# EXPERIMENTAL RESULTS

## I- Fungal species Recorded In The Present Investigation:

In the present investigation, 83 fungal species belonging to 26 genera were identified (Table, 1). *Scopulariopsis* and *Cladosporium* contributed the broadest spectra of all genera. Three species of *Scopulariopsis* were identified (Table, 15) as discribed by Morton & Smith (1963) and 5 species of *Cladosporium* were identified (Table, 14) as discribed by De Vries (1952). *Aspergillus* and *Penicillium* followed the above genera in ther count. Forteen species of *Aspergillus* were identified, which belong to 14 groups (Table, 2) of those described by Raper & Fennell (1965) as follows: *A.fumigatus*, *A.ochraceus*, *A.versicolor*, *A.clavatus*, *A.niger*, *A.flavus*, *A.nidulans*, *A.ustus*, *A.candidus*, *A.flavipes*, *A.wentii*, *A.restrictus*. *A.glaucus* and *A.terreus*. Ten species of *Penicillium* were identified (Table, 3) during this investigation and represented in 3 sections of those discribed by Raper & Thom (1949) as follows: 2 species belong to Monoverticillata, 7 species belong to Asymmetrica and one species belong to biverticillata symmetrica. The seven species of Asymmetrica were classified under its subsections as follows : 5 under Velutina, one under divaricata and one under fasciculata.

TABLE (1)

**List of fungal species collected during the present investigation:**

| | | |
|---|---|---|
| *Absidia* | *butleri* | Lendner |
| *A.* | *glauca* | Hagem |
| *Alternaria* | *alternata* | (Fr.) Keissler |
| *A.* | *brassicicola* | (Schv.) Willshire |
| *A.* | *cheiranthi* | (Lib.) Bolle |
| *A.* | *Dianthi* | Stevens & Hall. |
| *Aphanomyces* | *Laevis* | de Bary |
| *Aspergillus* | *candidus* | Link ex. Fr. |
| *A.* | *clavatus* | Desm. |
| *A.* | *flavipes* | Thom & Church |
| *A.* | *flavus* | Link ex. Fr. |
| *A.* | *fumigatus* | Fres. |
| *A.* | *glaucus* | Thom and Raper |
| *A.* | *nidulans* | (Eidam) Wint |
| *A.* | *niger* | Van Tieghem |
| *A.* | *ochraceus* | Wilhelm. |
| *A.* | *restrictus* | Smith |
| *A.* | *sydowi* | Thom and Church |
| *A.* | *terreus* | Thom |
| *A.* | *ustus* | (Bain.) Thom & church |
| *A.* | *versicolor* | (Vuill.) Tirab |
| *A.* | *wentii* | Wehmer |
| *Botryotrichum* | *atrogriseum* | Van Beyma |
| *Cephalosporium* | *curtipes* | Saccardo |
| *C.* | *roseo-griseum* | Saksena |
| *Chaetomium* | *caprinum* | Bainier |
| *C.* | *magnum* | Bainier |
| *Circinella* | *spinosa* | Tieghem & Le Monnier |

| | | |
|---|---|---|
| *Cladosporium* | *cladosporioides* | (Fresen.) de vries |
| *C.* | *herbarum* | (Pars.) Link ex. Gray |
| *C.* | *macrocarpum* | Preuss |
| *C.* | *oxysporum* | Berk & Curt |
| *C.* | *sphaerospermium* | Penzig |
| *Cunninghamella* | *echinulata* | Thaxter |
| *Curvularia* | *brachyspora* | Boedijn |
| *C.* | *clavata* | Jain |
| *C.* | *lunata* | (Wakker) Boedijn |
| *C.* | *oryza* | Bugnicourt |
| *C.* | *ovoidea* | (Hiroe & Watan.) |
| *C.* | *pallescens* | Boedijn |
| *Doratomyces* | *phillipsii* | (Berk & Legighton) |
| *Drechslera* | *erythrospila* | (Drechsler)Shoemaker |
| *D.* | *euphorbiae* | (Hansford)M. B. Ellis |
| *D.* | *halodes* | (Drechsler)Subram. & Jain |
| *D.* | *Siccans* | (Drechsler)Shoemaker |
| *Epicoccum* | *nigrum* | Link |
| *Fusarium* | *dimerum* | Penzig |
| *F.* | *heterosporum* | Nees ex. Fr. |
| *F.* | *moniliforme* | Sheldon |
| *F.* | *nivale* | (Fries) Cesati |
| *F.* | *oxysporum* | Schlecht |
| *F.* | *poae* | (Peck) Wollenv. |
| *F.* | *semitictum* | Berk & Rav. |
| *F.* | *solani* | (Mart.) Sacc., Michelia |
| *Mucor* | *ambiguus* | Vuillemin |
| *M.* | *circinolloides* | Van Tieghem |
| *M.* | *griseo-cyanus* | Hagem |
| *M.* | *racemosus* | Fresenius |
| *M.* | *silvaticus* | Hagem |
| *M.* | *strictus* | Hagem |

| | | |
|---|---|---|
| *Nigrospora* | *Sphaerica* | (Saccardo) Mason |
| *Penicillium* | *canescens* | Sopp |
| *P.* | *chrysogenum* | Thom |
| *P.* | *citrinum* | Thom |
| *P.* | *decumbens* | *Thom* |
| *P.* | *duclauxi* | Delacroix |
| *P.* | *expansum* | (Link) Thom |
| *P.* | *notatum* | Westling |
| *P.* | *oxalicum* | Currie & Thom |
| *P.* | *roquefortii* | Thom |
| *P.* | *waksmani* | Zaleski |
| *Rhizoctonia* | *solani* | Kuhn |
| *Rhizopus* | *nigricans* | Ehrenberg |
| *Scopulariopsis* | *brevicaulis* | (Sacc.) Bainier |
| *S.* | *brumptii* | Salvanet-Duval |
| *S.* | *constantini* | Bainier |
| *Sepedonium* | *chrysospermum* | (Bull.)Fr. |
| *Stachybotrys* | *atra* var. *microspora* | Mathur & Sankhla |
| *Stemphlium* | *botryosum* | Waltr |
| *S.* | *piriforme* | Bonorden |
| *Syncephalastrum* | *racemosum* | (Cohn) Schroeter |
| *Torula* | *alli* | (Harz)Saccardo |
| *T.* | *herbarum* | (Pers.) Link ex Fr. |

Table (2): Classification of *Aspergillus* species isolated during the present investigation, on the basis of the key of Raper and Fennel (1965).

| Species | | Group |
|---|---|---|
| *A. fumigatus* | Fres | *A. fumigatus* |
| *A. ocharceus* | Wihelm | *A. ochraceus* |
| *A. versicolor* | (Vuillemin) Tiraboschi | *A. versicolor* |
| *A. sydowi* | (Bainier and Sartory) Tho and church | |
| *A. clavatus* | Desm. | *A. clavatus* |
| *A. niger* | Van Tieghem | *A. niger* |
| *A. flavus* | Link ex. Fr. | *A. flavus* |
| *A. nidulans* | (Eidam) Winter | *A. nidulans* |
| *A. ustus* | (Bainier) Thom & Church | *A. ustus* |
| *A. candidus* | Link ex. Fr. | *A. candidus* |
| *A. flavipes* | Tom & Church | *A. flavipes* |
| *A. wentii* | Wehmer | *A. wentii* |
| *A. restrictus* | Smith | *A. restrictus* |
| *A. glaucus* | Thom and Rapper | *A. glaucus* |
| *A. terreus* | Thom | *A. terreus* |

Table (3): Sections and sub-sections described by Raper & Thom (1949) which belong to the species of *Penicillium* which identified during the present investigation.

| Monover. | Asymmetrica | | | Biverticillata symmetrica |
|---|---|---|---|---|
| | Velutina | Divaricata | fasciculata | |
| *P. decumbens* Thom<br>*P. waksmani* Zaleski | *P. notatum* Westling<br>*P. roqueforti* Thom<br>*P. oxalicum* Currie&Thom<br>*P. chrysogenum* Thom<br>*P. citrinum* Thom | *P. canescens* Sopp. | *P. expansum* (Link) Thom | *P. duclauxi* Delacroix |

## II- Diurnal Fluctuations of Air-borne Fungi:

This experiment was carried out once every month during the period of 6-months (January-June 1988). Three plates of Czapek's agar + rose bengal (1/15000) and three plates of Sabouraud's agar media were exposed to the air outside or inside the poultry farm for 5 minutes at 6-hour intervals during 24 hours. Then, the plates were incubated at $27^{o}$c and the developing fungal isolates were counted and identified. The air temperature and relative humidity were measured at every exposure.

When the results were subjected to statistical analysis (Analysis of Variance), table 4 showed that the results were significant at January, March, April and June, but at February and May the results indicated no significance outside the farm. On the other hand, the results inside the farm were highly significant at January, February, March and June, as well as significant at April and May (Table, 5).

**Total fungi:**

The total count of fungi recorded outside and inside the poultry farm through this experiment was 11772 isolates in 288 plates (Tables 4 and 5). 24 genera with 63 species were identified during this experiment (Table, 18). The fluctuations of fungal count at 6-hour intervals during the 6-days of the experiment, outside and inside poultry farm on Czapek's-agar and Sabouraud-agar media were as follows:

Table[4]:Relationship between temperature and relative humidity and total counts of air-borne fungi outside poultry farm at 6-hour intervals during 6-days covers the period of January-June 1988.

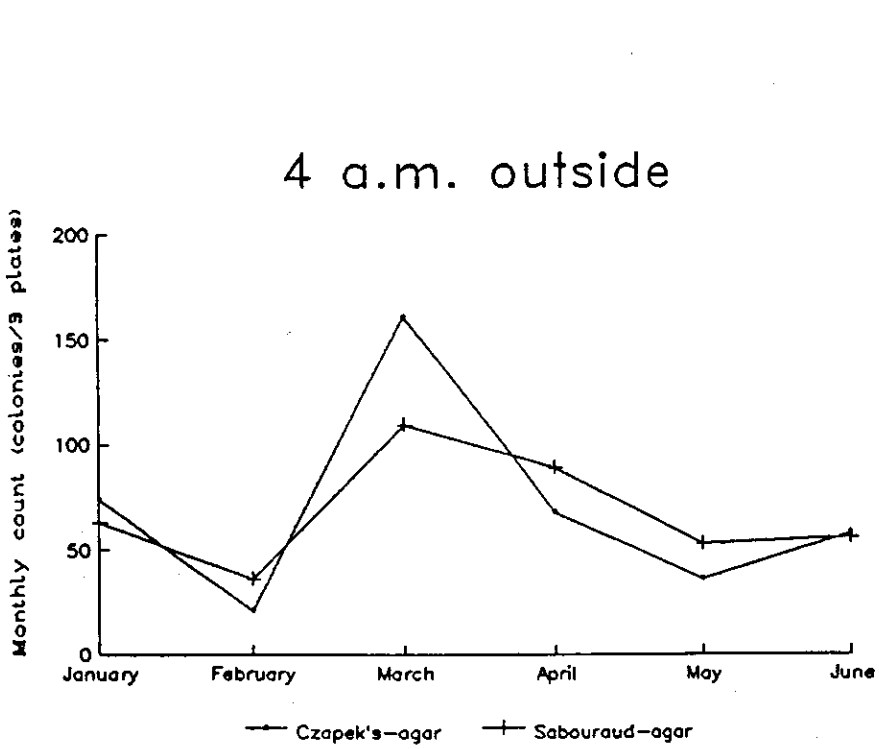
| Time | 4 a.m | | | | 10 a.m | | | | 4 p.m | | | | 10 p.m | | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | T.C Dox | T.C Sab | T. °c | RH % | T.C Dox | T.C Sab | T. °c | RH % | T.C Dox | T.C Sab | T. °c | RH % | T.C Dox | T.C Sab | T. °c | RH % | Dox | Sab. | F-value |
| January | 74 | 63 | 7 | 60 | 94 | 98 | 13 | 60 | 111 | 121 | 18 | 70 | 108 | 123 | 10 | 74 | 387 | 405 | S |
| February | 21 | 36 | 8 | 63 | 125 | 141 | 15 | 72 | 77 | 106 | 15 | 67 | 91 | 42 | 11 | 64 | 314 | 325 | NS |
| March | 161 | 109 | 5 | 77 | 103 | 159 | 13 | 78 | 180 | 229 | 15 | 81 | 115 | 135 | 10 | 78 | 559 | 632 | S |
| April | 68 | 89 | 9 | 68 | 90 | 65 | 18 | 65 | 138 | 134 | 16 | 78 | 90 | 70 | 13 | 62 | 386 | 358 | S |
| May | 36 | 53 | 17 | 63 | 94 | 131 | 29 | 69 | 108 | 132 | 32 | 72 | 69 | 70 | 21 | 60 | 307 | 386 | NS |
| June | 58 | 56 | 20 | 69 | 96 | 90 | 33 | 68 | 113 | 84 | 35 | 65 | 87 | 73 | 29 | 65 | 354 | 303 | S |
| Total of each medium | 418 | 406 | | | 602 | 684 | | | 727 | 806 | | | 560 | 513 | | | 2307 | 2409 | |
| Total of tov media | 824 | | | | 1286 | | | | 1533 | | | | 1073 | | | | 4716 | | |

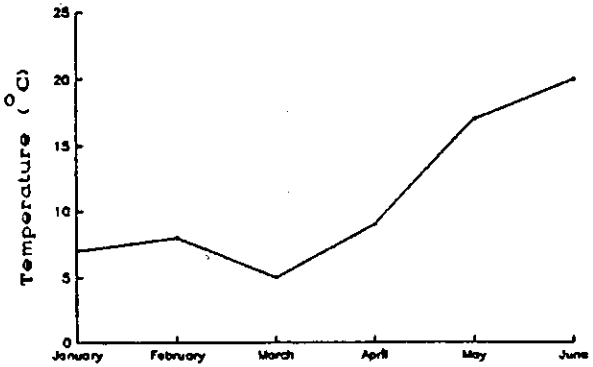
T.C. Dox = Total count of Czapek's-Dox-agar medium
T.C. Sab. = Total count of Sabouraud-agar medium
T. °c = Temperature degree
R.H.% = Relative humidity percente
S = Significant
NS = Non-Significant

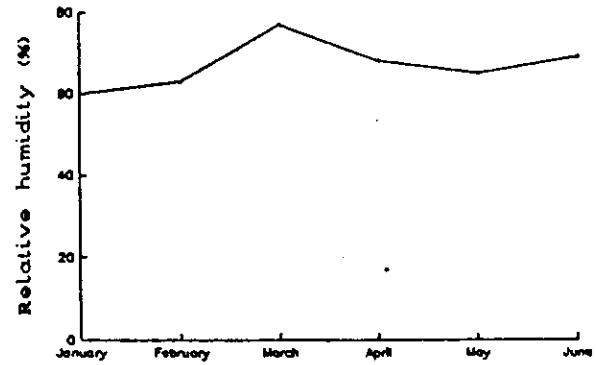
Table [6]: Monthly total counts of air-borne fungi at 4 a.m. hour during January-June 1988 inside and outside poultry farm on Dox and Sab. media.

| Months & Genera | January | | | | February | | | | March | | | | April | | | | May | | | | June | | | | Total | | | | % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | |
| | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O |
| *Aspergillus* | 48 | 1 | 78 | 1 | 10 | 1 | 8 | 4 | 10 | 4 | 2 | 2 | 11 | - | 27 | 1 | 9 | - | - | - | - | - | - | - | 77 | 6 | 105 | 8 | 10.5 | 1.4 | 11.5 | 1.9 |
| *Fusarium* | - | - | - | 5 | - | - | 1 | 5 | - | 13 | - | 11 | - | - | - | - | - | - | - | - | - | - | - | - | - | 13 | 1 | 21 | - | 3.1 | 0.1 | 5.1 |
| *Alternaria* | - | 5 | - | 5 | - | 2 | - | 1 | 1 | 4 | - | 14 | 1 | 4 | - | 7 | 1 | 9 | - | - | 4 | 8 | 8 | 8 | 7 | 26 | 8 | 35 | 0.9 | 6.2 | 0.8 | 8.6 |
| *Scopulariopsis* | 47 | - | 48 | 5 | 94 | 4 | 102 | 6 | 78 | 41 | 193 | 17 | 23 | 4 | 46 | 21 | 30 | 13 | 61 | 42 | 91 | 17 | 84 | 30 | 383 | 79 | 534 | 121 | 52.5 | 18.9 | 58.7 | 29.8 |
| *Botryotrichum* | - | 1 | - | 1 | 3 | - | 5 | - | 7 | 3 | - | 8 | 3 | 7 | 6 | 9 | 8 | 3 | - | - | 3 | - | - | 2 | 24 | 14 | 11 | 20 | 3.2 | 3.3 | 1.2 | 4.9 |
| *Cephalosporium* | - | 1 | - | 4 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | 4 | 0.1 | 0.2 | - | 0.9 |
| *Circinella* | 1 | - | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 3 | - | 0.1 | - | 0.3 | - |
| *Cladosporium* | - | 54 | 2 | 32 | 12 | 10 | 2 | 9 | 24 | 90 | 5 | 47 | 29 | 82 | 22 | 41 | 5 | 5 | 16 | 11 | 18 | 24 | 10 | 14 | 88 | 215 | 57 | 154 | 12.0 | 51.4 | 6.2 | 37.9 |
| *Penicillium* | - | - | 4 | - | 64 | 1 | 85 | 11 | 24 | 1 | 16 | 6 | 13 | - | 38 | 7 | - | - | - | - | - | - | - | - | 101 | 2 | 143 | 24 | 13.8 | 0.4 | 15.7 | 5.9 |
| *Cunninghamella* | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 3 | - | - | - | 0.3 | - |
| *Rhizopus* | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 12 | 6 | 0.1 | - | 1.3 | 1.4 |
| *Stemphylium* | 1 | - | - | 1 | 1 | - | 7 | - | - | - | 3 | 2 | - | - | - | - | - | 1 | 1 | - | - | - | - | - | 1 | 4 | 1 | 1 | 0.1 | 0.9 | 0.1 | 0.2 |
| *Mucor* | - | - | - | 1 | 1 | 1 | - | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 32 | 2 | 7 | - | 4.3 | 0.4 | 0.7 | - |
| *Aphanomyces* | 18 | 2 | 1 | - | 5 | - | - | - | 5 | - | 6 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 0.1 | - | - | - |
| *Absidia* | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 3 | 5 | 2 | 0.1 | 0.7 | 0.3 | 0.4 |
| *Chaetomium* | - | - | - | - | 2 | - | 4 | - | - | 3 | 1 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | - | 3 | 9 | 2 | - | 0.4 | 2.1 | 0.2 | - |
| *Torula* | - | 5 | - | - | 1 | - | - | - | 2 | - | - | - | - | 19 | - | - | - | - | 4 | 1 | - | - | - | - | - | 21 | - | 2 | - | 4.9 | - | 0.4 |
| *Nigrospora* | - | 1 | - | 2 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | 5 | - | - | - | 1.1 | - | - |
| *Drechslera* | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | 3 | - | - | - | 3 | 2 | - | - | 0.4 | 0.4 | - | - |
| *Doratomyces* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 | - | - | 5 | 1 | - | - | 6 | 2 | - | - | 11 | 15 | - | - | 2.5 | 1.4 | - |
| *Curvularia* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 2 | 0.4 | 0.6 | 0.4 | 0.4 |
| *Mycelia Sterilia* | - | 1 | - | 6 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | 6 | - | 0.4 | - | 1.4 |
| Total count | 110 | 74 | 193 | 69 | 194 | 21 | 209 | 86 | 152 | 161 | 226 | 109 | 84 | 68 | 152 | 89 | 67 | 86 | 81 | 55 | 122 | 59 | 108 | 56 | 729 | 418 | 909 | 406 | 100 | | 100 | |

