Sporulation of *Helminthosporium solani* and Infection of Potato Tubers in Seed and Commercial Storages

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ABSTRACT

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Silver scurf has become a major reason for rejection of fresh and processing potatoes in recent years. Control of the disease by chemical or cultural practices or resistant cultivars has been difficult. Observations have shown spread and increase of disease of potatoes in storage, but this has not been extensively studied. The objective of this study was to document *Helminthosporium solani* conidia production, dispersal, and tuber infection in potato storages. Spore samplers placed in seed, processing, and table stock storages collected conidia ranging from 0 to 12,000 conidia per day in seed and table stock storages (4°C), and from 0 to 24,000 conidia per day in processing storages (10°C). Conidia were detected soon after tubers entered storage and increased progressively during the storage period, with the maximum conidia numbers found during the time of tuber handling. Greenhouse-produced minitubers placed in storages for 1, 2, 3, or 4 weeks were infected by *H. solani* spores. Infection was significantly higher in those exposed for 4 weeks than in those exposed for 1 week. Results document the buildup of *H. solani* spores throughout the storage period, and that this inoculum is important in disease epidemiology. Control of this inoculum could lead to disease reduction.

Silver scurf of potato, long recognized as a disease of minor importance (15,27), has become a major reason for rejection of fresh and processing potato shipments by the industry (14,25,26). Control has been aggravated by widespread resistance of the pathogen, *Helminthosporium solani* Durieu and Mont., to post-harvest benzimidazole fungicides (6,12,16,22), lack of resistant cultivars (18,20), and a poor understanding of disease epidemiology.

The fungus is primarily a seedborne pathogen, but evidence suggests that it is able to survive in the soil for short periods (2,11,17). Seed tubers are believed to be responsible for infection of new daughter tubers in the field (5,9,23,24), but the mechanism of infection transfer from seed to new tubers is unknown. Low levels of infection may also come from free conidia in the soil from previous crops (17,20). Jellis and Taylor (9) studied disease development in the field and reported sporulation of *H. solani* on seed tubers 1 week after planting, extracted viable conidia from the soil surrounding young tubers at 7 weeks, and found infection in the new tubers at 10 weeks. We have been able to recover *H. solani* conidia from soil surrounding potato seed pieces 2 weeks after planting, and observed infection of new tubers 1 week after planting (G. A. Secor et al., unpublished).

Silver scurf–diseased tubers are often found at harvest demonstrating the characteristic gold to silver colored lesions, which are restricted to the periderm (3). The disease has been observed to spread in storage, and potato storage conditions have been linked to disease increase and pathogen spread. Potatoes are generally stored at a relative humidity (RH) of >90% to maintain quality and reduce shrinkage. Storage temperature varies according to final use of the potatoes. Seed potatoes are held at 3 to 4°C, table potatoes at 4 to 7°C, potatoes for French fries at 8 to 10°C, and potatoes for chips at 10 to 13°C. Growth of *H. solani* and silver scurf development also are favored by the temperature and RH found in potato storages. On the tuber, the fungus can sporulate at temperatures ranging from 2 to 27°C and the growth of silver scurf lesions is retarded below 9°C (19). RH also influences the development of *H. solani*. Sporulation is abundant in the 85 to 100% RH range, optimum at around 90%, slows below 80%, and stops below 55%. Optimum environmental conditions for both long-term storage and fungal development are coincident and suggest a continued relationship between pathogen and host in storage.

Limited management of disease can be accomplished by pre-planting and post-harvest fungicide use (2,4,19) and cultural practices such as irrigation (1), planting and harvest date (1,18,20), and wounding of seed (4). However, effective management of disease in storage is lacking. Although conidia dispersion has been observed in storage (8,21) and observation suggests the spread of silver scurf in storage by sporulation and infection (5), no data have been reported on the quantitation and dynamics of conidia dispersal in potato storage. This study was conducted to document and quantify conidial production, timing, dispersal, and infection in

Table 1. Potato storages and periods of collection of *Helminthosporium solani* conidia during the storage studies

Storage	Potato usage	Type of storage	Conidia collection	
			Start date	Finish date
1993 to 1994				
S1	Seed	Cross alley[a]	20 October	25 April
S2	Seed	Cross alley[a]	19 October	30 March
T	Table	Cross alley	19 October	5 April
P1	Processing	Single bin	08 November	14 February
P2	Processing	Single bin	08 November	27 February
P3	Processing	Single bin	08 November	19 January
P4	Processing	Cross alley[b]	20 October	1 March
P5	Processing	Cross alley[b]	20 October	22 Feb.
P6	Processing	Cross alley[b]	20 October	18 Feb.
1994 to 1995				
S1	Seed	Cross alley[a]	18 October	21 April
S2	Seed	Cross alley[a]	18 October	25 April
S3	Seed	Cross alley[b]	18 October	8 March
P4	Processing	Cross alley[b]	18 October	3 March
P6	Processing	Cross alley[b]	18 October	14 March
P7	Processing	Cross alley[b]	18 October	14 March

[a] Common ventilation system.
[b] Separate ventilation system.

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potato storages in order to understand the epidemiology of the disease in stored potatoes, leading to storage management.

MATERIALS AND METHODS

Storage study 1993 to 1994. The study was conducted in nine potato storages (Table 1). Six (P1 to P6) of the nine storages were used for storing processing potatoes, primarily cv. Norchip. Two of the storages were seed storages (S1 and S2) that contained seed tubers of various cultivars, including Norchip, Red Norland, Dark Red Norland, and Russet Burbank. The remaining storage (T) was a table stock storage with varied red-skinned cultivars and with a packing shed located next to it.

Storages P1 to P3 were single bin storages. Storages S1, S2, P4 to P6, and T were of the "cross alley" type, which consists of multiple bins placed side by side, perpendicular to a central alley. Bins in P4 to P6 had a common roof, but separate mechanical ventilation systems. The seed (S1, S2) and table stock (T) storages had a common ventilation system.

Conidia collection. A Kramer-Collins volumetric spore sampler (G. R. Manufacturing Co., Manhattan, KS) was installed in each storage after filling and was removed when the bins were emptied (Table 1). The spore samplers were located on the piled potatoes at approximately 3 to 4 m horizontally from the plenum fan in the storages. Each spore sampler was adjusted to sample 25 to 30 liters of air per minute as indicated by a built-in flow meter.

Conidia of *H. solani* collected on the sticky tape of the spore collector were counted with a microscope at 100× power. A sample of the total number of conidia was obtained by counting those found on a longitudinal 2-mm-wide band located on the center of the collecting tape. The total number of conidia was estimated by multiplying the number of conidia in the sample band by a correction factor of seven.

