.55^{b}
T_3 (8%)	18.3 ± 0.47^{c}	23.1 ± 0.52^{c}	28.2 ± 0.55^{c}
T_4 (10%, farmer practice)	16.6 ± 0.47^{cd}	21.5 ± 0.52^{cd}	26.6 ± 0.55^{cd}
T_5 (12%)	15.9 ± 0.47^{d}	20.8 ± 0.52^{d}	26.0 ± 0.55^{d}
F-value	59.78^{***}	45.41^{***}	43.83^{***}
p-value	<0.001	<0.001	<0.001
CV (%)	4.31	3.86	3.51
Grand mean	19.42	24.20	29.42

Note: Means in a column followed by different lowercase letters differ significantly at $p \leq 0.05$ (DMRT). ** $p \leq 0.01$; *** $p \leq 0.001$. SE: standard error (n = 4); CV: coefficient of variation

3.2 Number of fruiting bodies, cap diameter, and stipe length

Spawn rate significantly influenced all three morphological parameters (Table 2). The number of fruiting bodies per bag rose consistently with spawn rate, while average cap diameter and stipe length moved in the opposite direction, shrinking as fruiting-body density increased. T_4 and T_5 produced statistically similar numbers of fruiting bodies, both well ahead of the lower spawn rates. Even so, both treatments produced smaller, thinner fruiting bodies than T_1 and T_2 a size-number trade-off discussed further in Section 4.2.

Table 2 Effect of spawn rate on fruiting body number, cap diameter, and stipe length

Treatment	Fruiting bodies (No./bag)	Cap diameter (cm)	Stipe length (cm)
T_1 (4%)	24.3 ± 0.95^{d}	5.8 ± 0.21^{a}	4.9 ± 0.18^{a}
T_2 (6%)	29.1 ± 0.95^{c}	5.4 ± 0.21^{ab}	4.5 ± 0.18^{ab}
T_3 (8%)	34.8 ± 0.95^{b}	5.0 ± 0.21^{b}	4.0 ± 0.18^{b}
T_4 (10%, farmer practice)	38.2 ± 0.95^{a}	4.6 ± 0.21^{bc}	3.6 ± 0.18^{bc}
T_5 (12%)	39.0 ± 0.95^{a}	4.1 ± 0.21^{c}	3.2 ± 0.18^{c}
F-value	43.34^{***}	10.45^{***}	14.43^{***}
p-value	<0.001	<0.001	<0.001
CV (%)	6.02	7.44	8.11
Grand mean	33.08	4.98	4.04

Note: Means in a column followed by different lowercase letters differ significantly at $p \leq 0.05$ (DMRT). ** $p \leq 0.01$; *** $p \leq 0.001$. SE: standard error (n = 4); CV: coefficient of variation

3.3 Yield, biological efficiency, and contamination

Total fresh yield and biological efficiency followed the same upward trend as fruiting body number, while contamination incidence fell sharply as spawn rate increased (Table 3). Yield and biological efficiency at T_4 (10%) and T_5 (12%) were statistically indistinguishable, both significantly exceeding T_1, T_2, and T_3. Contamination was observed only at the two lowest spawn rates: one of four bags at T_1 (25%) and one of eight cumulative bag-observations at T_2 (12.5%) showed visible green mold before spawn run completion, whereas no contamination at all was recorded at 8% spawn rate or above (interpreted further in Section 4.2).