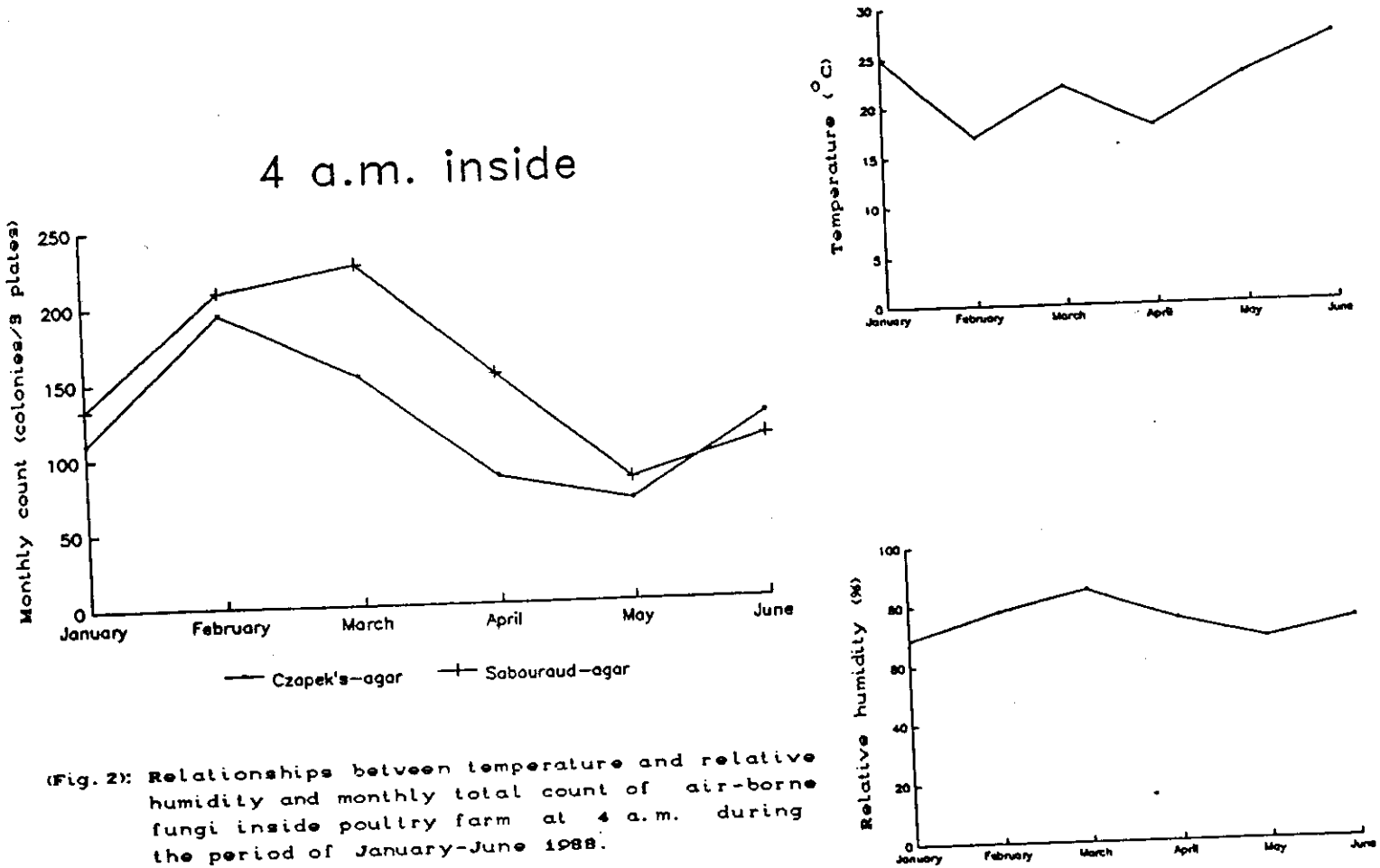
Dox = Czapek-Dox-agar  Sab.= Sabouraud-agar
I = Inside  O = outside




(Fig. 1): Relationships between temperature and relative humidity and monthly total count of air-borne fungi outside poultry farm at 4 a.m. during the period of January-June 1988.




(Fig. 2): Relationships between temperature and relative humidity and monthly total count of air-borne fungi inside poultry farm at 4 a.m. during the period of January-June 1988.

relative himidity reached the maximum at June and March in outside and inside the farm respectively (Figs. 1 and 2).

**Total count of fungal species recorded at 10 a.m:**

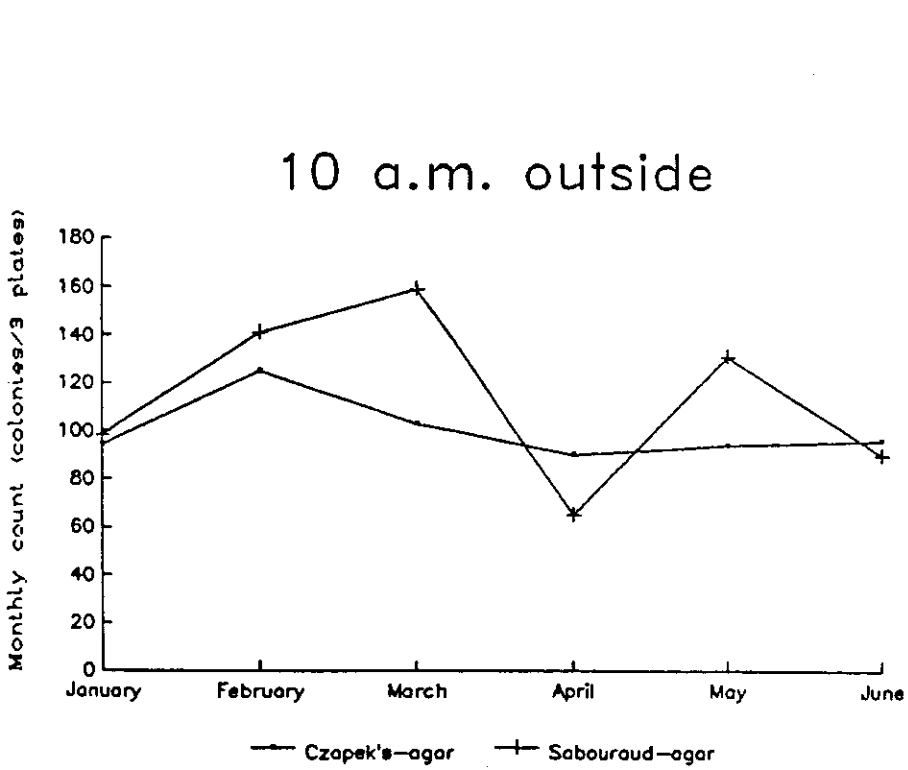
At this time of the day, the results obtained from table 7 showed that, 1286 isolates of fungal spores in 36 plates were counted through the days of the experiment in outside poultry farm and constituted 10.92% of total count of fungal species. In addition, inside poultry farm 1871 isolates were recorded in 36 plates and constituted 15.89% of total count of fungi collected during the experiment on two media used. One daily maximum of total fungi was recorded at this time presented in March on both media inside the poultry farm. On the other hand, the highest count was recorded outside the farm during February on Czapek's-agar and during March on Sabouraud-agar.

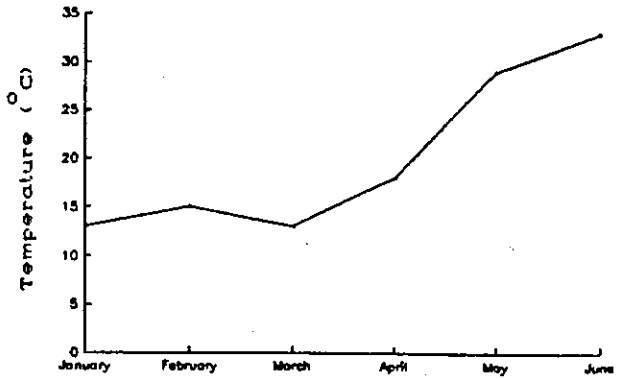
In outside poultry farm, the highest catch of fungal counts at this time on Czapek's-agar was 125 isolates in three plates and recorded in February and represented 20.76% of the total count of fungi on the previous medium, while on Sabouraud-agar 159 isolates in three plates were estimated and represented 23.25% of the total count of fungi collected at this time on the same medium. With regard to inside poultry farm, the highest count was 214 and 219 isolates on Czapek's-agar and Sabouraud-agar respectively in three plates each, which represented 24.10% and 22.28%

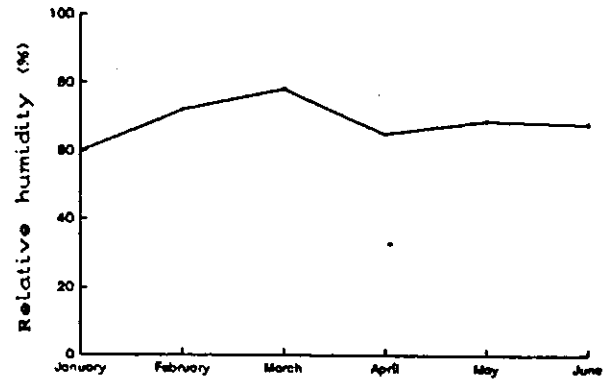
Table [7]: Monthly total counts of air-borne fungi at 10 a.m. hour during January-June 1988 inside and outside poultry farm on Dox and Sab. media.

| Months & Genera | January | | | | February | | | | March | | | | April | | | | May | | | | June | | | | Total | | | | % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dox | | Sab | | Dox | | Sab | | Dox | | Sab | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | |
| | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O |
| *Aspergillus* | 111 | 12 | 99 | 6 | 34 | 12 | 14 | 3 | 5 | 4 | 22 | 7 | 11 | - | 57 | 1 | - | 2 | 1 | - | 12 | - | 3 | 2 | 173 | 30 | 196 | 19 | 19.5 | 5.0 | 20.0 | 2.7 |
| *Fusarium* | 2 | 11 | - | 11 | 2 | 2 | - | - | - | 3 | 4 | 21 | - | 3 | - | 1 | - | 1 | - | - | - | - | - | - | 4 | 20 | 4 | 33 | 0.4 | 3.3 | 0.4 | 4.8 |
| *Alternaria* | - | - | - | 18 | - | 12 | - | 15 | - | 5 | - | 19 | - | 13 | - | 9 | 3 | 18 | 4 | 28 | 9 | 16 | 15 | 13 | 12 | 64 | 19 | 102 | 1.3 | 10.6 | 1.9 | 14.9 |
| *Scopulariopsis* | 36 | 9 | 55 | 3 | 58 | 11 | 95 | 16 | 109 | 13 | 129 | 18 | 68 | 11 | 49 | 29 | 10 | 8 | 58 | 31 | 63 | 17 | 46 | 32 | 344 | 89 | 432 | 129 | 38.7 | 11.4 | 44.0 | 18.8 |
| *Botryotrichum* | 7 | 10 | - | 2 | 3 | - | - | - | 4 | 5 | - | - | 13 | 8 | 3 | 5 | 1 | - | - | 5 | - | - | - | 2 | 28 | 23 | 3 | 14 | 3.1 | 3.8 | 0.3 | 2.0 |
| *Cephalosporium* | 7 | - | - | 3 | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 7 | - | - | 4 | 0.7 | - | - | 0.5 |
| *Circinella* | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | 6 | - | 2 | - | 0.6 | - | 0.2 | - |
| *Cladosporium* | 7 | 42 | 7 | 39 | 7 | 68 | 13 | 83 | 14 | 21 | 20 | 79 | 36 | 36 | 12 | 17 | 11 | 57 | 22 | 64 | 18 | 38 | 12 | 37 | 93 | 262 | 86 | 319 | 10.4 | 43.5 | 8.7 | 46.6 |
| *Penicillium* | - | 1 | - | 3 | 79 | 1 | 72 | - | 77 | 43 | 34 | - | 5 | 3 | 70 | 1 | - | - | - | - | - | - | - | - | 161 | 48 | 176 | 4 | 18.1 | 7.9 | 17.7 | 0.5 |
| *Cunninghamella* | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | 0.2 | - | - | - |
| *Rhizopus* | 4 | 9 | 9 | 12 | 2 | 1 | 7 | 8 | - | 4 | 8 | 10 | - | 4 | 4 | - | - | - | 3 | - | - | 9 | - | - | 6 | 27 | 31 | 30 | 0.6 | 4.5 | 3.1 | 4.3 |
| *Stemphylium* | - | - | - | - | - | 9 | - | - | - | 1 | - | - | - | 3 | - | 1 | - | - | - | 2 | - | - | - | 2 | - | 13 | - | 5 | - | 2.1 | - | 0.7 |
| *Mucor* | - | - | - | - | 5 | 5 | 1 | - | 5 | - | 2 | 1 | - | - | 1 | - | - | - | 2 | - | - | - | - | 2 | 10 | 5 | 6 | 3 | 1.1 | 0.8 | 0.6 | 0.4 |
| *Aphanomyces* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 1 | - | - | - | - | - | - | - | - | - | - | 5 | 1 | - | - | 0.5 | 0.1 |
| *Absidia* | 2 | - | - | - | 2 | 2 | 2 | - | - | - | - | 1 | - | - | 3 | - | - | - | - | - | - | - | - | - | 4 | 2 | 5 | 1 | 0.4 | 0.3 | 0.5 | 0.1 |
| *Chaetomium* | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 2 | - | - | 1 | - | - | 2 | 2 | 2 | - | 0.2 | 0.3 | 0.2 | - |
| *Torula* | - | - | - | - | - | - | - | 2 | - | - | - | - | - | 6 | - | - | 2 | - | 2 | - | 2 | 3 | - | - | 4 | 9 | 2 | 2 | 0.4 | 1.4 | 0.2 | 0.3 |
| *Nigrospora* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 13 | 9 | - | - | - | 5 | - | - | 13 | 10 | - | - | 1.4 | 1.6 | - | - |
| *Drechslera* | - | - | 1 | 1 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 2 | 2 | - | - | 9 | 3 | 2 | - | 0.5 | 0.3 | 0.3 |
| *Doratomyces* | - | - | - | - | - | - | - | - | - | - | - | - | 10 | 1 | - | - | 6 | 1 | - | 1 | 1 | - | - | - | 17 | 2 | - | 1 | 1.9 | 0.2 | - | 0.1 |
| *Curvularia* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 11 | - | - | 3 | 11 | - | - | 0.5 | 1.1 | - |
| *Sepedonium* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | - | - | 2 | 2 | - | - | 0.2 | 0.3 | - | - |
| *Mycelia sterilia* | - | - | - | - | - | 2 | - | 13 | - | 4 | - | 2 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | 8 | - | 15 | - | 1.3 | - | 2.2 |
| Total count | 184 | 94 | 171 | 98 | 193 | 125 | 204 | 141 | 214 | 103 | 219 | 159 | 143 | 90 | 204 | 65 | 47 | 94 | 96 | 131 | 107 | 96 | 89 | 90 | 888 | 602 | 983 | 684 | 100 | | 100 | |