Temperature and RH were recorded by means of hygrothermographs that were placed on the potato pile in storages S1, S2, and P4-P6, and in the work area in storage T. The hygrothermographs were calibrated monthly with a psychrometer. Temperature and RH readings were taken every 2 weeks from the internal computer-driven control system in storages P1 to P3.

Tuber infection. Greenhouse-produced minitubers of cv. Red Norland (Valley Tissue Culture, Inc., Halstad, MN) were used to determine the ability of storage airborne *H. solani* conidia to infect tubers in storages. Ten tubers were placed in separate plastic mesh bags and stored in sealed cardboard boxes at 4°C until used. Five or six mesh bags were dispensed to storages S1, S2, and P4 to P6 weekly and to storages P1 to P3 monthly over a 12- to 15-week period. Mesh bags containing minitubers were placed on the potato pile, in the plenum, or the work area of the storages. One bag of minitubers was placed inside a plastic bag and placed on the pile or the work area as an unexposed control.

After storage exposure, two or three of the six or seven bags of minitubers were surface sterilized in the laboratory with 0.5% sodium hypochlorite for 10 min and three rinses with tap water before incubation. Tubers from all bags were incubated for 4 to 5 weeks in humid chambers in the dark, using boxes lined with moist paper towels.

At the end of the incubation period, the tuber surface was evaluated for infection by counting infection sites, which consisted of 1 to 5 conidiophores with conidia, using a low power microscope. A rating scale was used to evaluate the infection: No sites = 0; 1 to 2 sites = 1; 3 to 5 sites = 2; and more than 5 sites = 3. This rating scale was used to calculate an "infection index" with the following formula adapted from the "weighted nematode rating" formula used by Jorgenson (10) for root-knot

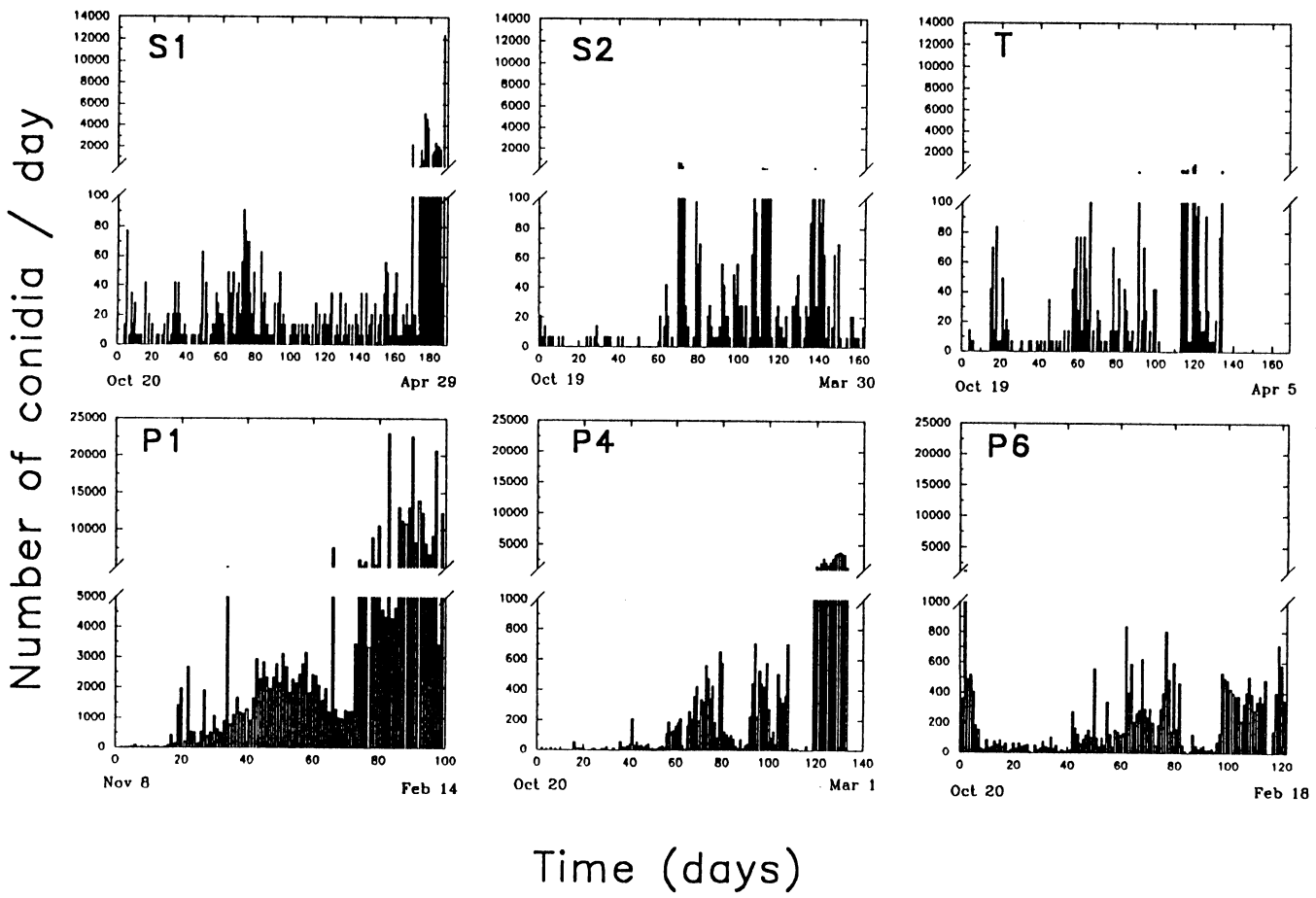

Fig. 1. Number of conidia of *Helminthosporium solani* collected per day in two seed (S1 and S2), one table stock (T), and three processing (P1, P4, and P6) storages during 1993 to 1994. The scale of the axes varies among graphs.