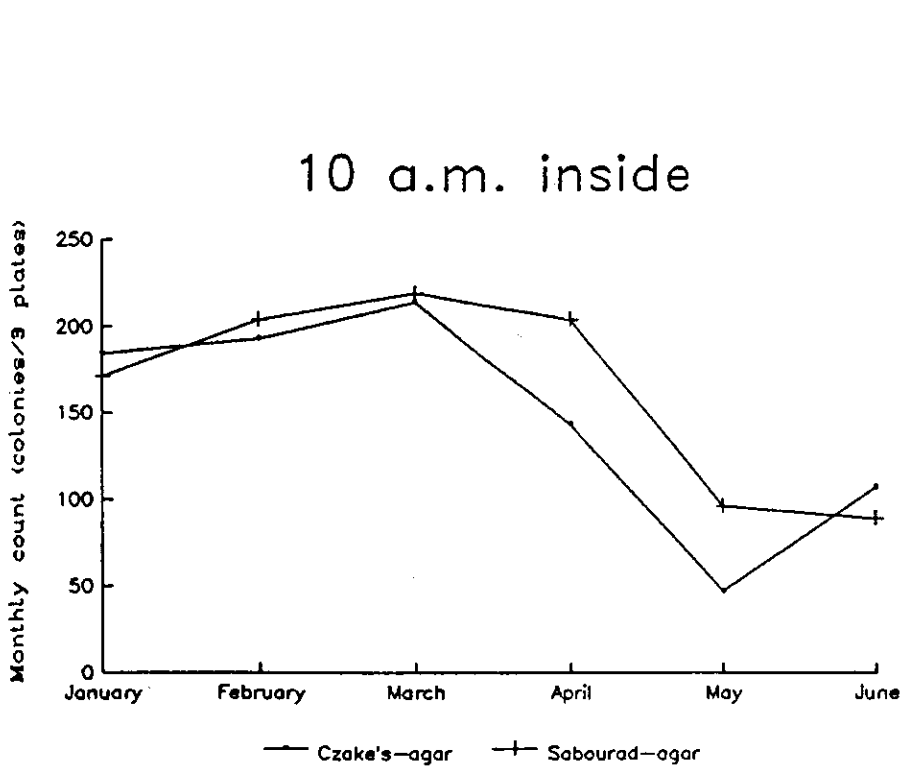
Dox = Czapek-Dox-agar  Sab. = Sabouraud-agar
I = Inside  O = Outside

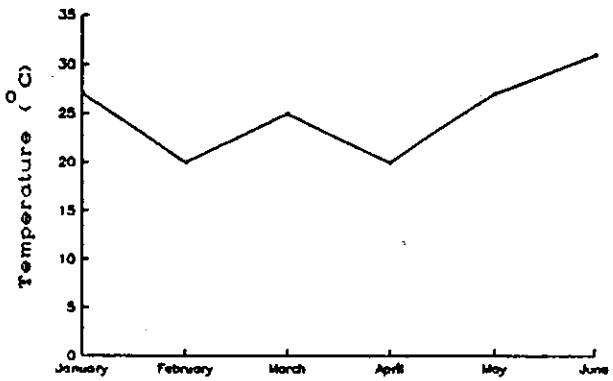


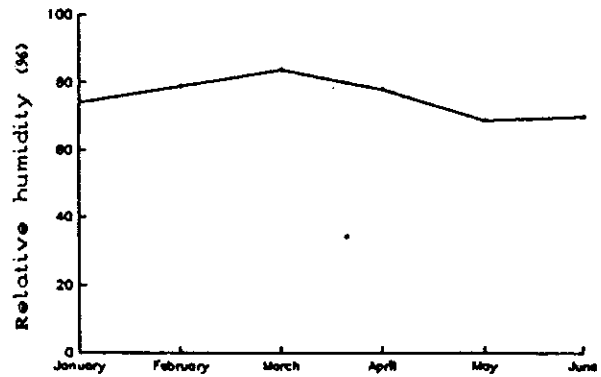




(Fig. 3): Relationships between temperature and relative humidity and monthly total count of air-borne fungi outside poultry farm at 10 a.m. during the period of January-June 1988.




(Fig. 4): Relationships between temperature and relative humidity and monthly total count of air-borne fungi inside poultry farm at 10 a.m. during the period of January-June 1988.

respectively of the total count of fungi collected at this time on each of the previous media; these data was recorded in March 1988. This high count was mainly attributed to contribution of *Cladosporium* count in outside and *Scopulariopsis* count in inside the farm. Both temperature and relative himidity reached the maximum at June and March in outside and inside the farm respectively (Figs. 3 and 4).

**-Total count of fungal species recorded at 4 p.m:**

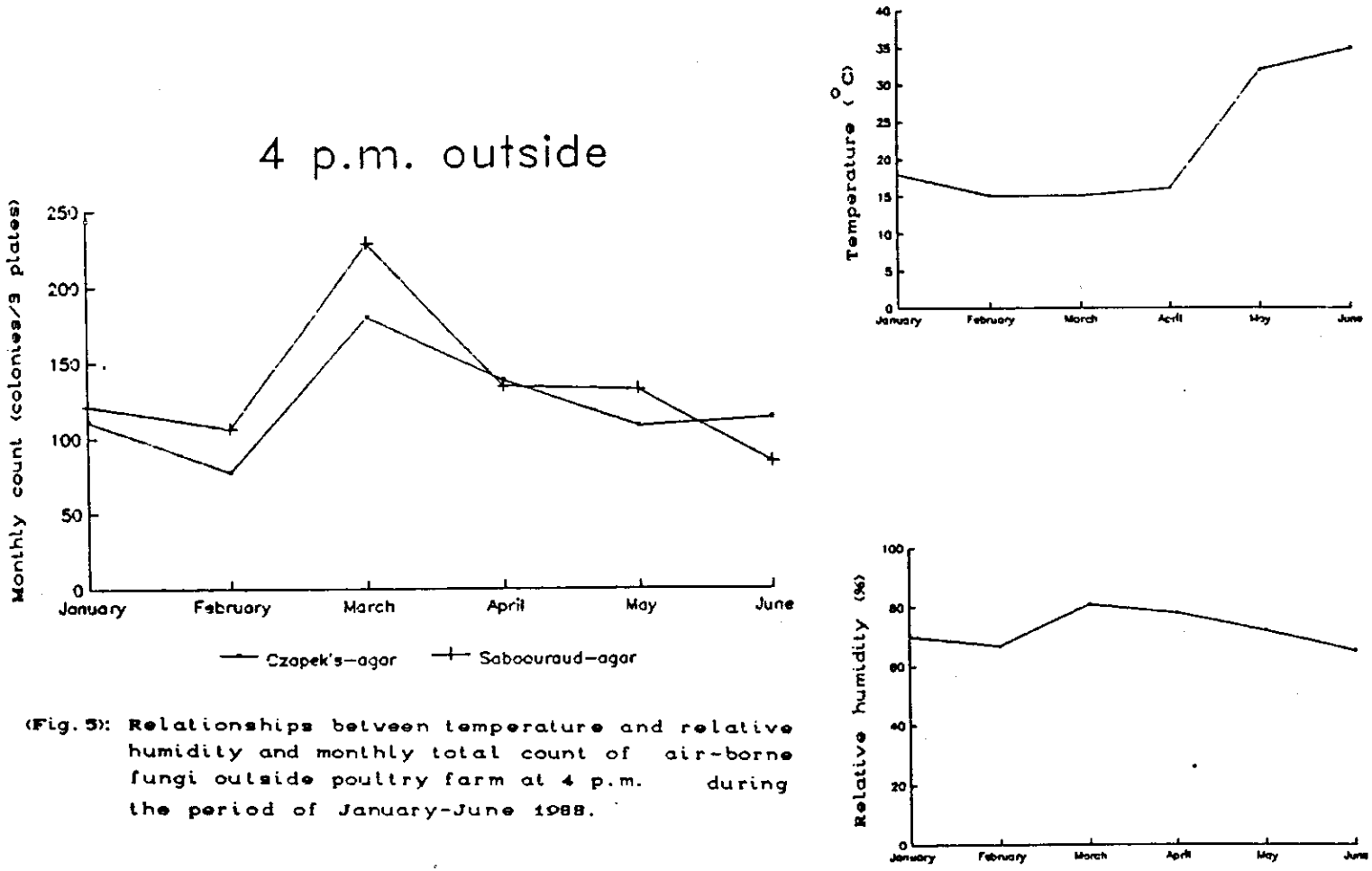
The results obtained from table 8 revealed that, the total number of isolates through the experiment outside poultry farm was 1533 isolates in 36 plates which constitued 13.02% of total count of fungi, while inside the farm was 1872 isolates in 36 plates which constituted 15.90% of total count of fungi collected during the experiment. One daily maximum of total fungi at this time was recorded during March, 1988 in outside of the farm. On the other hand, in outside poultry farm, the highest count which recorded on Czapek's-agar was 180 isolates in three plates represented 24.76% of the total count of fungi collected at this time on the previous medium, while 229 isolates were recorded on Sabouraud-agar in three plates represented 28.41% of the total count of fungi collected at this time on this medium.

Inside poultry farm, the maximum record of fungi was 266 and 229 isolates on Czapek's-agar and Sabouraud-agar respectively in three plates each, which represented 27.94%

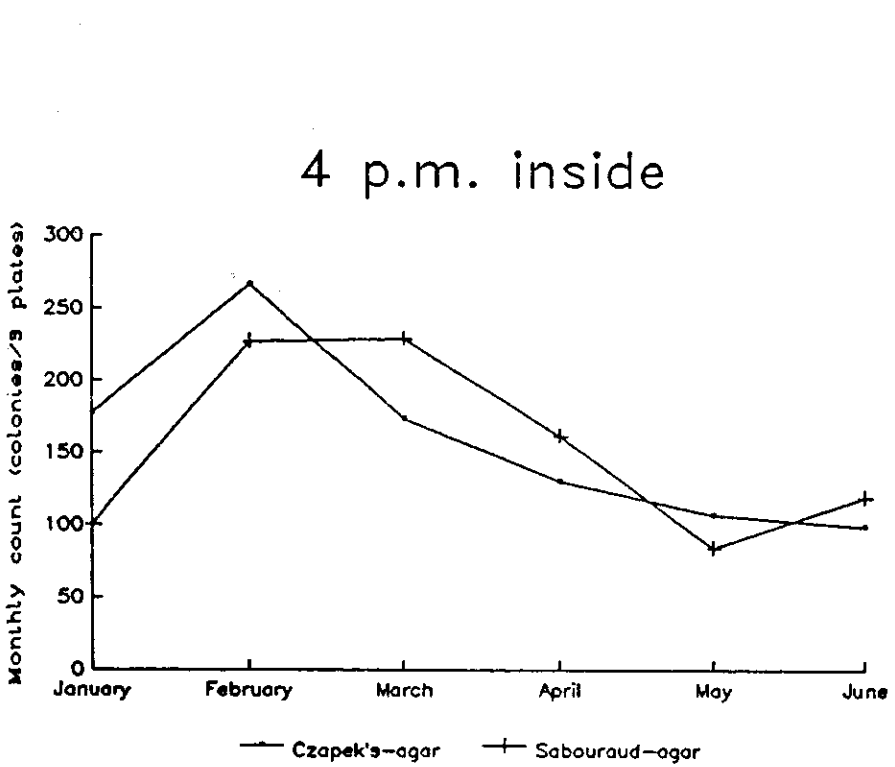
Table [8] : Monthly total counts of air-borne fungi at 4 p.m. hour during January-June 1988 inside and outside poultry farm on Dox and Sab. media.

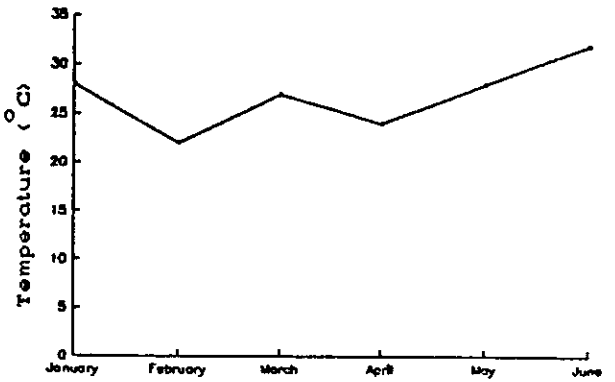
| Months & Genera | January | | | | February | | | | March | | | | April | | | | May | | | | June | | | | Total | | | | % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dox | | Sab | | Dox | | Sab | | Dox | | Sab | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | |
| | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O |
| *Aspergillus* | 123 | 1 | 91 | 4 | 6 | 1 | 2 | 8 | 4 | 9 | 7 | 3 | - | - | - | - | 24 | 24 | - | 4 | 2 | - | - | 3 | 159 | 35 | 100 | 22 | 16.7 | 4.8 | 10.8 | 2.7 |
| *Fusarium* | 2 | 8 | 1 | 3 | 2 | 8 | - | 1 | - | 2 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | 4 | 18 | 1 | 6 | 0.4 | 2.4 | 0.1 | 0.7 |
| *Alternaria* | 1 | 8 | - | 12 | - | 5 | - | 6 | - | 8 | - | 13 | - | 10 | - | 5 | 8 | 28 | 10 | 37 | 3 | 13 | 19 | 11 | 12 | 67 | 29 | 84 | 1.2 | 9.2 | 3.1 | 10.4 |
| *Scopulariopsis* | 19 | 1 | - | 1 | 145 | - | 145 | 9 | 113 | 90 | 153 | 123 | 100 | 26 | 139 | 54 | 38 | 19 | 44 | 41 | 41 | 32 | 48 | 24 | 456 | 108 | 523 | 254 | 47.9 | 23.1 | 56.8 | 31.5 |
| *Botryotrichum* | 1 | 11 | - | 1 | - | 2 | - | - | 10 | 12 | 1 | 5 | 12 | 9 | - | 6 | 4 | 9 | - | 1 | - | - | - | - | 27 | 43 | 1 | 13 | 2.8 | 5.9 | 0.1 | 1.6 |
| *Cephalosporium* | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 4 | - | - | - | 2 | - | - | 7 | 6 | - | - | 0.7 | 0.8 | - | - |
| *Circinella* | 4 | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | - | - | - | 0.5 | - | - | - |
| *Cladosporium* | 9 | 72 | - | 73 | 7 | 48 | 2 | 48 | 14 | 18 | 20 | 39 | 13 | 88 | 26 | 69 | 26 | 21 | 19 | 32 | 28 | 32 | 33 | 11 | 97 | 279 | 100 | 274 | 10.2 | 38.3 | 10.9 | 34.0 |
| *Penicillium* | - | - | - | - | 66 | 6 | 39 | 2 | 21 | 22 | 39 | 26 | - | - | - | - | - | - | - | - | - | - | - | - | 87 | 28 | 78 | 28 | 9.1 | 3.8 | 8.5 | 3.5 |
| *Cunninghamella* | 1 | - | - | - | - | - | 1 | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | 1 | 0.1 | - | 0.1 | 0.1 |
| *Rhizopus* | - | 4 | 4 | 19 | 1 | - | 2 | - | - | 5 | 4 | 5 | 1 | - | 2 | - | - | - | 6 | - | - | - | 3 | 1 | 2 | 9 | 21 | 25 | 0.2 | 1.2 | 2.3 | 3.1 |
| *Stemphylium* | - | 3 | - | 1 | - | - | - | - | - | 2 | - | 3 | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 6 | - | 5 | - | 0.8 | - | 0.6 |
| *Mucor* | - | - | 3 | - | 1 | - | - | - | 4 | 1 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 1 | 3 | 1 | 0.5 | 0.1 | 0.3 | 0.1 |
| *Sepedonium* | 15 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 15 | 1 | - | - | 1.6 | 0.1 | - | - |
| *Chaetomium* | - | - | - | 1 | 38 | - | 14 | - | 4 | 3 | 1 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 43 | 3 | 15 | 1 | 4.5 | 0.4 | 1.6 | 0.1 |
| *Torula* | - | -- | - | - | - | 1 | 6 | 14 | 2 | 4 | - | - | - | - | - | - | 1 | 3 | 5 | 14 | 1 | 2 | 3 | 2 | 4 | 10 | 14 | 30 | 0.4 | 1.3 | 1.5 | 3.7 |
| *Curvularia* | - | - | - | - | - | - | 16 | 9 | - | 4 | - | 2 | - | - | - | - | - | - | - | - | 18 | 26 | 11 | 31 | 18 | 30 | 27 | 42 | 1.9 | 4.0 | 2.6 | 5.1 |
| *Absidia* | - | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - | 0.2 | 0.3 |
| *Doratomyces* | - | - | - | - | - | - | - | - | - | - | 2 | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | - | 2 | - | 0.3 | - | 0.2 | - |
| *Stachybotrys* | - | - | - | - | - | - | - | - | - | - | - | - | - | 4 | - | - | 1 | 3 | - | - | - | - | - | - | 1 | 7 | - | - | 0.1 | 0.9 | - | - |
| *Nigrospora* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 3 | - | - | - | - | - | 1 | - | 3 | - | 0.1 | - | 0.4 |
| *Drechslera* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -- | - | - | - | 6 | 3 | 2 | - | 6 | 5 | 2 | - | 0.6 | 0.7 | 0.2 | - |
| *Mycelia sterilia* | - | 2 | 1 | 4 | - | 6 | - | 9 | - | - | - | 1 | - | - | - | - | - | 1 | - | - | - | 1 | - | - | - | 10 | 1 | 14 | - | 1.3 | 0.1 | 1.7 |
| Total count | 177 | 111 | 100 | 121 | 266 | 77 | 227 | 106 | 173 | 180 | 229 | 229 | 130 | 138 | 161 | 134 | 107 | 108 | 84 | 132 | 99 | 113 | 119 | 84 | 952 | 727 | 920 | 806 | 100 | | 100 | |

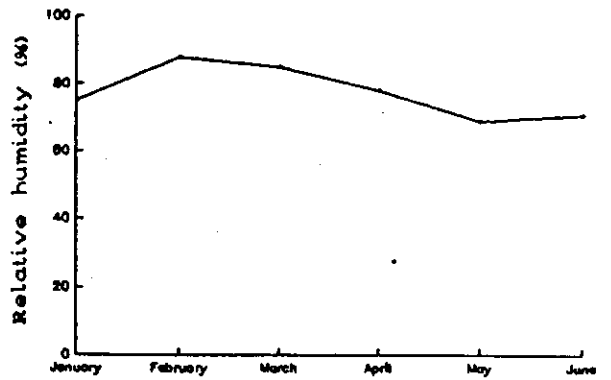
Dox = Czapek-Dox-agar  Sab. = Sabouraud-agar
I = Inside  O = Outside




(Fig. 5): Relationships between temperature and relative humidity and monthly total count of air-borne fungi outside poultry farm at 4 p.m. during the period of January-June 1988.