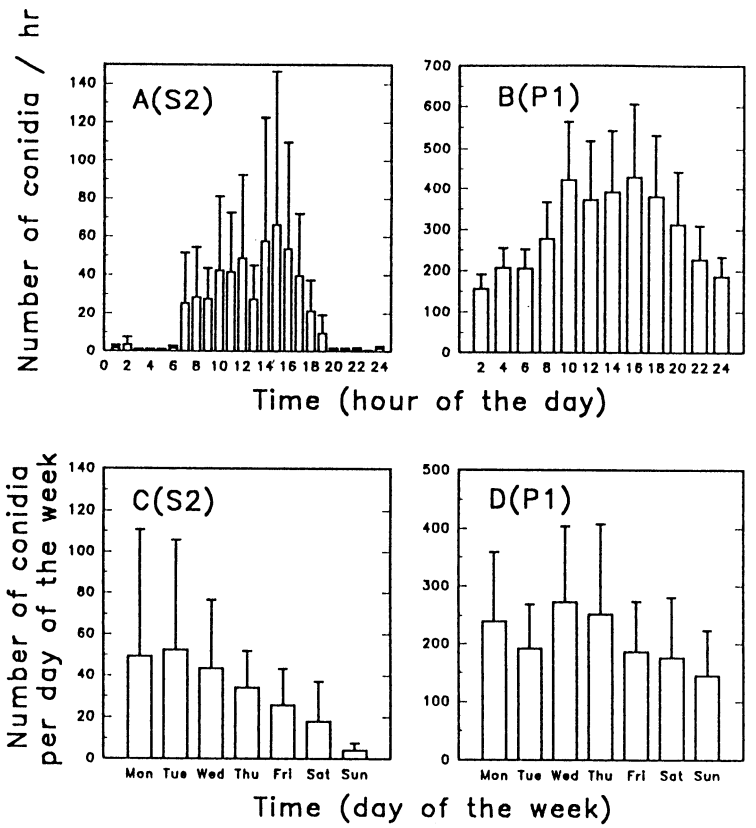

Fig. 2. Average number of conidia of *Helminthosporium solani* collected in two potato storages during 1993 to 1994. **(A, B)** Average number of conidia per hour of the day in a seed (S2) and a processing (P1) storage. **(C, D)** Average number of conidia per day of the week in a seed (S2) and a processing (P1) storage. The scale of the *Y* axis varies among graphs. Bars represent standard error of the mean.

nematodes: ii = sum($n_i s_i$) · $N^{-1}S^{-1}$ · 100; where ii = infection index; n_i = individual tuber; s_i = site rating; N = total number of tubers evaluated in each bag; and S = maximum site rating possible.

Storage study 1994 to 1995: Conidia collection. The study was repeated in six (three seed and three processing) storages (Table 1) using the same methodology as in 1993 to 1994. Four of the storages (S1, S2, P4, and P6) were the same as those used in the 1993 to 1994 study. An additional processing storage (P7) and a seed

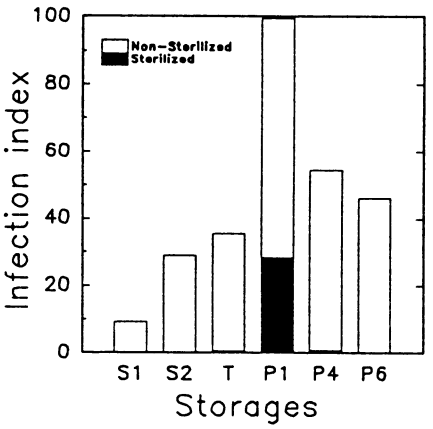

Fig. 3. Infection of surface sterilized and non-sterilized minitubers by *Helminthosporium solani* incubated for 4 weeks after exposure (1 week in S1, S2, T, P4, and P6; 4 weeks in P1) to the storage airborne conidia in 1993 to 1994.

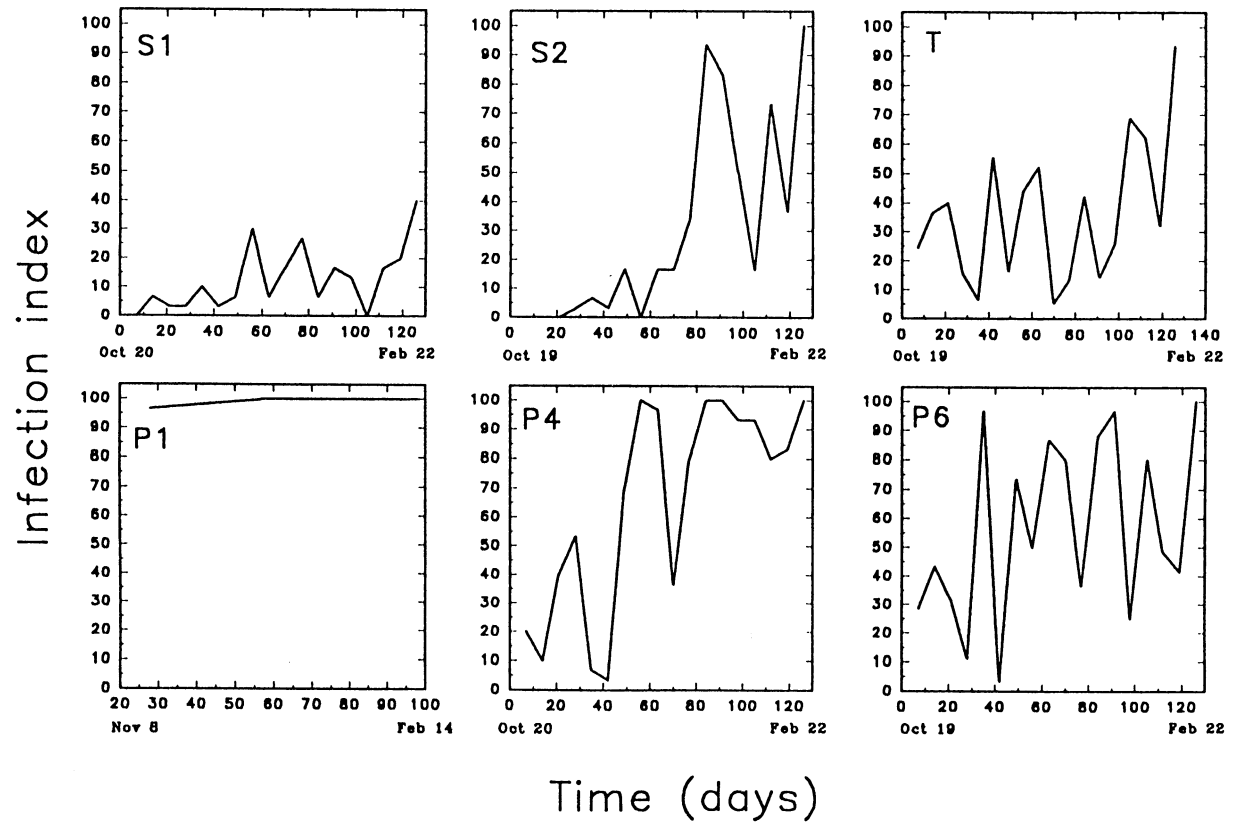

Fig. 4. Infection of non-surface-sterilized minitubers exposed to the storage airborne conidia of *Helminthosporium solani* incubated for 1 week (S1, S2, T, P4, and P6) or 4 weeks (P1) in 1993 to 1994. Maximum value of infection index is 100. The scale of the *X* axis varies among graphs.

storage (S3) were included (Table 1). All storages were of the cross alley type. The procedures for collecting and counting conidia and for recording temperature and RH were similar to those in 1993 to 1994.

Tuber infection. Five minitubers of cv. Norchip from the same source as before were placed in each plastic mesh bag and stored in sealed cardboard boxes at 4°C. Four mesh bags were taken to the potato storages and left for 1, 2, 3, or 4 weeks on the potato pile. Control tubers placed into plastic bags were left in the storages for 4 weeks every month. All minitubers in bags coming out of storage were surface sterilized, incubated, and evaluated for *H. solani* sporulation as previously described. The study of tuber infection was conducted over a 5-month period.

Data analysis. In 1993 to 1994, the number of conidia and infection indices were used to depict frequency curves for each storage; *t* tests (SAS Institute, Cary, NC) were performed to compare mean infection indices in the different locations within the storage and to compare common type storages.

In 1994 to 1995, numbers of conidia also were used to depict frequency curves for each storage. Analysis of variance was performed on infection indices, using the general linear model procedure (SAS Institute, Cary, NC) and least-square means to compare mean infection indices of the different exposure times within each storage. Combined analysis of variance of all the storages was performed to determine differences of infection among the 5 months of exposure.

Table 2. Comparison of storages based on mean infection indices on the potato pile or in the work area in 1993 to 1994, using *t* test

Storage	*t* test[a]
Seed (S1) vs seed (S2)[b]	**
Seed (S1) vs table stock (T)[b]	**
Seed (S2) vs table stock (T)[b]	NS
Processing (P1) vs processing (P4)[c]	**
Processing (P4) vs processing (P6)[c]	NS

[a] ** $P = 0.01$; NS = no significance.
[b] Minitubers were located in the work area.
[c] Minitubers were located on the pile.

RESULTS

Storage study 1993 to 1994. The spore collector located in one of the processing storages (P2) was found to be working improperly at the end of the study. Therefore, the study was reduced to 8 storages with the elimination of data from P2. For reasons of clarity and conciseness, only six representative storages are reported here: the two seed (S1, S2), the table stock (T), and three processing (P1, P4, P6) storages. Results from storages P3 and P5 were similar to those obtained from P1 and P4, respectively.

Conidia collection. The number of conidia collected varied among storages (Fig. 1) and was usually higher in processing storages. Conidia count in seed and table stock storage ranged from 0 to 12,000 conidia per day, and in processing storage from 0 to 24,000 conidia per day. The highest conidia count was generally found at the end of the season. Regardless of the storage, conidia count generally increased with time, often with multiple and variable peaks (Fig. 1).

Figure 2 shows the average conidia count per hour and per day of the week in one seed (S2) and one processing (P1) storage. Higher conidia numbers were usually concentrated between 0700 and 1800 hours, and lower during the night, with a maximum average of 25 conidia per h at 1500 hours in seed storage and 420 conidia per h in processing storage at 1000 and 1600 hours (Fig. 2A, and 2B). The average of conidia collected per day of the week was higher from Monday through Friday and lower on Saturday and Sunday. The maximum conidia collected in the seed storage was 50 conidia on Tuesday, and the