(Fig. 6): Relationships between temperature and relative humidity and monthly total count of air-borne fungi inside poultry farm at 4 p.m. during the period of January-June 1988.

and 24.89% respectively of the total count of fungi collected at this time on each of the previous media; this count was estimated during February on Czapek's-agar and during March on Sabouraud-agar. The temperature reached the maximum at June and relative humidity was at March in outside, while in inside the maximum temperature was at June and relative humidity reached maximum at February (Figs. 5 and 6).

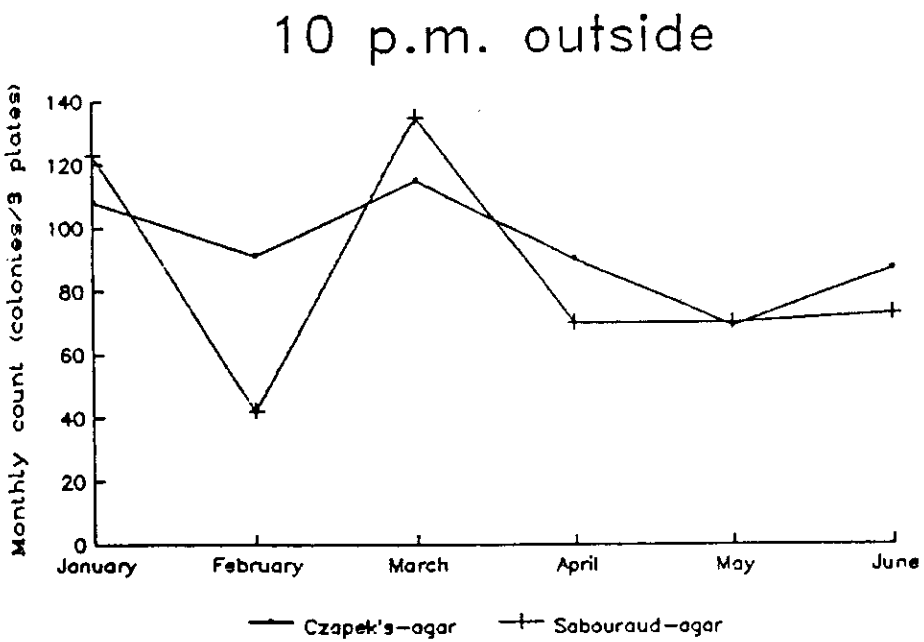
**Total count of fungal species recorded at 10 p.m:**

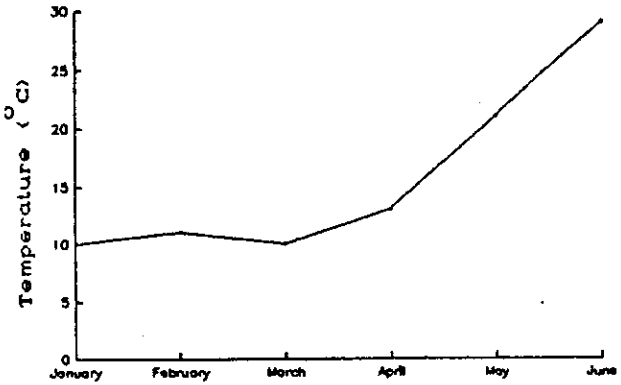
At this time, the results obtained from table 9 showed that total count of fungal species through the experiment in outside poultry farm was 1073 isolates in 36 plates were counted and represented 9.11% of the total catch of fungi, during the experiment, while inside poultry farm 1675 isolates were estimated which accounted for 14.23% of the gross fungi collected during the experiment. One daily maximum of total fungi was recorded in March, 1988 at this time in outside the farm. In outside poultry farm, the highest number was recorded on Czapek's-agar which was 115 isolates in three plates and constituted 20.54% of the total count of fungi collected at this time on the previous medium, while on Sabouraud-agar 135 isolates were counted in three plates and represented 26.32% of the total count of fungi collected at this time on the same medium.

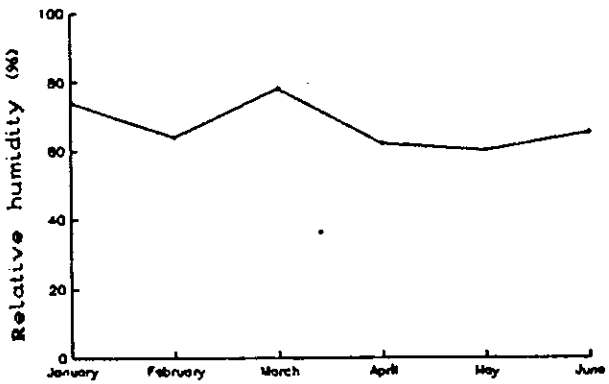
Table (9) : Monthly total counts of air-borne fungi at 10 p.m. hour during January-June 1988 inside and outside poultry farm on Dox and Sab. media.

| Months & Genera | January | | | | February | | | | March | | | | April | | | | May | | | | June | | | | Total | | | | % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dox | | Sab | | Dox | | Sab | | Dox | | Sab | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | | Dox | | Sab. | |
| | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O | I | O |
| *Aspergillus* | 107 | 6 | 66 | 15 | 13 | 40 | 7 | 2 | 6 | 1 | - | - | - | - | - | - | 8 | 3 | - | - | 5 | - | - | 16 | 139 | 50 | 73 | 33 | 18.6 | 8.9 | 7.8 | 6.4 |
| *Fusarium* | 4 | 13 | 2 | 5 | 18 | 12 | - | 5 | - | 13 | - | 11 | - | - | - | - | - | - | - | - | - | - | - | - | 22 | 38 | 2 | 21 | 2.9 | 6.8 | 0.2 | 4.1 |
| *Alternaria* | - | 1 | - | 8 | - | 2 | - | 4 | 1 | 8 | - | 18 | - | 14 | - | 5 | - | 11 | - | 10 | 2 | 14 | 2 | 14 | 3 | 50 | 2 | 59 | 0.4 | 8.9 | 0.2 | 11.5 |
| *Scopulariopsis* | 58 | 1 | 64 | - | 32 | 2 | 95 | 1 | 64 | 9 | 187 | 13 | 10 | 4 | 60 | 8 | 36 | 34 | 58 | 34 | 38 | 34 | 51 | 9 | 238 | 84 | 315 | 65 | 31.9 | 15.0 | 55.4 | 12.7 |
| *Botryotrichum* | 14 | 7 | 10 | 2 | 2 | 2 | - | 1 | 3 | 21 | 4 | 12 | 18 | 11 | 20 | 13 | 2 | 2 | - | 8 | - | 1 | 6 | 1 | 39 | 44 | 40 | 37 | 5.2 | 7.8 | 4.3 | 7.2 |
| *Cephalosporium* | - | - | - | - | - | 6 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6 | - | 6 | - | 8 | 2.7 | 5.0 | - | 1.6 |
| *Circinella* | 2 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | 1 | - | 0.3 | - | 0.1 | - |
| *Cladosporium* | - | 66 | - | 79 | - | 21 | 3 | 17 | 24 | 45 | 17 | 63 | 13 | 46 | 6 | 40 | 10 | 12 | 18 | 10 | 20 | 22 | 22 | 21 | 67 | 212 | 66 | 230 | 6.3 | 33.9 | 7.1 | 44.8 |
| *Penicillium* | - | 3 | 15 | - | 102 | 2 | 87 | 1 | 45 | 11 | 48 | - | - | - | - | - | - | - | - | - | - | - | - | - | 147 | 16 | 150 | 1 | 19.7 | 2.8 | 16.1 | 0.2 |
| *Cunninghamella* | - | - | - | - | - | - | - | - | 9 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 9 | - | - | - | 1.2 | - | - | - |
| *Rhizopus* | 3 | 1 | 4 | 6 | 1 | - | 3 | - | - | - | 4 | 6 | 7 | - | 1 | - | 3 | - | - | 4 | - | - | 2 | 2 | 14 | 1 | 14 | 18 | 1.9 | 0.2 | 1.5 | 3.5 |
| *Stemphylium* | - | 1 | - | - | - | - | - | 2 | 2 | - | - | 2 | - | 2 | - | - | - | - | - | - | - | - | - | - | 2 | 3 | - | 4 | 0.3 | 0.5 | - | 0.8 |
| *Mucor* | - | - | 1 | - | 3 | - | - | - | - | - | 5 | - | - | - | - | - | - | - | 8 | - | - | - | - | - | 8 | - | 14 | - | 0.4 | - | 1.4 | - |
| *Torula* | - | - | - | - | - | - | - | - | - | - | - | - | - | 9 | - | - | - | 2 | - | - | - | 1 | - | - | - | 12 | - | - | - | 2.1 | - | - |
| *Stachybotrys* | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 | - | - | - | 3 | - | - | - | 0.5 | - | - |
| *Curvularia* | - | - | - | - | - | - | - | 1 | - | - | - | 4 | - | - | - | 2 | 2 | 2 | - | - | 4 | 10 | 1 | 3 | 6 | 12 | 1 | 10 | 0.8 | 2.2 | 0.1 | 2.0 |
| *Doratomyces* | - | - | - | - | - | - | - | - | - | - | - | - | 19 | - | 22 | 2 | 19 | 2 | 15 | - | 7 | 3 | - | - | 45 | 5 | 37 | 2 | 6.0 | 0.9 | 4.0 | 0.4 |
| *Chaetomium* | - | - | 2 | - | - | - | 7 | - | - | - | - | - | - | - | - | - | 2 | - | 2 | 4 | 2 | 1 | 1 | - | 4 | 1 | 12 | 4 | 0.5 | 0.2 | 1.3 | 0.8 |
| *Aphanomyces* | - | - | - | 3 | - | - | 2 | - | 5 | - | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | 5 | - | 2 | 9 | 0.7 | - | 0.2 | 1.8 |
| *Absidia* | - | - | - | - | - | - | - | - | - | 6 | 1 | - | - | 4 | - | - | - | - | - | - | - | - | - | - | - | 7 | 1 | - | - | 1.8 | 0.1 | - |
| *Rhizoctonia* | - | 1 | - | - | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | - | - | - | 0.9 | - | - |
| *Mycelia sterilia* | - | 7 | - | 5 | - | - | - | 6 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 8 | - | 12 | - | 1.4 | - | 2.3 |
| Total count | 188 | 108 | 165 | 123 | 171 | 91 | 204 | 42 | 159 | 115 | 266 | 135 | 67 | 90 | 109 | 70 | 82 | 69 | 101 | 70 | 78 | 87 | 85 | 73 | 745 | 560 | 930 | 513 | 100 | | 100 | |

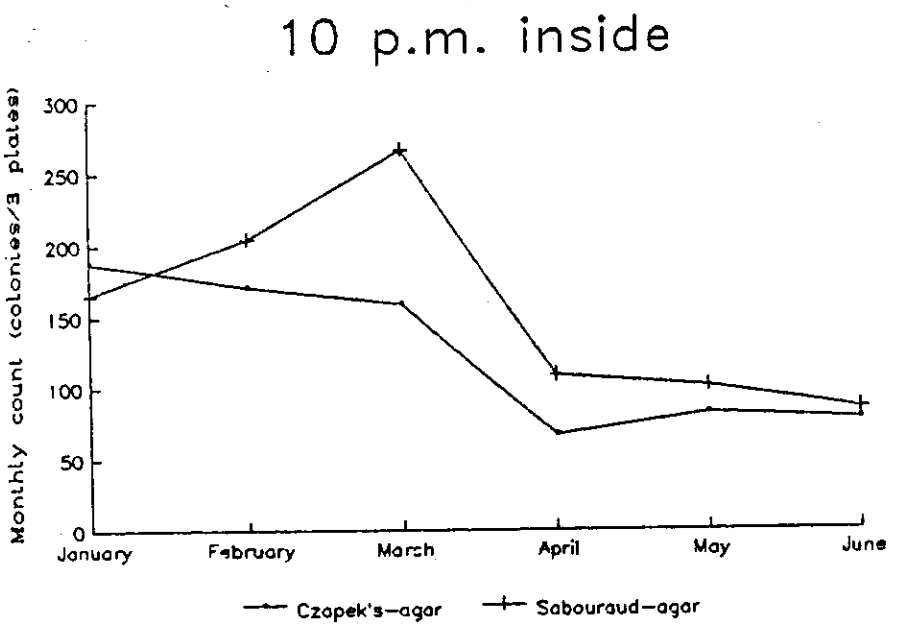
Dox = Czapek-Dox-agar  Sab. = Sabouraud-agar
I = Inside  O = Outside

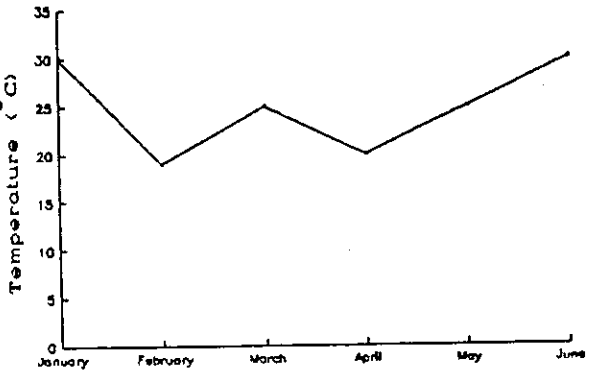


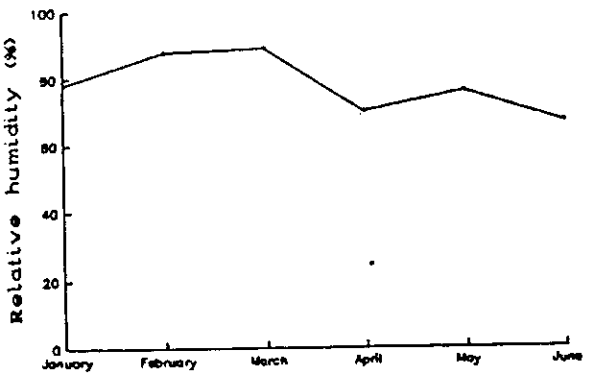




(Fig. 7): Relationships between temperature and relative humidity and monthly total count of air-borne fungi outside poultry farm at 10 p.m. during the period of January-June 1988.




(Fig. 8): Relationships between temperature and relative humidity and monthly total count of air-borne fungi inside poultry farm at 10 p.m. during the period of January-June 1988.

Table[10]:Total and percentage counts, frequencies of occurrence and number of species of various genera of fungi in the air during the period of January-June 1988 inside and outside the poultry farm on Czapek-Dox-agar medium.

| Genera | Inside | | | | Outside | | | |
|---|---|---|---|---|---|---|---|---|
| | No. Sp. | T. C. | Percent count | F. | No. Sp. | T. C. | Percent count | F. |
| *Scopulariopsis* | 3 | 1421 | 42.88 | 23 | 3 | 400 | 17.34 | 20 |
| *Aspergillus* | 11 | 548 | 16.54 | 24 | 10 | 121 | 5.24 | 12 |
| *Penicillium* | 2 | 496 | 14.97 | 6 | 3 | 94 | 4.07 | 6 |
| *Cladosporium* | 3 | 345 | 10.41 | 14 | 5 | 968 | 41.96 | 21 |
| *Alternaria* | 1 | 34 | 1.03 | 6 | 1 | 207 | 8.97 | 12 |
| *Fusarium* | 3 | 30 | 0.91 | 3 | 6 | 89 | 3.86 | 11 |
| *Botryotrichum* | 1 | 118 | 3.56 | 10 | 1 | 124 | 5.37 | 9 |
| *Cephalosporium* | 2 | 21 | 0.63 | 3 | 2 | 50 | 2.16 | 1 |
| *Circinella* | 1 | 14 | 0.42 | 2 | - | - | - | - |
| *Cunninghamella* | 1 | 12 | 0.36 | 2 | - | - | - | - |
| *Rhizopus* | 1 | 18 | 0.54 | 4 | - | - | - | - |
| *Stemphylium* | 1 | 3 | 0.09 | 1 | 2 | 26 | 1.13 | 6 |
| *Mucor* | 2 | 50 | 1.51 | 5 | 1 | 8 | 0.35 | 1 |
| *Absidia* | 1 | 9 | 0.27 | 1 | 1 | 7 | 0.31 | 1 |
| *Aphanomyces* | 1 | 3 | 0.09 | 1 | - | - | - | - |
| *Chaetomium* | 2 | 52 | 1.57 | 4 | 1 | 16 | 0.69 | 2 |
| *Torula* | 1 | 4 | 0.12 | 2 | 2 | 44 | 1.91 | 5 |
| *Nigrospora* | 1 | 13 | 0.39 | 1 | 1 | 13 | 0.56 | 2 |
| *Drechslera* | 2 | 11 | 0.33 | 2 | 3 | 18 | 0.78 | 2 |
| *Doratomyces* | 1 | 65 | 1.96 | 3 | 1 | 7 | 0.30 | 5 |
| *Curvularia* | 4 | 31 | 0.93 | 3 | 5 | 64 | 2.77 | 1 |
| *Sepedonium* | 1 | 15 | 0.45 | 1 | 1 | 11 | 0.48 | 2 |
| *Stechybotrys* | 1 | 1 | 0.03 | 1 | 1 | 10 | 0.43 | 1 |
| *Rhizoctonia* | - | - | - | - | 1 | 4 | 0.17 | 5 |
| *Mycelia sterilia* | - | - | - | | 1 | 26 | 1.13 | |
| Total count | | 3314 | | | | 2307 | | |

T. C. = Total count. No. Sp. = Number of species

F = Frequency of occurrence

Occurrence: High = 13-24 cases
Moderate = 7-12 cases
Low = 4-6 cases
Rare = 1-3 cases

Table[11]:Total and percentage counts, frequencies of occurrence and number of species of various genera of fungi in the air during the period of January-June 1988 inside and outside the poultry farms on Sabouraud-agar medium.

| Genera | Inside | | | | Outside | | | |
|---|---|---|---|---|---|---|---|---|
| | No. Sp. | T. C. | Percent count | F. | No. Sp. | T. C. | Percent count | F. |
| *Scopulariopsis* | 3 | 2004 | 53. 55 | 24 | 3 | 569 | 23. 62 | 22 |
| *Penicillium* | 3 | 547 | 14. 61 | 7 | 2 | 57 | 2. 37 | 4 |
| *Aspergillus* | 8 | 474 | 12. 66 | 19 | 7 | 82 | 3. 40 | 14 |
| *Cladosporium* | 5 | 309 | 8. 26 | 15 | 5 | 977 | 40. 55 | 21 |
| *Rhizopus* | 1 | 74 | 1. 98 | 9 | 1 | 24 | 0. 996 | 3 |
| *Alternaria* | 2 | 58 | 1. 55 | 3 | 2 | 280 | 11. 62 | 13 |
| *Botryotrichum* | 1 | 55 | 1. 47 | 4 | 1 | 84 | 3. 49 | 9 |
| *Doratomyces* | 1 | 50 | 1. 34 | 2 | 1 | 3 | 0. 12 | 1 |
| *Mucor* | 2 | 29 | 0. 77 | 5 | 1 | 4 | 0. 17 | 1 |
| *Chaetomium* | 2 | 28 | 0. 75 | 3 | 1 | 4 | 0. 17 | 1 |
| *Curvularia* | 4 | 54 | 1. 44 | 4 | 4 | 81 | 3. 35 | 4 |
| *Absidia* | 1 | 13 | 0. 35 | 2 | 1 | 3 | 0. 12 | 1 |
| *Fusarium* | 2 | 8 | 0. 21 | 2 | 5 | 81 | 3. 36 | 11 |
| *Ciricinella* | 1 | 6 | 0. 16 | 2 | – | – | – | – |
| *Aphanomyces* | 1 | 5 | 0. 13 | 1 | 1 | 1 | 0. 04 | 1 |
| *Drechslera* | 1 | 8 | 0. 20 | 1 | 1 | 57 | 2. 36 | 3 |
| *Cunninghamella* | 1 | 8 | 0. 20 | 1 | 1 | 1 | 0. 04 | 1 |
| *Torula* | 1 | 6 | 0. 15 | 1 | 2 | 4 | 0. 17 | 1 |
| *Stemphylium* | 1 | 3 | 0. 078 | 1 | 2 | 16 | 0. 66 | 4 |
| *Cephalosporium* | – | – | – | – | 2 | 19 | 0. 78 | 2 |
| *Nigrospora* | – | – | – | 1 | 1 | 15 | 0. 60 | 2 |
| *Mycelia sterilia* | 1 | 3 | 0. 078 | | 1 | 47 | 1. 95 | 5 |
| Total count | | 3742 | | | | 2409 | | |

T. C. = Total count. No. Sp. = Number of species

F = Frequency of occurrence

Occurrence: High = 13-24 cases
Moderate = 7-12 cases
Low = 4-6 cases
Rare = 1-3 cases

Inside poultry farm, the maximum record of fungi was 188 and 266 isolates on Czapek's-agar and sabouraud-agar respectively in three plates each, and represented 25.23% and 28.60% respectively of the total count of fungi collected at this time on each of the previous media; these data was recorded in January on Czapek's-agar and in March on Sabouraud-agar. It is clear from figures 1-8 that the highest count of fungal species was recorded in March on both media inside and outside the farm at different intervals except at 4 p.m. inside the farm, the highest count was recorded at February. This highest count always correspond the temperature ranging between 5-15$^{o}$c in outside and 22-27$^{o}$c inside. On other hand, the highest count correspond the relative humidity ranging between 77-81% in outside and 84-89% inside the farm.

**The dominant fungal genera:**

1- *Cladosporim:* The results obtained in table 14 showed that *Cladosporium* was the most common fungal genus recorded in the exposured plates (especially in outside poultry farm) and its total count was 1945 isolates in outside and 654 isolates inside the farm in 288 plates and constituted 16.52% and 5.56% respectively of the total fungi in this experiment. Five species of this genus were identified namely, *C.cladosporiodes*, *C.sphaerospermium*, *C.oxysporum*, *C.herbarum* and *C.macrocarpum*. The maximum total count of the

Table (12): Total count of most common air-borne fungi inside and outside the poultry farm on Dox medium at 6-hour intervals during 6-days of January-June 1988.

| Genera | 4.a.m | | 10.a.m | | 4.p.m | | 10.a.m | | Total and % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | O | I | O | I | O | I | O | I | % | O | % |
| *Scopulariopsis* | 389 | 79 | 344 | 69 | 456 | 168 | 238 | 84 | 1421 | 42.9 | 400 | 17.3 |
| *Cladosporium* | 88 | 215 | 93 | 262 | 97 | 279 | 67 | 212 | 345 | 10.4 | 968 | 42.0 |
| *Aspergillus* | 77 | 6 | 173 | 30 | 159 | 35 | 139 | 50 | 548 | 16.5 | 121 | 5.2 |
| *Penicillium* | 101 | 2 | 161 | 48 | 87 | 28 | 147 | 16 | 496 | 15.0 | 94 | 4.1 |

I= Inside poultry farm

O= outside poultry farm

Table (13): Total count of most common air-borne fungi inside and outside the poultry farms on Sab. medium at 6-hour intervals during 6-days of January-June 1988.

| Genera | 4.a.m | | 10.a.m | | 4.p.m | | 10.a.m | | Total and % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | O | I | O | I | O | I | O | I | % | O | % |
| *Scopulariopsis* | 534 | 121 | 432 | 129 | 523 | 254 | 515 | 65 | 2004 | 53.6 | 569 | 23.6 |
| *Cladosporium* | 57 | 154 | 86 | 319 | 100 | 274 | 66 | 230 | 309 | 806 | 977 | 40.6 |
| *Aspergillus* | 105 | 8 | 196 | 19 | 100 | 22 | 73 | 33 | 474 | 12.7 | 82 | 3.4 |
| *Penicillium* | 143 | 24 | 176 | 4 | 78 | 28 | 150 | 1 | 547 | 14.6 | 57 | 2.4 |

I= Inside poultry farm

O= outside poultry farm

Table [14]:Total counts and ferquencies of occurrence of *Cladosporium* spp. during the period of January-June 1988 inside and outside the poultry farm on Czapek-Dox-agar and Sabouraud-agar media.

i-On Czapek-Dox-agar medium:

| Species | Inside | | | Outside | | |
|---|---|---|---|---|---|---|
| | T.C | % | F. | T.C | % | F. |
| *Cladosporium cladosporiodes* (Fresen.) de Vries | 212 | 61.45 | 15 | 614 | 63.43 | 19 |
| *C.sphaerospermium* Penzig | 119 | 34.49 | 9 | 332 | 34.30 | 17 |
| *C.oxysporum* Berk & Curt. | 14 | 4.06 | 3 | 8 | 0.83 | 2 |
| *C.herbarm* (Pers.) Link ex Gray. | - | - | - | 13 | 1.34 | 3 |
| *C.macrocarpum* Preuss | - | - | - | 1 | 0.10 | 1 |
| Total count | 345 | - | - | 968 | - | - |

ii-On Sabouraud-agar medium:

| Species | Inside | | | Outside | | |
|---|---|---|---|---|---|---|
| | T.C | % | F. | T.C | % | F. |
| *Cladosporium cladosporiodes* (Fresen.) de Vries | 185 | 59.87 | 18 | 666 | 68.17 | 18 |
| *C.sphaerospermium* Penzig | 77 | 24.92 | 9 | 258 | 26.41 | 17 |
| *C.oxysporum* Berk & Curt. | 16 | 5.18 | 1 | 27 | 2.76 | 3 |
| *C.herbarm* (Pers.) Link ex Grcy. | 29 | 9.39 | 1 | 20 | 2.05 | 2 |
| *C.macrocarpum* Preuss | 2 | 0.65 | 1 | 6 | 0.61 | 1 |
| Total count | 309 | 100% | - | 977 | - | - |

T.C. = Total count

F. = Frequency of occurrence

genus was recorded at 4 p.m outside and inside the farm when the two media used. 553 isolates outside and 197 isolates inside in 72 plates of the two media used were isolated at 4. p.m. through the experiment. At 4. p.m., three daily maxima were recorded during January outside on two media used and during April outside on Czapek's-agar only (Table, 8). At 4,10 a.m. and 10 p.m., one, two and two daily maxima were recorded respectively. The fluctuations were exactly parallel to those of total fungi. *C.cladosporiodes* was the highest frequency and total count inside and outside the farm on two media used (Table, 14).

2- *Scopulariopsis:*

*Scopulariopsis* was the most common genus in the exposured plates especially inside poultry farm and its total count was 969 isolates outside and 3425 isolates inside in 288 plates and constituted 8.23% and 29.09% respectively of the total fungi in this experiment (Table, 15). Three species of this genus were identified namely; *S.brevicaulis*, *S.brumptii* and *S.constantini*. Table 12 revealed that this genus gained its maximum count through the experiment during 4 p.m. outside and inside the farm on Czapek's-agar which represented 168 isolates outside and 456 isolates inside. Table 13 revealed that the maximum total count was recorded during 4 a.m. inside and 4 p.m. outside where they were 534 and 254 isolates respectively on Sabouraud-agar. At 4 p.m., three daily maxima were recorded

Table (15): Total counts and ferquencies of occurrence of *Scopulariopsis* spp. during the period of January-June 1988 inside and outside the poultry farm on Czapek-Dox-agar and Sabouraud-agar media.

i-On Czapek-Dox-agar medium:

| Species | Inside T.C | % | F. | Outside T.C | % | F. |
|---|---|---|---|---|---|---|
| *Scopulariopsis brevicaulis* (Sacc.) Bainier | 1064 | 74.88 | 24 | 243 | 60.75 | 21 |
| *S.constantini* Bainier | 235 | 16.54 | 14 | 88 | 22.00 | 13 |
| *S.brumptii* Salvanet-Duval | 122 | 8.58 | 7 | 69 | 17.25 | 6 |
| Total count | 1421 | | | 400 | | |

ii-On Sabouraud-agar medium:

| Species | Inside T.C | % | F. | Outside T.C | % | F. |
|---|---|---|---|---|---|---|
| *Scopulariopsis brevicaulis* (Sacc.) Bainier | 1316 | 65.67 | 23 | 303 | 53.25 | 23 |
| *S.constantini* Bainier | 521 | 26.00 | 15 | 118 | 20.74 | 12 |
| *S.brumptii* Salvanet-Duval | 167 | 8.33 | 9 | 148 | 26.01 | 9 |
| Total count | 2004 | 100% | | 569 | 100% | |

T.C. = Total count

F. = Frequency of occurrence

during March inside the farm on Sabouraud-agar, during February inside the farm on the two media used and in March outside the farm on the two media used (Table, 8). Three daily maxima were recorded at 4 a.m. and 10 a.m., while four daily maxima were recoeded at 10 p.m. The fluctuations were exactly parallel to those of total count of fungi. *S.brevicaulis* was the highest frequency and total count inside and outside poultry farm on the two media used (Table, 15).

3- *Aspergillus:*

The total count of *Aspergillus* was 203 isolates outside and 1022 isolates inside in 288 plates which constituted 1.72% and 8.68% respectively of the total fungi in this experiment (Table, 16), and hence it considered the third position behind *Cladosporium* and *Scopulariopsis*. The maximum count of this genus was recorded at 10 a.m. inside the farm when the two media were used, 173 isolates on Czapek's-agar and 196 isolates on Sabouraud-agar (Table, 7). At 10 p.m., 50 and 33 isolates were recorded on Czapek's-agar and Sabouraud-agar outside the farm respectively (Tables 12 and 13). At 10 a.m., two daily maxima were recorded during January inside the farm on the two media (Table, 7). At 10 p.m., two daily maxima were recorded during January inside the farm on Czapek's-agar and during February outside the farm on Czapek's-agar (Table, 9). At 4 a.m. and 4.p.m., one

Table [16]:Total counts and ferquencies of occurrence of *Aspergillus* spp. during the period of January.-June 1988 inside and outside the poultry farm on Czapek-Dox-agar and Sabouraud-agar media.

i-On Czapek-Dox-agar medium:

| Species | Inside | | | Outside | | |
|---|---|---|---|---|---|---|
| | T.C | % | F. | T.C | % | F. |
| *Aspergillus niger* Van Tieghem | 36 | 6.57 | 10 | 5 | 4.13 | 3 |
| *A.flavus* Link ex Fr. | 77 | 14.05 | 8 | 11 | 9.09 | 4 |
| *A.wentii* Wehmer | 152 | 27.74 | 8 | 29 | 23.96 | 4 |
| *A.ochraceus* Wilhelm | 46 | 8.39 | 6 | 16 | 13.22 | 5 |
| *A.clavatus* Desm. | 5 | 0.91 | 4 | - | - | - |
| *A.fumigatus* Fres. | 200 | 36.49 | 3 | 2 | 1.65 | 1 |
| *A.versicolor* (Vuill.)Triab. | 22 | 4.01 | 2 | 47 | 38.84 | 2 |
| *A.candidus* Link ex Fr. | 2 | 0.36 | 2 | 1 | 0.83 | 1 |
| *A.nidulans* (Eidam)Wint. | 3 | 0.55 | 2 | - | - | - |
| *A.flavipes* Thom & Church | 4 | 0.73 | 1 | 6 | 4.96 | 1 |
| *A.ustus* (Bain.)Thom & Church | 1 | 0.18 | 1 | - | - | - |
| *A.restrictus* Smith | - | - | - | 2 | 1.65 | 1 |
| *A.glaucus* Thom & Raper | - | - | - | 2 | 1.65 | 1 |
| Total count | 548 | 100% | | 121 | 100% | |

ii-On Sabouraud-agar medium:

| Species | Inside | | | Outside | | |
|---|---|---|---|---|---|---|
| | T.C | % | F. | T.C | % | F. |
| *A.flavus* Link ex Fr. | 88 | 18.57 | 10 | 12 | 14.63 | 6 |
| *Aspergillus niger* Van Tieghem | 22 | 4.64 | 9 | 6 | 7.32 | 4 |
| *A.wentii* Wehmer | 100 | 21.10 | 5 | 36 | 43.90 | 8 |
| *A.ochraceus* Wilhelm | 13 | 2.74 | 5 | 8 | 9.76 | 5 |
| *A.fumigatus* Fres. | 240 | 50.63 | 4 | - | - | - |
| *A.clavatus* Desm. | 8 | 1.69 | 3 | - | - | - |
| *A.candidus* Link ex Fr. | 2 | 0.42 | 1 | 18 | 21.95 | 2 |
| *A.restrictus* Smith | 1 | 0.21 | 1 | - | - | - |
| *A.nidulans* (Eidam)Wint. | - | - | - | 1 | 1.22 | 1 |
| *A.flavipes* Thom & church | - | - | - | 1 | 1.22 | 1 |
| Total count | 474 | 100% | | 82 | 100% | |

T.C. = Total count

F. = Frequency of occurrence

and two daily maxima were recorded respectively (Tables 6 and 8). In table 16, *A.niger* and *A.ochraceus* were the highest frequency inside and outside poultry farm respectively, while *A.fumigatus* and *A.versicolor* were the highest total count inside and outside the farm respectively on Czapek's-ager medium. Also in table 16 *A.flavus* and *A.wentii* were the highest frequency inside and outside the farm respectively, while *A.fumigatus* and *A.wentii* were the highest total count inside and outside the farm respectively on Sabouraud-agar medium.