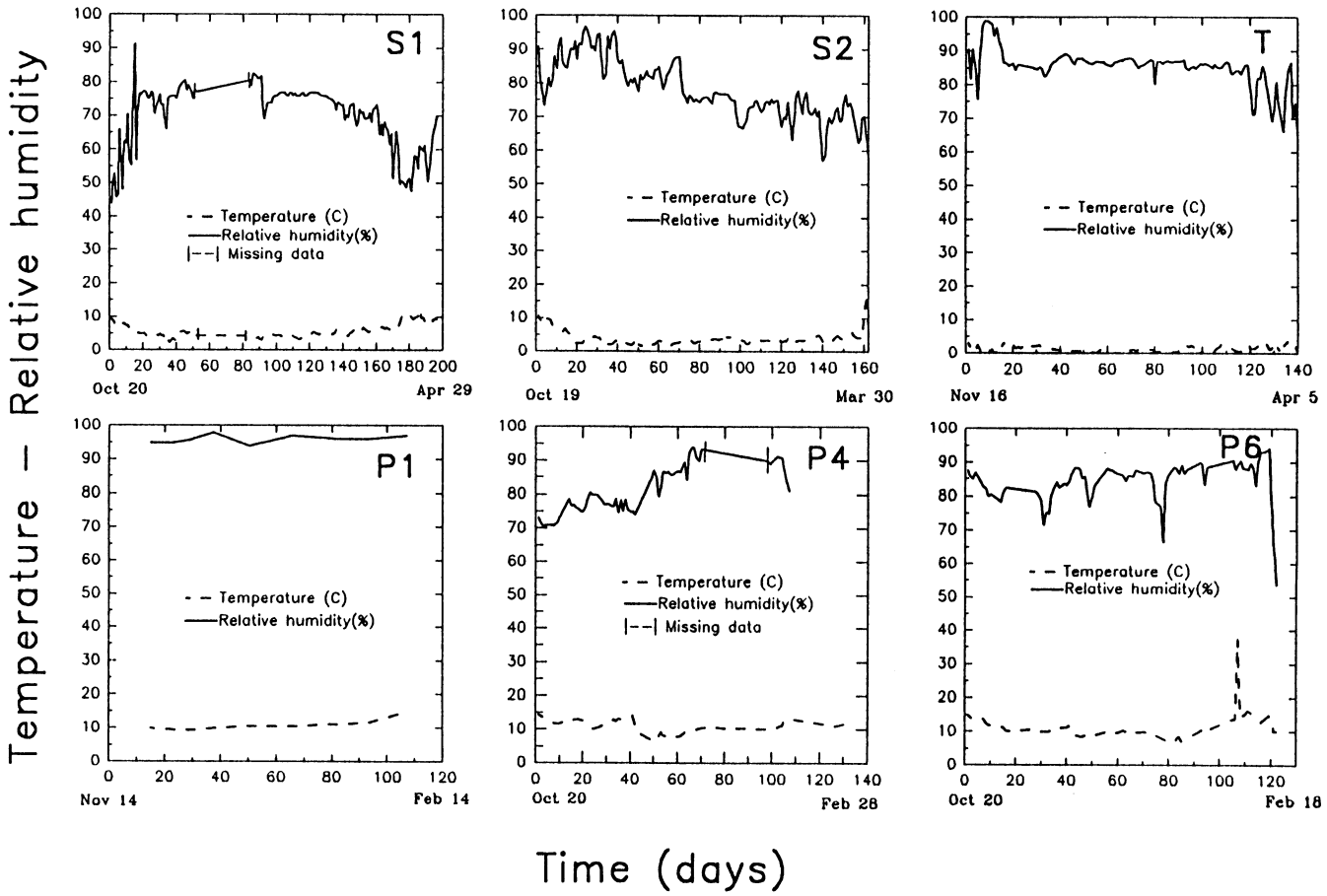

Fig. 5. Temperature (C) (- - -) and relative humidity (%) (—) recorded in six potato storages. Missing information (|—|in S1 and |- - -| in P4). S1 and S2 were seed storages, T was a table stock storage, and P1, P4, and P6 were processing storages. Relative humidity was not recorded during the last 30 days of study due to malfunctioning of the hygrothermograph. The scale of the *X* axis varies among graphs.

minimum was 7 on Sunday. In the processing storage, the maximum was 270 conidia on Wednesday, and the minimum of 140 conidia on Sunday (Fig. 2C and D). Similar trends were observed in the other storages (data not shown).

Tuber infection. There was no significant difference in infection index between tubers located on the pile and those in the plenum or in the work area. There was a significant difference ($P < 0.01$) in the number of sporulation sites between tubers sterilized or not sterilized before incubation (data not shown). Virtually no infection sites were observed on surface-sterilized tubers from storages S1, S2, P4, P6, and T, where tubers were exposed to the airborne conidia for only 1 week (Fig. 3). Infection, as indicated by a higher infection index, was obtained only in storage P1 after sterilization, where tubers remained in storage for 4 weeks (Fig. 3).

The infection index of non-surface-sterilized minitubers placed at weekly intervals on the top of the pile (S1, S2, P1, P4, P6) or in the work area (T) (Fig. 4) was plotted by weekly assay date. The infection indices in most of the storages showed a progressive increase with time. In general, tubers in storages S1, S2, and T had lower infection indices than those in storages P1, P4, and P6. Storage P1, in which the tubers stayed for 4 weeks, started with and maintained a very high infection index throughout the storage period (Fig. 4).

Comparison of storages, using *t* tests, by their mean infection indices of non-surface-sterilized tubers on the top of the pile or in the work area (Table 2) showed significant differences ($P < 0.01$) between S1 and S2, and between S1 and T (Table 2). There was also a significant difference ($P < 0.01$) between P1 (tubers exposed for 4 weeks) and P4 (tubers exposed for 1 week). No significant difference was found between S2 and T, or between P4 and P6 (Table 2).

Temperature and RH. Temperature was lower in seed and table stock storages than in processing storages (Fig. 5). After the first 20 days, the average daily temperature in S1 was between 5 and 10°C, and average RH ranged from 70 to 80% with a decline at about 160 days (Fig. 5). In S2, the temperature was between 2 and 5°C after the first 20 days, and RH declined from 95% (first 40 days) to about 70% at the end of the storage period. In storage T, temperature ranged from 0 to 4°C, and RH remained between 85 and 90% for most of the time, declining to about 70% at the end of the study (120 to 140 days) (Fig. 5).

With regard to the processing storages, the average temperature was 10°C or above in all three storages (Fig. 5). RH was particularly high in P1, where it remained above 95% for most of the storage period. In P4, RH was low (70 to 80%) during the first 20 days, increasing later to remain at around 90% during the rest of the period (RH was not recorded in P4 during the last 30 days due to malfunctioning of the hygrothermograph). In P6, RH ranged mostly between 80 and 85% (Fig. 5).

Storage study 1994 to 1995: Conidia collection. As in the 1993 to 1994 study, conidia numbers varied among storages (Fig. 6). Numbers of *H. solani* conidia ranged from 0 to <4,000 conidia per day in seed storages (S1, S2, and S3), and from 0 to >7,000 conidia per day in processing storages (P4, P6, and P7). There was a notable difference among seed storages (Fig. 6). Storage S1 had the lowest conidia count per day, with the maximum of just under 1,000 conidia per day at the end of the storage season. Storage S3 had the highest conidia count (<4,000 conidia per day) of the three seed storages, and this was found 13 and 128 days after initiating the study.

Conidia numbers per day also varied among processing storages (Fig. 6). Although storage P7 showed the highest single-day conidia number (>7,000 at the end of the study), storage P4 had more days with high (>1,000) conidia numbers than

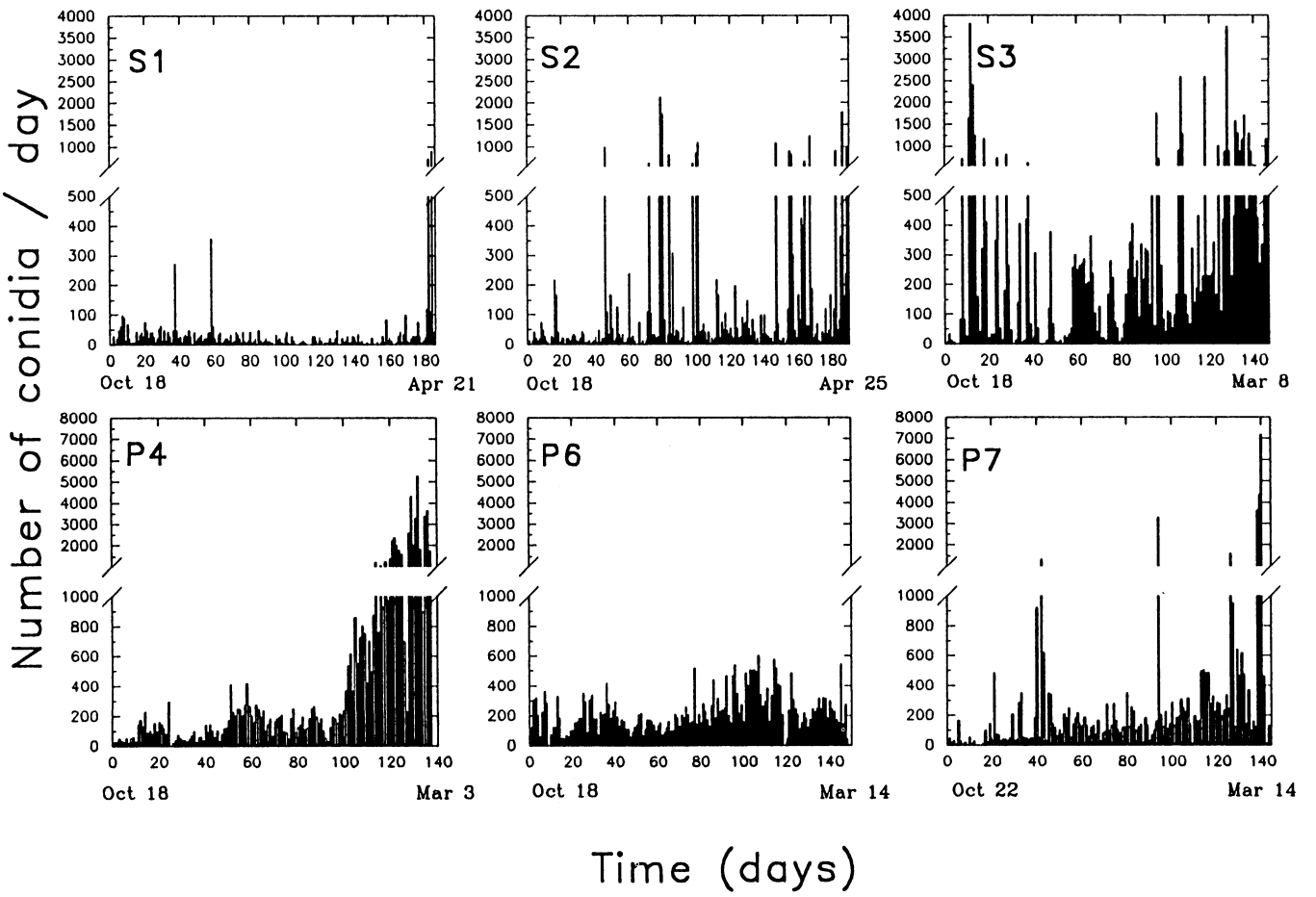

Fig. 6. Number of conidia of *Helminthosporium solani* collected per day in three seed (S1, S2, and S3), and three processing (P4, P6, and P7) storages during 1994 to 1995. The scale of the axes varies among graphs.

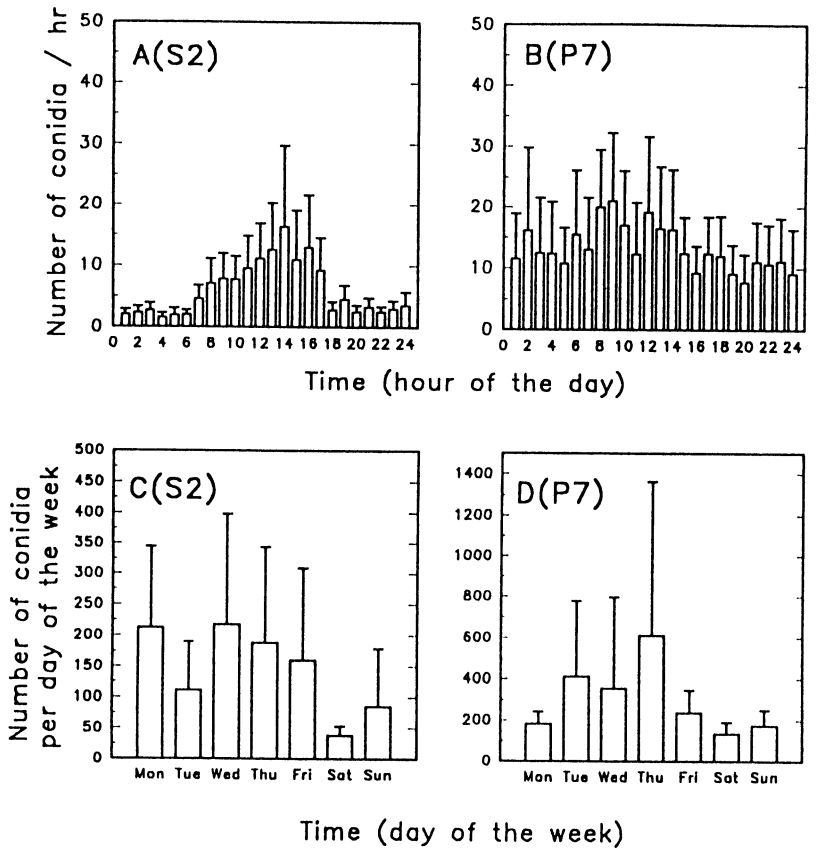

Fig. 7. Average number of conidia of *Helminthospoirum solani* collected in two potato storages during 1994 to 1995. **(A, B)** Average number of conidia per hour of the day in a seed (S2) and a processing (P7) storage. **(C, D)** Average number of conidia per day of the week in a seed (S2) and a processing (P7) storage. The scale of the *Y* axis varies among graphs. Bars represent standard error of the mean.

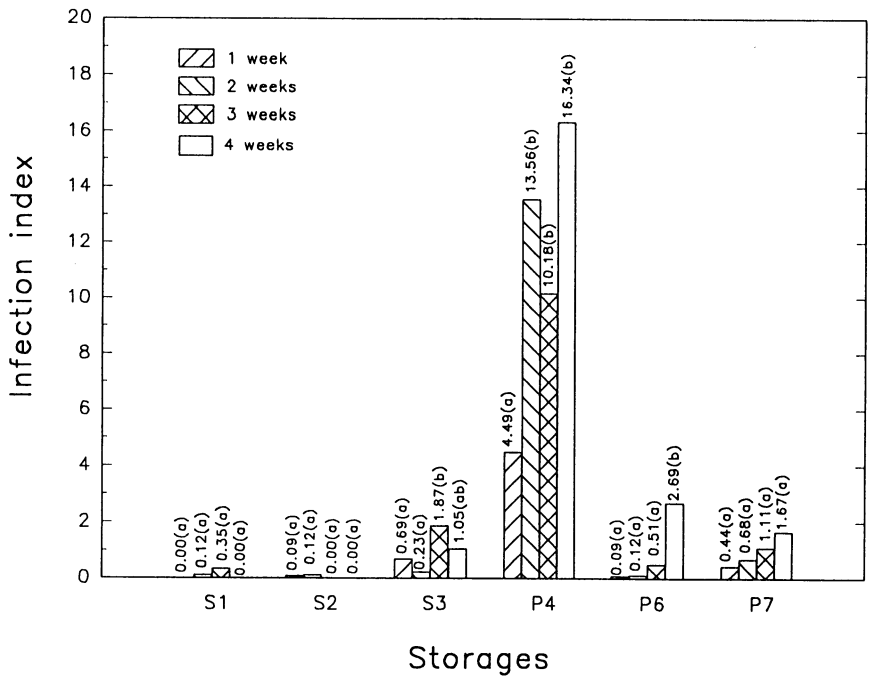

Fig. 8. Infection of minitubers by *Helminthosporium solani* after exposure to airborne conidia for 1, 2, 3, and 4 weeks in three seed (S1, S2, and S3) and three processing (P4, P6, and P7) storages in 1994 to 1995. Minitubers were surface sterilized with 0.5% sodium hypochlorite and incubated for 4 weeks. Times of exposure were analyzed within each storage. Means followed by the same letters within storage were not significantly different according to a least-square means test ($P < 0.05$). Maximum value of infection index is 100.