4- *Penicillium:*

Three species of *Penicillium* were isolated during this experiment namely; *P.roquefroti*, *P.notatum* and *P.expansum*. *Penicillium* was the fourth genus regarding the total count, 151 isolates outside and 1043 isolates inside in 288 plates which constituted 1.28% and 8.86% respectively of the total fungi in this experiment (Table, 17). The maximum count of the genus was recorded at 10 a.m. inside and outsid on Czapek's-agar (Table, 12) and at 10 a.m. inside and 4 p.m. outside on Sabouraud-agar (Table, 13). At 10 a.m., four daily maxima were recorded inside poultry farm, two of them on Czapek's-agar at February and March and the others on Sabouraud-agar at February and April (Table, 7). At 4 a.m, 4 p.m. and 10 p.m., two, one and two daily maxima were recorded respectively. Table 17 revealed that *P.roqueforti*

Table [17]:Total counts and ferquencies of occurrence of *Penicillium* spp. during the period of January-June 1988 inside and outside the poultry farm on Czapek-Dox-agar and Sabouraud-agar media.

i-On Czapek-Dox-agar medium:

| Species | Inside | | | Outside | | |
|---|---|---|---|---|---|---|
| | T.C | % | F. | T.C | % | F. |
| *Penicillium roqueforti* Thom | 477 | 96.17 | 10 | 89 | 94.68 | 9 |
| *P.notatum* Westling | 19 | 3.83 | 1 | 4 | 4.26 | 2 |
| *P.expansum* (Link)Thom | - | - | - | 1 | 1.06 | 1 |
| Total count | 496 | 100% | | 94 | 100% | |

ii-On Sabouraud-agar medium:

| Species | Inside | | | Outside | | |
|---|---|---|---|---|---|---|
| | T.C | % | F. | T.C | % | F. |
| *Penicillium roqueforti* Thom | 498 | 91.04 | 10 | 54 | 94.74 | 7 |
| *P.notatum* Westling | 30 | 5.48 | 1 | - | - | - |
| *P.expansum* (Link)Thom | 19 | 3.47 | 2 | 3 | 5.26 | 1 |
| Total count | 547 | 100% | | 57 | 100% | |

T.C. = Total count

F. = Frequency of occurrence

was the highest frequency inside and outside poultry farm, where the number of cases of isolation on Czapek's-agar was 10 and 9 cases respectively and on Sabouraud-agar was 10 and 7 cases inside and outside respectively.

**Percentage count and number of cases of isolation:**

The total count of fungi was more inside than outside on two media used. This high count was due to heavy showers of *Scopulariopsis*, *Cladosporium*, *Aspergillus* and *Penicillium* in outside or inside the farm.

Inside poultry farm *Scopulariopsis* owned the largest number of isolates among all the genera recorded in the present experiment specially inside poultry farm. The total count of this genus was 1421 and 2004 isolates which constituted 42.88% and 53.55% of total percentage count on Czapek's-agar and Sabouraud-agar respectively (Tables 10&11). The number of cases of isolation of *Scopulariopsis* was 24 cases on Sabouraud-agar which represented the highest frequency of all genera (Table, 11) and 23 cases on Czapek's-agar which came behind *Aspergillus* and represented the highest frequency on this medium which was 24 cases (Table, 10). *S.brevicaulis* owned the highest number of cases of isolation among all different species recorded during this experiment as 24 cases and 23 cases which constituted

32.1% and 35.2% of total percentage count on Czapek's-agar and Sabouraud-agar respectively (Table, 18). *Cladosporium cladosporiodes* was the second species regarding number of cases of isolation as 15 cases and 18 cases which represented 6.4% and 4.9% of total percentage count on Czapek's-agar and Sabouraud-agar respectively (Table, 18).

Outsid poultry farm, *Cladosporium* owned the highest number of isolates among all the genera in the present experiment specially outside poultry farm. The total count of this genus was 968 and 977 isolates which constituted 41.96% and 40.55% of total percentage count on Czapek's-agar and Sabouraud-agar respectively (Tables 10&11). The number of cases of isolation of the same genus was 21 cases on Czapek's-agar which represented the highest frequency of all genera (Table, 10) and 21 cases on Sabouraud-agar which came behind *Scopulariopsis* and represented the highest frequency on this medium which was 22 cases (Table, 11). Furthermore, *S.brevicaulis* owned the highest nubmer of cases of isolation among all the species recorded in this experiment as 21 cases and 23 cases which constituted 10.5% and 12.7% of total percentage count on Czapek's-agar and Sabouraud-agar respectively. *Cladosporium cladosporiodes* was the second species regading number of cases of isolation as 19 cases and 18 cases which represented 26.6% and 27.6% of total percentage count on Czapek's agar and Sabouraud-agar

Table(18):Percentage count of air-borne fungal species and their frequency inside and outside poultry farm on Dox and Sab. media at 6-hour intervals during 6-days of January-June 1988.

| Fungal species | Inside | | | | outside | | | |
|---|---|---|---|---|---|---|---|---|
| | Dox | | Sab. | | Dox | | Sab. | |
| | F | % | F | % | F | % | F | % |
| *Aspergillus fumigatus* Fres. | 3 | 6.0 | 4 | 6.4 | 1 | 0.1 | - | - |
| *A.clavatus* Desm | 4 | 0.2 | 3 | 0.2 | - | - | - | - |
| *A.ochraceus* Wilhelm | 6 | 1.4 | 5 | 0.3 | 5 | 0.7 | 5 | 0.3 |
| *A.niger* Van Tieghem | 10 | 1.1 | 9 | 0.6 | 3 | 0.2 | 4 | 0.3 |
| *A.flavus* Link ex Fr. | 8 | 2.3 | 10 | 2.4 | 4 | 0.5 | 6 | 0.5 |
| *A.versicolor* (Vuill.)Triab. | 2 | 0.7 | - | - | 2 | 2.0 | - | - |
| *A.nidulans* (Eidam)Wint. | 2 | 0.1 | - | - | - | - | 1 | 0.04 |
| *A.ustus* (Bain.)Thom&Church | 1 | 0.03 | - | - | - | - | - | - |
| *A.condulans* Link ex. Fr. | 2 | 0.1 | 1 | 0.1 | 1 | 0.04 | 2 | 0.7 |
| *A.flavipes* Thom & Church | 1 | 0.1 | - | - | 1 | 0.3 | 1 | 0.04 |
| *A.wentii* Wehmer | 8 | 4.6 | 5 | 2.7 | 4 | 1.3 | 8 | 1.5 |
| *A.restrictus* Smith | - | - | 1 | 0.03 | 1 | 0.1 | - | - |
| *A.glaucus* Thom&Rapper | - | - | - | - | 1 | 0.1 | - | - |
| *Penicillium notatum* Westling | 1 | 0.6 | 1 | 0.8 | 2 | 0.2 | - | - |
| *P.roquefortii* Thom | 10 | 14.4 | 10 | 13.3 | 9 | 3.9 | 7 | 2.2 |
| *P.expansum* (Link)Thom | - | - | 2 | 0.5 | 1 | 0.04 | 1 | 0.1 |
| *Scopulariopsis brevicaulis* (Sacc.)Bainier | 24 | 32.1 | 23 | 35.2 | 21 | 10.5 | 23 | 12.7 |
| *S.brumptii* Salvanet-Duval | 7 | 3.7 | 9 | 4.5 | 6 | 3.0 | 9 | 6.2 |
| *S.constantini* Bainier | 14 | 7.2 | 15 | 13.9 | 13 | 3.8 | 12 | 4.9 |
| *Cladosporium sphaerospermium* Penzig | 9 | 3.6 | 9 | 2.1 | 17 | 14.4 | 17 | 10.7 |
| *C.cladosporiodes* (Fresen.) de vries | 15 | 6.4 | 18 | 4.9 | 19 | 26.6 | 18 | 27.6 |
| *C.herbarum* (Pers.) Link ex Gray. | - | - | 1 | 0.4 | 3 | 0.6 | 3 | 1.2 |
| *C.oxysporum* Berk & Curt. | 3 | 0.2 | 1 | 0.1 | 2 | 0.3 | 2 | 0.3 |
| *C.macrocarpum* Preuss | - | - | 1 | 0.1 | 1 | 0.04 | 1 | 0.3 |
| *Alternaria alternata* (Fr.) Keissler | 12 | 1.0 | 6 | 1.5 | 23 | 8.9 | 23 | 11.3 |
| *A.dianthi* Stevens & Hall. | - | - | 1 | 0.04 | - | - | 2 | 0.4 |

F = Frequency of occurrence

Table (18): Cont.

| Fungal species | Inside | | | | outside | | | |
|---|---|---|---|---|---|---|---|---|
| | Dox | | Sab. | | Dox | | Sab. | |
| | F | % | F | % | F | % | F | % |
| *Fusarium Solani* (Mart.)Sacc. ,Michelia | - | - | - | - | 1 | 0.1 | - | - |
| *F.moniliforme* Sheldon | 4 | 0.8 | 3 | 0.2 | 7 | 2.0 | 3 | 0.7 |
| *F.oxysporum* Schlecht | - | - | - | - | 1 | 0.04 | 1 | 0.3 |
| *F.nivale* (Fries) Cesati | 1 | 0.1 | - | - | 5 | 0.7 | 9 | 1.2 |
| *F.dimerum* Penzig | 1 | 0.1 | 1 | 0.02 | 4 | 0.2 | 8 | 1.2 |
| *F.semitictum* Berk & Rav. | - | - | - | - | 3 | 0.9 | 1 | 0.04 |
| *Cunninghamella echinulata* Thaxter | 3 | 0.4 | 3 | 0.2 | - | - | 1 | 0.04 |
| *Derchslera siccans* (Drechsler)Shoemaker | - | - | - | - | 1 | 0.14 | 2 | 0.16 |
| *D.erythrospila* (Drechsler)Shoemaker | 1 | 0.1 | 2 | 0.2 | - | - | 4 | 2.2 |
| *D.euphorbiae* (hansford)M. B. Ellis | 2 | 0.2 | - | - | 1 | 0.3 | - | - |
| *D.halodes* (Drechsler) Subram. & Jain | - | - | - | - | 2 | 0.34 | - | - |
| *Stemphylium botryosum* Waltr | - | - | 1 | 0.07 | 9 | 0.8 | 6 | 0.36 |
| *S.piriforme* Bonorden | 2 | 0.1 | - | - | 4 | 0.33 | 3 | 0.3 |
| *Curvularia oryza* Bugnicourt | 1 | 0.13 | - | - | 1 | 0.14 | - | - |
| *C.lunata* (Wakker) Boedijn | 1 | 0.3 | 1 | 0.09 | 5 | 1.9 | 3 | 1.7 |
| *C.pallescens* Boedijn | - | - | - | - | 1 | 0.13 | 2 | 0.2 |
| *C.brachyspora* Boedijn | 3 | 0.3 | 4 | 1.2 | 2 | 0.3 | 3 | 1.25 |
| *C.clavata* Jain | 1 | 0.2 | 2 | 0.1 | 2 | 0.3 | 1 | 0.2 |
| *C.ovoidea* (Hiroe & Watan.) | - | - | 1 | 0.05 | - | - | - | - |
| *Mucor silvaticus* Hagem | 5 | 0.5 | 6 | 0.4 | - | - | 3 | 0.17 |
| *M.strictus* Hagem | 5 | 1.0 | 4 | 0.4 | 3 | 0.3 | - | - |
| *Cephalosporium curtipes* Saccardo | 2 | 0.28 | - | - | 1 | 0.56 | 1 | 0.18 |
| *C.roseo-griseum* Saksena | 4 | 0.35 | - | - | 2 | 1.6 | 4 | 0.6 |
| *Torula herbarum* (Pers)Link ex Fr. | 3 | 0.1 | 1 | 0.15 | 7 | 1.3 | 1 | 0.1 |
| *T.alli* (Harz) Saccardo | - | - | - | - | 4 | 0.6 | 1 | 0.07 |
| *Rhizoctonia Solani* | - | - | - | - | 1 | 0.17 | - | - |

Table (18): cont.

| Fungal species | Inside | | | | outside | | | |
|---|---|---|---|---|---|---|---|---|
| | Dox | | Sab. | | Dox | | Sab. | |
| | F | % | F | % | F | % | F | % |
| *Aphanomyces laevis* de Bary | 2 | 0.1 | 1 | 0.1 | - | - | 1 | 0.04 |
| *Doratomyces phillipsii* (Berk & Legighton) | 7 | 2.0 | 5 | 1.3 | 4 | 0.3 | 2 | 0.1 |
| *Sepedonium chrysospermum* (Bull.) Fr. | 1 | 0.4 | - | - | 1 | 0.48 | - | - |
| *Stachybotrys atra var microspora* Mathur & Sankhla | 1 | 0.03 | - | - | 5 | 0.4 | - | - |
| *Rhizopus nigricons* Ehrenberg | 9 | 0.5 | 19 | 2.0 | - | - | 7 | 1.0 |
| *Circinella spinosa* Tieghem & Le Monnier | 5 | 0.4 | 3 | 0.2 | - | - | - | - |
| *Botryotrichum atorgriseum* Van Beyma | 19 | 3.56 | 8 | 1.5 | 18 | 5.4 | 18 | 3.5 |
| *Chaetomium magnum* Bainier | 6 | 0.4 | 5 | 0.2 | 5 | 0.69 | 1 | 0.1 |
| *C.caprinum* Bainier | 3 | 1.2 | 2 | 0.5 | - | - | - | - |
| *Nigrospora sphaerica* (Saccardo)Moson | 1 | 0.4 | - | - | 4 | 0.6 | 5 | 0.6 |
| *Absidia glauca* Hagem | 1 | 0.27 | 3 | 0.35 | 1 | 0.3 | 1 | 0.1 |
| *Mycelia sterilia* | - | - | 1 | 0.07 | 11 | 1.13 | 10 | 1.95 |
| Total count | 3314 | | 3742 | | 2307 | | 2409 | |

respectively. *C.cladosporiodes* owned a percentage count more than *S.brevicaulis*, and the last species owned number of cases of isolation more than *C.cladosporiodes* outside the farm, while inside the farm *S.brevicaulis* owned percentage count and number of cases of isolation more than *C.cladosporiodes* (Table, 18).

### III- Air-Borne Fungi in Different Localities:

This experiment was carried out at different localities at Qalubia governorate. Air-borne fungi of Benha locality ($L_1$) and Sheblanga locality ($L_2$) were recorded at February and March 1988, while Moshtohour locality ($L_3$) and El-Safa locality ($L_4$) were recorded at September and October 1988. Three plates of Czapek's-agar + rose bengal (0/15000) and three plates for Sabouraud-agar were exposed to the air of poultry farms of five minutes at half meter high at the following times: pre-entry the flock of chickens, then after 15-days, 30-days and 45-days (15-days intervals). The plates were then incubated at 27°c and the developing fungal isolates were counted and identified.

**Total fungi recorded in 4 localities:**

The total count through the present experiment was 3872 isolates in 96 plates of two media used (Table, 19). 25 genera and 63 species were identified during this experiment (Tables 27 and 28). The fluctuations of fungal count at different localities were recorded on Czapek's-agar and Sabouraud-agar

media. Moshtohour locality ($L_3$) indicated the highest total count of fungi on Czapek's-agar and recorded 573 isolates which constituted 14.80% of the total count of fungi collected during this experiment at different localities while Benha locality ($L_1$) indicated the highest count on Sabouraud-agar and recorded 755 isolates which constituted 19.50% of the total count of fungi in the whole experiment. The maximum counts of fungi was recorded after 45-days of breeding on Czapek's-agar and Sabouraud-agar as 611 and 632 isolates which constituted 15.78% and 16.32% respectively of the total count of fungi in the whole experiment at different localities (Table, 19).

At statistical analysis; correlation coefficient (r) between $L_1$ & $L_2$ (when $L_1$ constant) was 0.936 and F-value was significant, while correlation coefficient between $L_1$ & $L_2$ (when $L_2$ constant) as 0.871 and F-value was non-significant. Also correlation coefficient between $L_3$ & $L_4$ (when $L_3$ constant) was 0.957 and F-value was significant, while correclation coefficient between $L_3$ & $L_4$ (when $L_4$ constant) was 0.994 and F-value was highly significant (Table, 19).

1- Benha locality ($L_1$):

**a. Isolation an Czapeks's-agar:** The total number of fungi at this locality was 532 isolates in 12 plates which represented 29.34% of the total fungi isolated on this medium from different localities and represented 13.74% of the total fungi allthrough the experiment. Fungi isolated at different times of complete period of chicks breeding were 72, 131, 156 and 173 isolates at pre-entery of the flock of chickens, after 15-days, 30-days and after 45-days respectively (Table, 19 and Fig. 9). It was observed that, the fungal count increased gradually until reach the maximum at 45-days. 17 fungal genera were identified at this locality on this medium. *Scopulariopsis* owned the highest number of isolates among all the genera recorded at this locality, and its total count was 281 isolates which constituted 52.22% of the total fungi collected at this locality. *Penicillium* and *Cladosporium* recorded a relatively high shower, and its total count was 90 and 74 isolates which represented 16.92% and 13.91% respectively, of the total fungi at this locality (Table, 20).