P6 and P7. Both types of storages, seed and processing, showed cyclical peaks of conidia collection.

Figure 7 shows the average conidia numbers per hour and per day of the week in one seed (S2) and one processing (P7) storage. In the seed storage, a higher average conidia count per hour was concentrated between 0700 and 1700 hours (Fig. 7A). In the processing storage, although there was a similar trend, conidia numbers were more dispersed throughout the day (Fig. 7B).

Conidia numbers per day of the week (Fig. 7C and D) were also higher Monday through Friday, and lower on Saturday and Sunday, in both seed and processing storages. There was a maximum average of 224 conidia on Wednesday and a minimum of 30 conidia on Saturday in seed storage (Fig. 7C); and a maximum average of 600 conidia on Thursday and a minimum of 150 conidia on Saturday in the processing storage (Fig. 7D). Similar trends were observed with the other storages (data not shown).

Tuber infection. Significant differences ($P < 0.05$) of infection between times of exposure were found within storages S3, P4, and P6 (Fig. 8). Almost no infection was observed in S1 and S2. Very low tuber

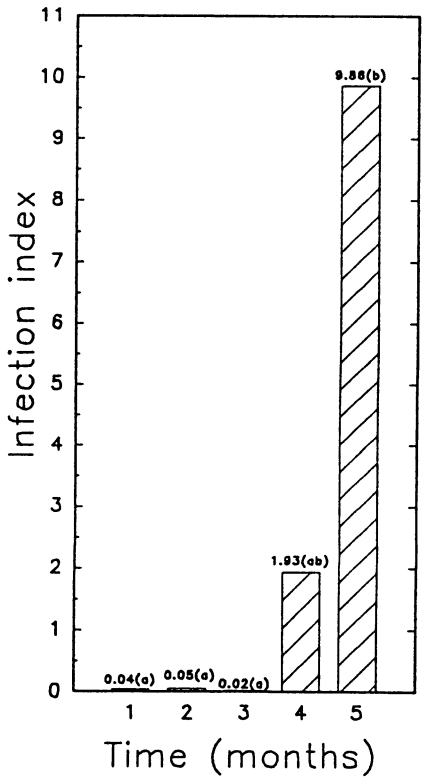

Fig. 9. Infection of minitubers *Helminthosporium solani* in storage during 5 months of study. Results represent the combined analysis of the infection indices after 1, 2, 3, and 4 weeks of exposure in six potato storages in 1994 to 1995. Means followed by the same letters were not significantly different according to a least-square means test ($P < 0.05$). Maximum value of infection is 100.

infection, and nonsignificant differences were obtained in P7 (Fig. 8). Four weeks of exposure generally showed higher infection indices than 1-week and 2-week exposures (Fig. 8, lanes P4 and P6), but they were not significantly higher than those at 3 weeks. Staggering the time of exposure of 1 week, 2 weeks, and 3 weeks at the beginning or the end of the month did not result in a significant difference in tuber infection. Therefore, means of infection index were combined to generate an index average for 1 week, 2 weeks, and 3 weeks, respectively (Fig. 8).

The overall infection during the first 3 months of study was very low (Fig. 9). Silver scurf infection on tubers started to increase at 4 months and was significantly higher ($P = 0.05$) after 5 months of exposure than it was initially (Fig. 9).

Temperature and RH. Temperature was generally lower in seed storage than in processing storage (Fig. 10). In all three seed storages, temperature decreased from 15 to 5°C or below during the first 30 to 50 days of the study. Thereafter, temperature remained at about 5°C in S1 and S3, and slightly lower (2 to 5°C) in S2. RH also decreased from 80 or 90%, in the first 40 days, to 70 or 75% at the end of the storage period (Fig. 10).

In all three processing storages (Fig. 10), temperature was 10°C for most of the study period with a slight increase to 15°C at the end. RH ranged from 80 to 90% in P6 and P7, with periodic decreases to 70% in P6 during the first 40 days. Storage P4 had a steady increase in RH from 85 to 98% during the study (Fig. 10).

DISCUSSION

This study demonstrated that *H. solani* sporulates in storage and that the conidia can infect tubers in storage if favorable environmental conditions are met. The most favorable conditions appear to be warmer temperatures and high RH. These results agreed with findings of other researchers (5,7,8 9). Under low temperature and RH, *H. solani* conidia are still produced, but in lower numbers. Conidia numbers were generally lower in seed and table stock storages than in storages containing processing potatoes. This was probably due to the lower temperature in the seed storages. RH was particularly high in P1 and P4, which may explain why these two storages had the highest conidia numbers. Temperature and RH affect sporulation and infection of *H. solani* and the progression of silver scurf (9). Sporulation and conidial germination are reduced at low temperature and RH and increase when these are high (13,19).

Conidia dispersal was detected soon after potatoes were stored, and especially high numbers were found opposite the plenum in the cross alley type of storage (Fig. 1, lane P6). This indicated that conidia of *H. solani* can disperse soon after tubers enter storage. This sporulation is favored by the environmental conditions of warm temperatures and high humidity present during the first month of storage.

Storages with processing potatoes and 70 to 90% RH (P6 and P7) had lower conidial numbers and infection indices than processing storages with 90 to 100% RH (P1 and P4). Although this might be associated with the initial amount of inoculum, we feel that the differences in RH were partially responsible for this observation because of the tendency of *H. solani* to have high sporulation at RH above 90%.