**b- Isolation on Sabouraud-agar:** This locality recorded the highest count of fungi among all localities on this medium and represented 755 isolates in 12 plates which constituted 36.67% of the total count of fungi collected on

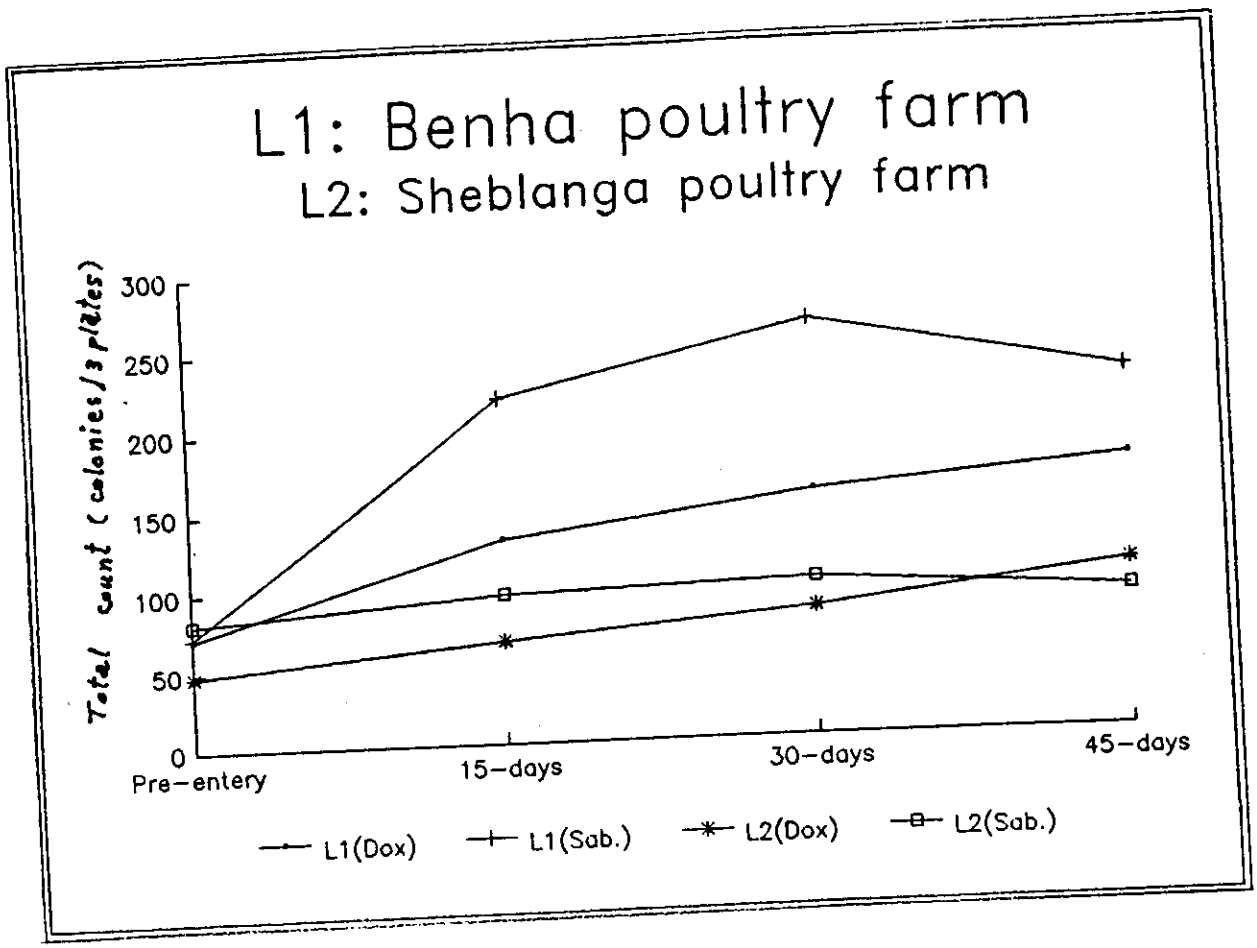
this medium and constituted 19.50% of the total count of fungi all through the experiment. The isolated fungi at different times were 73, 219, 236 and 227 isolates at pre-entry the flock of chickens, after 15-days, 30-days and 45-days respectively (Table, 19 and Fig. 9). The maximum count of fungi was recorded after 30-days of breeding. 14 genera were identified at this locality on this medium. *Scopulariopsis* showed the highest number of isolates among all genera recorded at this locality, and its total count was 488 isolates which constituted 64.64% of the total fungi collected at this locality. *Penicillium* and *Cladosporium* recorded a relatively high showers, and its total count was 121 and 67 isolates which represented 16.03% and 8.87% respectively of the total fungi at this locality (Table,21).

2- Sheblanga locality ($L_2$):

a. **Isolation on Czapek's-agar:**This locality recorded the lowest count of fungi on this medium and it was 303 isolates in 12 plates which constituted 16.71% of the total fungi isolated on this medium, and constituted 7.83% of the total fungi allthrough the experiment. Fungi isolated at different times of complete period of chicks breeding were 48, 66, 82 and 107 isolates at pre-entry the flock of chickens, after 15-days, 30-days and 45-days respectively (Table, 19 and Fig. 9). The fungal count increased gradually until reach the maximum at 45-days. 13 genera were identified at this locality on this medium. *Scopulariopsis* owned the highest

number of isolates among all genera recorded at this locality, and its total count was 133 isolates which represented 43.89% of the total fungi collected at this locality. *Cladosporium* and *Aspergillus* recorded a relatively high showers, and its total count was 52 and 36 isolates which represented 17.16% and 11.88% respectively of the total fungi at this locality (Table,20). *Doratomyces*, *Botryotrichum*. *Nigrospora* and *Alternaria* were represented 8.25%, 4.95%, 4.29% and 3.96% respectively, of the total fungi at this locality. *Penicillium* and *Fusarium* not represented at this locality.

**b. Isolation on sabouraud-agar:** This locality recorded the lowest count of fungi on this medium and it was 368 isolates in 12 plates which constituted 17.87% of the total count of fungi collected on this medium, and constituted 9.50% of the total count of fungi allthrough the experiment. The isolated fungi at different times were 81, 96, 101 and 90 isolates at pre-entry the flock of chickens, after 15-days, 30-days and 45-days respectively (Table, 19 and Fig. 9). The maximum count of fungi was after 30-days of breeding, 12 genera were identified at this locality on this medium. *Scopulariopsis* showed the highest number of isolates among all genera recorded at this locality, and its total count was 221 isolates which represented 60.05% of the total fungi collected at this locality. *Clodosporium* followed the




(Fig. 9): Total counts of air-borne fungi isolated from Benha and Sheblanga poultry farms at different times during February and March 1988.

above genus and counted 82 isolates which represented 22.28% of the total count of fungi at this locality. *Doratomyces*, *Alternaria*, *Mucor* and *Rhizopus* were constituted 4.34%, 3.80%, 2.71% and 2.44% respectively of the total fungi at this locality. *Penicillium*, *Fusarium*, *Curvularia* and *Sepedonium* were not represented at this locality (Table,21).

### 3- Moshtohour locality ($L_9$):

**a. Isolation on Czapek's-agar:** This locality represented the highest count of fungi among all localities on this medium and recorded 573 isolates in 12 plates which constituted 31.61% of the total count of fungi collected on this medium and constituted 14.80% of the total count of fungi during the whole experiment. The isolated fungi at different times of complete period of chicks breeding were 60, 128, 186 and 199 isolates at pre-entry the flock of chickens, after 15-days, 30-days and 45-days respectively (Table, 19 and Fig. 10). The fungal count increased gradually until reach the maximum at 45-days. 16 genera were identified at this locality on this medium. *Scopulariopsis* owned the highest number of colonies among all genera recorded at this locality. The total count was 194 isolates and constituted 33.86% of the total fungi collected at this locality. *Cladosporium* recorded a relatively high shower, and its total count was 133 isolates which constituted 23.21% of the total fungi at this locality. *Penicillium* and *Aspergillus* recorded a moderate showers and its total count

was 96 and 46 isolates which represented 16.75% and 8.03% respectively of total fungi at this locality. *Chaetomium*, *Botryotrichum*, *Alternaria* and *Fusarium* were represented 4.01%, 3.14%, 2.79% and 2.62% respectively of the total fungi at this locality (Table, 20).

**b. Isolation on Sabouraud-agar:** The total fungi at this locality was 486 isolates in 12 plates which constituted 23.60% of the total fungi isolated on this medium and constituted 12.55% of the total fungi during the whole experiment. The isolated fungi at defferent times of complete period of chicks breeding were 58, 119, 150 and 159 isolates at pre-entry the flock of chickens, after 15-days, 30-days and 45-days respectively (Table, 19 and Fig. 10). The fungal count increased gradually until reach the maximum at 45-days. 21 genera were identified at this locality on this medium and considered the maximum number of genera at the four localities on two media used. *Cladosporium* owned the highest number of isolates among all genera recorded at this locality and its total count was 140 isolates which represented 28.81% of the total fungi collected at this locality. *Scopulariopsis* recorded a high shower and its total count was 112 isolates which constituted 23.05% of the total fungi at this localtiy. *Penicillium* recorded a moderate shower, and its total count was 57 isolates which represented 11.73% of the total fungi at this locality.

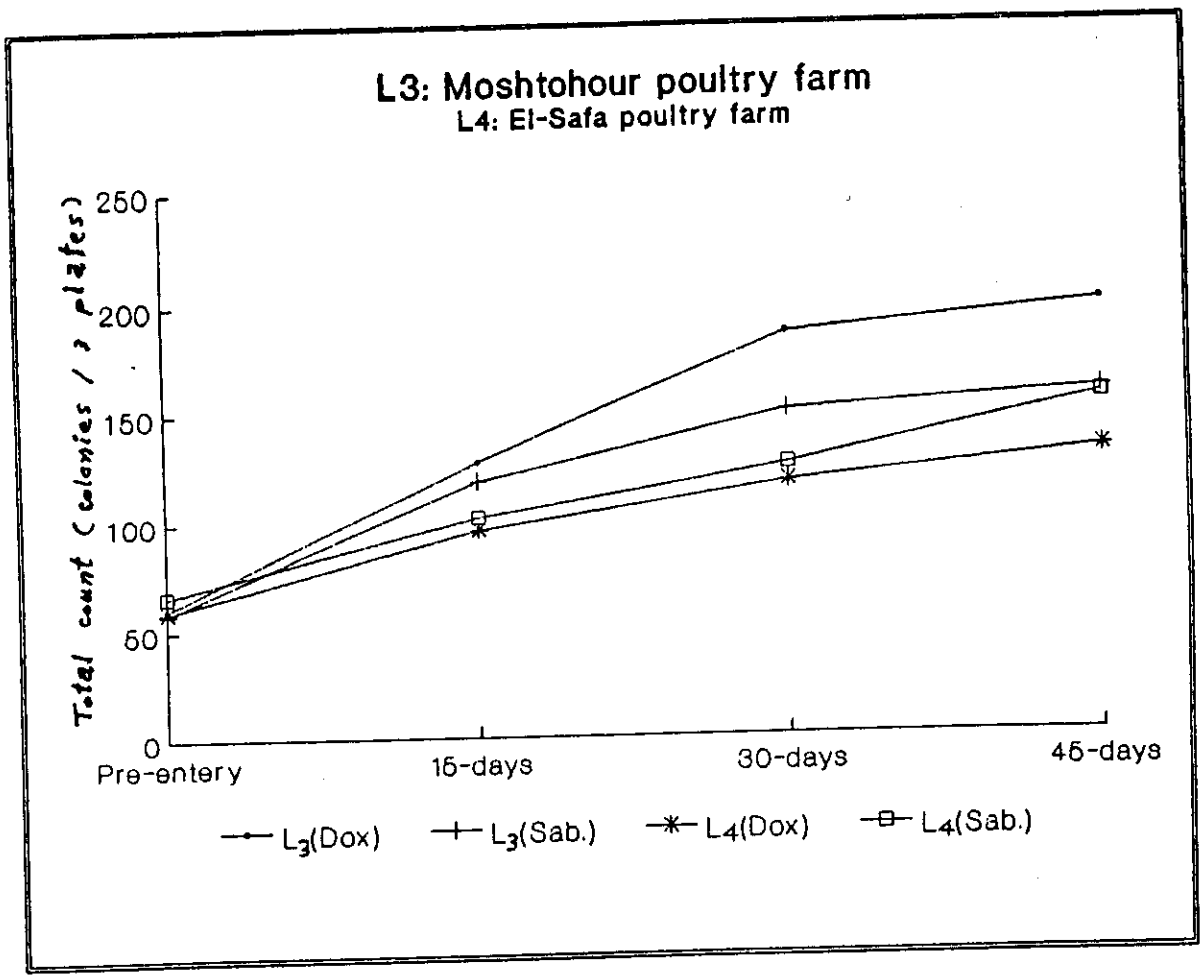
*Aspergillus, Alternaria, Fusarium,* and *Cephalosporium* were represented 6.58%, 6.38%, 4.12%, and 2.47% respectively of the total fungi at this locality (Table, 21).

4- El-Safa locality ($L_4$):

a. Isolation on Czapek's-agar:The total fungi collected at this locality was 405 isolates in 12 plates which constituted 22.34% of the total count of fungi isolated on this medium, and constituted 10.46% of the total count of fungi allthrough the experiment. The isolated fungi at different times of complete period of ckicks breeding were 59, 96, 118 and 132 isolates at pre-entery the flock of chickens, after 15-days, 30-days and 45-days respectively (Table, 19 and Fig.10). The fungal count increased gradually until reach the maximum at 45-days. 13 genera were identified at this locality on this medium. *Aspergillus* and *Cladosporium* showed the highest number of isolates among all genera recorded at this locality, and its total count was 92 and 87 isolates which constituted 22.72% and 21.48% respectively of the total count of fungi at this locality. *Scopulariopsis* recorded a relatively high shower, and its total count was 69 isolates which represented 17.04% of the total fungi at this locality. *Penicillium* recorded a moderate shower and its total count was 48 isolates which represented 11.85% of the total fungi at this locality. *Fusarium, Sepedonium, Alternaria* and *Botryotrichum* were

represented 8.64%, 6.17%, 3.70% and 3.21% respectively, of the total fungi at this locality (Table, 20).

**b. Isolation on Sabouraud-agar:**The total fungi isolated at this locality was 450 isolates in 12 plates which constituted 21.86% of the total fungi recorded on this medium, and constituted 11.62% of the total count of fungi allthrough the experiment. The isolated fungi at different times of complete period of chicks breeding were 66, 102, 126 and 156 isolates at pre-entery the flock of chickens, after 15-days, 30-days and 45-days respectively (Table, 19 and Fig. 10). The fungal count increased gradually until reach the maximum at 45-days. 15 genera were identified at this locality on this medium. *Scopulariopsis* owned the highest number of isolates among all genera recorded at this locality, and its total count was 174 isolates which constituted 38.67% of the total fungi collected at this locality. *Cladosporium* recorded a moderate shower, and its total count was 89 isolates which represented 19.78% of the total fungi isolated at this locality. *Alternaria*, *Fusarium*, *Aspergillus*, *Penicillium*, *Epicoccum* and *Curvulatia* were represented 8.67%, 6.22%, 5.56%, 4.67%, 4.67% and 3.56% respectively of the total fungi recorded at this locality (Table, 21).




(Fig. 10):Total counts of air-borne fungi isolated from Moshtohour and El-Safa poultry farms at different times during September and October 1988.

Table[20]:Counts of air-borne fungi isolated from the poultry farms in different localities, at different breeding periods; on Dox medium.

| Time & localities | L1 | | | | | | L2 | | | | | | L3 | | | | | | L4 | | | | | | T4 | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| genera | l1 | l2 | l3 | l4 | T | % | l1 | l2 | l3 | l4 | T | % | l1 | l2 | l3 | l4 | T | % | l1 | l2 | l3 | l4 | T | % | | |
| *Scopulariopsis* | 41 | 63 | 64 | 113 | 281 | 52.219 | 10 | 49 | 36 | 38 | 133 | 43.894 | - | 18 | 93 | 83 | 194 | 33.856 | - | 15 | 4 | 50 | 69 | 17.037 | 677 | 37.341 |
| *Cladosporium* | 18 | 18 | 24 | 14 | 74 | 13.909 | 11 | 5 | 10 | 26 | 52 | 17.161 | 13 | 72 | 21 | 27 | 133 | 23.211 | 17 | 19 | 20 | 31 | 87 | 21.481 | 346 | 19.084 |
| *Aspergillus* | - | 12 | 6 | 4 | 22 | 4.135 | 1 | 3 | 8 | 24 | 36 | 11.881 | 17 | 1 | 19 | 9 | 46 | 8.027 | 4 | 13 | 48 | 27 | 92 | 22.716 | 196 | 10.810 |
| *Penicillium* | - | 24 | 45 | 21 | 90 | 19.917 | - | - | - | - | - | -- | 9 | - | 39 | 48 | 96 | 16.753 | 2 | 17 | 24 | 5 | 48 | 11.851 | 234 | 12.906 |
| *Rhizopus* | - | - | - | - | - | - | - | - | 3 | - | 3 | 0.990 | - | - | 2 | - | 2 | 0.349 | - | - | - | - | - | - | 5 | 0.275 |
| *Fusarium* | - | - | - | - | - | - | - | - | - | - | - | -- | 5 | 8 | - | 2 | 15 | 2.617 | 20 | 10 | 4 | 1 | 35 | 8.641 | 50 | 2.757 |
| *Curvularia* | 3 | - | - | - | 3 | 0.563 | - | - | - | - | - | -- | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 0.165 |
| *Sepedonium* | - | - | - | - | - | - | - | - | - | - | - | -- | - | - | - | - | - | - | - | 12 | 13 | - | 25 | 6.172 | 25 | 1.378 |
| *Alternaria* | 4 | 9 | 1 | - | 14 | 2.631 | 3 | 1 | - | 8 | 12 | 3.960 | 8 | 8 | - | - | 16 | 2.792 | 8 | 1 | 3 | 3 | 15 | 3.703 | 57 | 3.143 |
| *Chaetomium* | - | - | - | 4 | 4 | 0.751 | 1 | - | 2 | - | 3 | 0.990 | - | - | - | 23 | 23 | 4.013 | - | - | - | - | - | - | 30 | 1.654 |
| *Stemphylium* | - | - | 2 | - | 2 | 0.375 | - | - | - | - | - | -- | 2 | 3 | - | - | 5 | 0.872 | - | - | - | 3 | 3 | 0.740 | 10 | 0.551 |
| *Botryotrichum* | 3 | - | 3 | 10 | 16 | 3.007 | 1 | 8 | 2 | 4 | 15 | 4.950 | - | 11 | 5 | 2 | 18 | 3.141 | - | 6 | 1 | 6 | 13 | 3.209 | 62 | 3.419 |
| *Nigrospora* | - | - | - | - | - | - | 13 | - | - | - | 13 | 4.290 | - | - | - | - | - | - | - | - | - | - | - | - | 13 | 0.717 |
| *Drechslera* | 3 | 4 | - | 2 | 9 | 1.691 | - | - | 2 | - | 2 | 0.660 | - | - | - | - | - | - | - | - | - | - | - | - | 11 | 0.606 |
| *Doratomyces* | - | 1 | - | - | 1 | 0.187 | 6 | - | 19 | - | 25 | 8.250 | - | - | - | - | - | - | - | - | - | - | - | - | 26 | 1.434 |
| *Absidia* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | 0.174 | - | - | - | - | - | - | 1 | 0.055 |
| *Epicoccum* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6 | - | - | - | 6 | 1.481 | 6 | 0.331 |
| *Stachybotrys* | - | - | - | - | - | - | - | - | - | 1 | 1 | 0.330 | - | - | - | - | - | - | - | - | 1 | - | 1 | 0.246 | 2 | 0.110 |
| *Cephalosporium* | - | - | - | - | - | - | - | - | - | 5 | 5 | 1.650 | - | - | - | - | - | - | - | - | - | 5 | 5 | 1.234 | 10 | 0.551 |
| *Circinella* | - | - | - | 1 | 1 | 0.187 | - | - | - | - | - | - | - | - | 1 | - | 1 | 0.174 | - | - | - | - | - | - | 2 | 0.110 |
| *Aphanomyces* | - | - | 2 | - | 2 | 0.375 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 0.110 |
| *Mucor* | - | - | - | 4 | 4 | 0.751 | - | - | - | - | - | - | - | - | 3 | - | 3 | 0.523 | - | - | - | - | - | - | 7 | 0.386 |
| *Torula* | - | - | - | - | - | - | 2 | - | - | 1 | 3 | 0.990 | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 0.165 |
| *Cunninghamella* | - | - | 9 | - | 9 | 1.691 | - | - | - | - | - | - | - | - | 2 | - | 2 | 0.349 | - | - | - | - | - | - | 11 | 0.606 |
| *Rhizoctonia* | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | - | - | 5 | 0.872 | - | 3 | - | - | 3 | 0.740 | 8 | 0.441 |
| *Mycelia sterilia* | - | - | - | - | - | - | - | - | - | - | - | - | 6 | 2 | - | 5 | 13 | 2.268 | 2 | - | - | 1 | 3 | 0.740 | 16 | 0.882 |
| Total count | 72 | 191 | 156 | 173 | 592 | 100 | 48 | 66 | 82 | 107 | 303 | 100 | 60 | 128 | 186 | 199 | 573 | 100 | 59 | 96 | 118 | 132 | 405 | 100 | 1813 | 100 |

l1=per-entry
l2=15-days
T=Total
l3=30-days
l4=45-days
T4=Total of four localities