Potato handling has a significant effect on conidial liberations. Conidial numbers were particularly high during the work hours and the weekdays, and low during holidays and weekends, (data not shown). This indicates that although conidia are produced during storage, airborne concentration depends on other factors. Handling or other disturbance of potatoes in storage

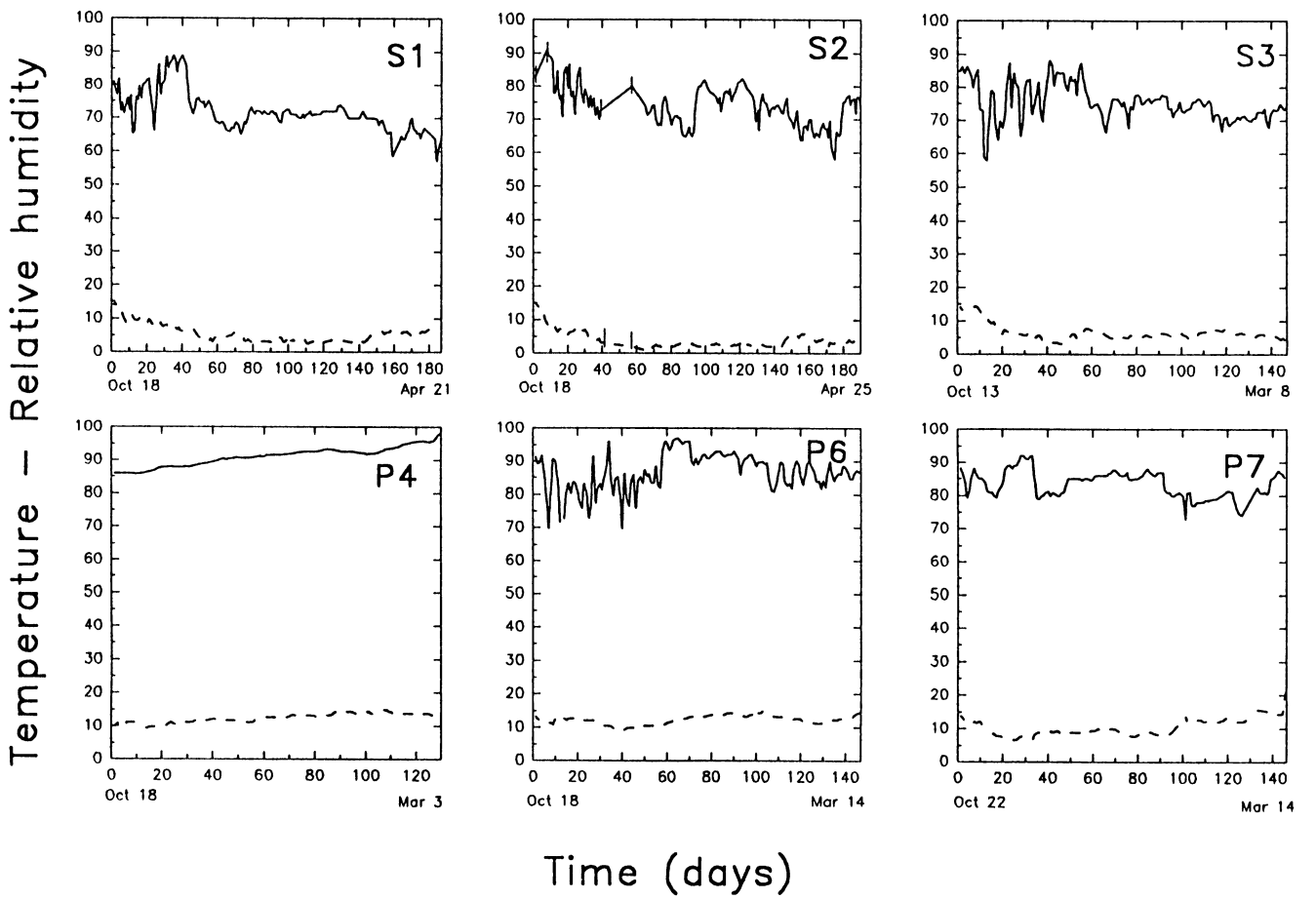

Fig. 10. Temperature (C) (- - -) and relative humidity (%) (—) recorded in six potato storages. Missing information (|—| and |- - -| in S2). S1, S2, and S3 were seed storages, and P4, P6, and P7 were processing storages. The scale of the *X* axis varies among graphs.

results in the release of conidia and their dispersion throughout the storage. During times of low activity in storage, liberation and dispersion depends on the amount of conidia present and the speed and pattern of air flow. Therefore, with fans operating at the same speed throughout the season, conidia collection increases progressively as the amount of sporulation increases.

Studies with minitubers demonstrated that the longer (3 to 4 weeks) the tubers were in the storage (at 10 to 15°C, and 90% RH) the greater the probability they would become infected in the storage. However, when tubers removed from storage after 1 week were surface sterilized, few *H. solani* lesions resulted. This indicates that new infections in storage require longer than 1 week to become established.

The fact that conidia are produced throughout the storage season, and are responsible for new infections, has implications for disease management in storage. If sporulation could be prevented, or spores that are produced could be killed, silver scurf could be drastically reduced in storage. Preliminary trials we conducted in commercial storages (G. A. Secor, unpublished) have shown reduction of *H. solani* spores by introduction of chlorine-based disinfectants in the humidification systems, but sporulation recurs after the disinfectant pressure is relieved. This practice shows potential for disease control and should be investigated further.

Since environmental conditions conducive to silver scurf development are especially favorable during the curing period, we suggest that any attempt to control the disease with chemical treatment should start at the beginning of the storage season, with successive periodic applications during the entire storage period. This suggestion, however, must be evaluated.

The epidemiology of silver scurf has two phases, field and storage, with the latter important to disease management because of the uniformity of environmental conditions. This uniformity may actually ensure a sustained production of conidia that are readily available to disperse and infect potatoes in storage or be taken to the field as inoculum. Conidia liberated in storage mark the beginning of a problem that may be severely manifested later in the field. Silver scurf may be transmitted from seed pieces to a limited number of progeny tubers in the field.

In storage, however, conidia can disperse to a larger number of tubers, frequently corresponding to several seed lots and cultivars. Therefore, the epidemiological impact of conidia movement in storage is potentially greater than disease spread in the field. When storing different seed lots together, dispersal of conidia in storage can perpetuate the disease cycle by contaminating uninfected, early generation seed lots. If early generation pathogen-free tubers are stored in a facility with a common ventilation system, older "infected" seed lots infest pathogen-free seed lots. Management of the disease should begin by separating seed lots to prevent conidia movement.

H. solani conidia build up, even in seed storages held at 4°C, reach maximum levels just prior to seed handling in the spring. These spores are easily dislodged and dispersed during seed handling, and may act as a major source of inoculum on the seed as it is being prepared for planting. Application of a fungicide as seed is being shipped may provide excellent control of seedborne inoculum by preventing infection by airborne spores. An additional benefit of fungicide application at this time may be protection of new wounds incurred at shipping, which heal slowly due to the cold temperature of the seed. This may prevent establishment of disease prior to planting and perpetuation of silver scurf.

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