Table (21): Counts of air-borne fungi isolated from the poultry farms in different localities, at different breeding periods; on Sab. medium.

| Time & localities | L1 | | | | | | L2 | | | | | | L3 | | | | | | L4 | | | | | | T4 | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Genera | t1 | t2 | t3 | t4 | T | % | t1 | t2 | t3 | t4 | T | % | t1 | t2 | t3 | t4 | T | % | t1 | t2 | t3 | t4 | T | % | | |
| *Scopulariopsis* | 49 | 129 | 157 | 153 | 488 | 64.635 | 61 | 58 | 58 | 44 | 221 | 60.054 | - | 1 | 39 | 72 | 112 | 23.045 | - | 40 | 86 | 48 | 174 | 38.666 | 995 | 48.324 |
| *Cladosporium* | 10 | 20 | 17 | 20 | 67 | 8.874 | 17 | 22 | 18 | 25 | 82 | 22.282 | 16 | 75 | 23 | 26 | 140 | 28.806 | 18 | 24 | 11 | 36 | 89 | 19.777 | 378 | 18.358 |
| *Aspergillus* | - | 22 | - | 7 | 29 | 3.841 | - | 1 | - | - | 1 | 0.271 | 8 | 4 | 12 | 8 | 32 | 6.584 | 7 | 8 | 2 | 8 | 25 | 5.555 | 87 | 4.225 |
| *Penicillium* | - | 34 | 48 | 39 | 121 | 16.026 | - | - | - | - | - | -- | 6 | - | 34 | 17 | 57 | 11.728 | 7 | 5 | 2 | 7 | 21 | 4.666 | 199 | 9.664 |
| *Rhizopus* | - | 8 | 4 | 4 | 16 | 2.119 | - | 3 | - | 6 | 9 | 2.445 | - | 4 | - | 2 | 6 | 1.234 | - | 2 | - | 3 | 5 | 1.111 | 36 | 1.748 |
| *Fusarium* | - | 4 | - | - | 4 | 0.529 | - | - | - | - | - | -- | 11 | 3 | 5 | 1 | 20 | 4.115 | 12 | 3 | 5 | 8 | 28 | 6.222 | 52 | 2.525 |
| *Curvularia* | 3 | - | - | - | 3 | 0.397 | - | - | - | - | - | -- | - | - | 4 | - | 4 | 0.823 | - | 1 | 4 | 11 | 16 | 3.555 | 23 | 1.117 |
| *Sepedonium* | - | - | - | - | - | - | - | - | - | - | - | -- | - | - | 3 | - | 3 | 0.617 | - | 5 | 3 | 4 | 12 | 2.666 | 15 | 0.728 |
| *Alternaria* | 8 | - | - | - | 8 | 1.059 | - | 4 | - | 10 | 14 | 3.804 | 10 | 10 | 8 | 3 | 31 | 6.378 | 10 | 2 | 8 | 19 | 39 | 8.666 | 92 | 4.468 |
| *Chaetomium* | 1 | - | - | - | 1 | 0.132 | 1 | 2 | 2 | - | 5 | 1.358 | - | - | 1 | 5 | 6 | 1.234 | - | 1 | 1 | - | 2 | 0.444 | 14 | 0.679 |
| *Stemphylium* | - | - | - | 1 | 1 | 0.132 | 1 | - | - | - | 1 | 0.271 | 1 | 2 | - | - | 3 | 0.617 | 1 | - | - | - | 1 | 0.222 | 6 | 0.291 |
| *Botryotrichum* | - | - | 4 | 1 | 5 | 0.662 | - | - | - | - | - | - | - | 1 | - | - | 1 | 0.205 | - | 4 | - | 3 | 7 | 1.555 | 13 | 0.631 |
| *Drechslera* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 0.444 | 2 | 0.097 |
| *Doratomyces* | 2 | - | - | - | 2 | 0.264 | 1 | - | 15 | - | 16 | 4.347 | - | - | - | - | - | - | - | - | 2 | - | 2 | 0.444 | 20 | 0.971 |
| *Absidia* | - | - | 1 | 2 | 3 | 0.397 | - | - | - | 5 | 5 | 1.358 | - | - | 2 | 22 | 24 | 4.938 | - | - | - | - | - | - | 32 | 1.554 |
| *Epicoccum* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 7 | 2 | 7 | 21 | 4.666 | 21 | 1.019 |
| *Cephalosporium* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 12 | - | 12 | 2.469 | - | - | - | - | - | - | 12 | 0.582 |
| *Circinella* | - | - | - | - | - | - | - | 2 | - | - | 2 | 0.543 | - | - | 3 | - | 3 | 0.617 | - | - | - | - | - | - | 5 | 0.243 |
| *Mucor* | - | 2 | 5 | - | 7 | 0.927 | - | 2 | 8 | - | 10 | 2.717 | - | - | 1 | - | 1 | 0.205 | - | - | - | - | - | - | 18 | 0.874 |
| *Torula* | - | - | - | - | - | - | - | 2 | - | - | 2 | 0.543 | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 0.097 |
| *Cunninghamella* | - | - | - | - | - | - | - | - | - | - | - | - | - | 15 | 3 | - | 18 | 3.703 | - | - | - | - | - | - | 18 | 0.874 |
| *Mycelia sterilia* | - | - | - | - | - | - | - | - | - | - | - | - | 6 | 4 | - | 3 | 13 | 2.674 | 6 | - | - | - | 6 | 1.333 | 19 | 0.923 |
| Total count | 73 | 219 | 236 | 227 | 755 | 100 | 81 | 96 | 101 | 90 | 368 | 100 | 58 | 119 | 150 | 159 | 486 | 100 | 66 | 102 | 126 | 156 | 450 | 100 | 2059 | 100 |

t1=per-entry
t2=15-days
T=Total
t3=30-days
t4=45-days
T4=Total of four localities

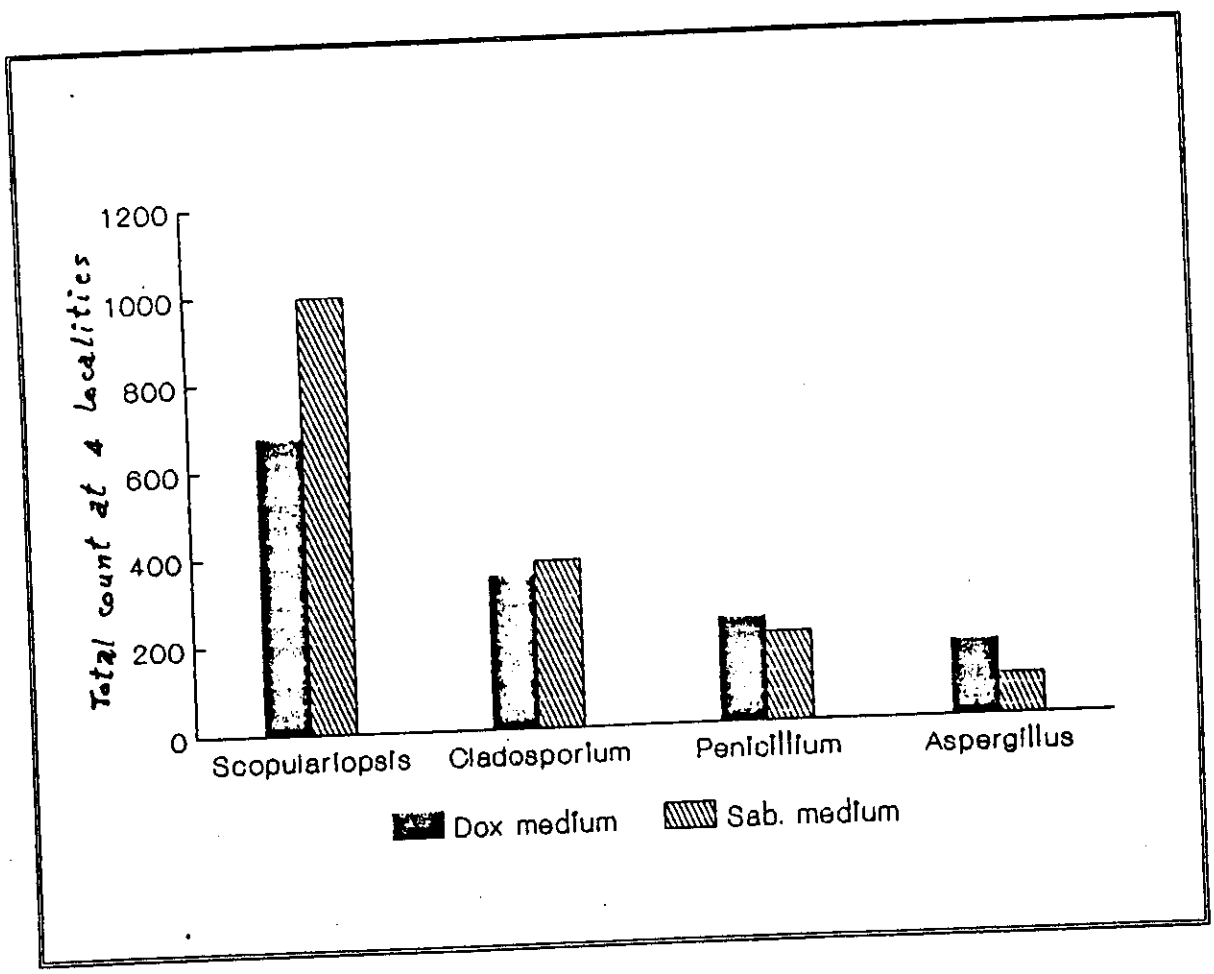
**-The dominant genera:**

1- *Scopulariopsis:*

*Scopulariopsis* owned the largest number of isolates among all genera recorded in the present experiment at four localities (Fig.11), and its total count on Czapek's-agar and Sabouraud- agar was 677 and 995 isolates which constituted 37.34% and 48.32% respectively of the total count of fungi. The maximum count of this genus was at Benha locality ($L_1$) and its count on Czapek's-agar and Sabouraud-agar was 281 and 488 isolates which represented 41.51% and 49.05% respectively of the total count of this genus in four locatities. The maximum count recorded at different times was at 45-days on Czapek's-agar, and its count was 284 isolates which represented 41.95% of the total count of this genus at four locatities; and after 30-days on Sabouraud-agar counted 340 isolates which represented 34.17% of the total count of this genus at four localities (Table, 22). Three species of *Scopulariopsis* were collected and identified named, *S.brevicaulis*, *S.brumptii* and *S.constantini* (Table, 28).

2- *Cladosporium:*

The total count of *Cladosporium* was 346 and 378 isolates on Cazpek's-agar and Sabouraud-agar which constituted 19.08% and 18.35% respectively of the total count of fungi at




(Fig. 11): Total counts of the dominant air-borne fungi isolated from different poultry farms at different localities on Czapek-Dox-agar and Sabouraud-agar media.

Table (22): Total counts of the genus *Scopulariopsis* isolated from the poultry farms at different localities at different times on Dox and Sab. media.

| M.L. | Time | Pre-entry T.C. | % | 15-days T.C. | % | 30-days T.C. | % | 45-days T.C. | % | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dox medium | $L_1$ | 41 | 6.06 | 63 | 9.30 | 64 | 9.45 | 113 | 16.69 | 281 | 41.51 |
| | $L_2$ | 10 | 1.48 | 49 | 7.24 | 36 | 5.32 | 38 | 5.61 | 133 | 19.64 |
| | $L_3$ | - | - | 18 | 2.66 | 93 | 13.74 | 83 | 12.26 | 194 | 28.66 |
| | $L_4$ | - | - | 15 | 2.21 | 4 | 0.59 | 50 | 7.38 | 69 | 10.19 |
| Total | | 51 | 7.53 | 145 | 21.41 | 197 | 29.09 | 284 | 41.95 | 677 | 100 |
| Sab. medium | $L_1$ | 49 | 4.92 | 129 | 12.96 | 157 | 15.78 | 153 | 15.37 | 488 | 49.05 |
| | $L_2$ | 61 | 6.13 | 58 | 5.83 | 58 | 5.83 | 44 | 4.42 | 221 | 22.21 |
| | $L_3$ | - | - | 1 | 0.10 | 39 | 3.92 | 72 | 7.24 | 112 | 11.26 |
| | $L_4$ | - | - | 40 | 4.02 | 86 | 8.64 | 48 | 4.82 | 174 | 17.48 |
| Total | | 110 | 11.05 | 228 | 22.91 | 340 | 34.17 | 317 | 31.85 | 995 | 100 |
| Total of tov media | | 161 | 9.63 | 373 | 22.31 | 537 | 32.12 | 601 | 35.94 | 1672 | 100 |

M.L. = Media and Localities

T.C. = Total count

different localities. At Moshtohour locality ($L_3$) the maximum count of this genus was recorded, and its count on Czapek's-agar and Sabouraud-agar was 133 and 140 isolates which represented 38.44% and 37.03% respectively of the total count of this genus at different localities. The maximum count recorded at different times was at 15-days on the two media used, and its count was 114 and 141 isolates which constituted 32.95% and 37.30% of the total count of this genus at different localities on Cazpek's-agar and Sabouraud-agar respectively (Table, 23). Four species of *Cladosporium* were collected and identified namely as *C. sphaerpermium*, *C. cladosporiodes*, *C. oxysporum* and *C.herbarum* (Table, 28).

3- *Penicillium:*

*Penicillium* was counted as 234 and 199 isolates which constituted 12.90% and 9.66% of the total count on Czapeks'agar and Sabouraud-agar respectively at different localities. The highest count of this genus was recorded at Moshtohour locality ($L_3$) on Czapek's-agar medium and at Benha locality ($L_1$) on Sabouraud-agar medium. The count was 96 and 121 isolates which represented 41.03% and 60.81% of the total count of this genus at different localities, on Czapek's-agar and Sabouraud-agar respectively. The maximum count recorded at different times was after 30-days on two

Table [23]: Total counts of the genus *Cladosporium* isolated from the poultry farms at different localities at different times on Dox and Sab. media.

| M.L. | Time | Pre-entry T.C. | % | 15-days T.C. | % | 30-days T.C. | % | 45-days T.C. | % | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dox medium | $L_1$ | 18 | 5.20 | 18 | 5.20 | 24 | 6.94 | 14 | 4.04 | 74 | 21.39 |
| | $L_2$ | 11 | 3.18 | 5 | 1.45 | 10 | 2.89 | 26 | 7.51 | 52 | 15.02 |
| | $L_3$ | 13 | 3.76 | 72 | 20.81 | 21 | 6.06 | 27 | 7.80 | 133 | 38.44 |
| | $L_4$ | 17 | 4.91 | 19 | 5.49 | 20 | 5.78 | 31 | 9.00 | 87 | 25.14 |
| Total | | 59 | 17.05 | 114 | 32.95 | 75 | 21.68 | 98 | 28.32 | 346 | 100 |
| Sab. medium | $L_1$ | 10 | 2.65 | 20 | 5.29 | 17 | 4.50 | 20 | 5.29 | 67 | 17.72 |
| | $L_2$ | 17 | 4.50 | 22 | 5.82 | 18 | 4.76 | 25 | 6.61 | 82 | 21.69 |
| | $L_3$ | 16 | 4.23 | 75 | 19.84 | 23 | 6.08 | 26 | 6.88 | 140 | 37.03 |
| | $L_4$ | 18 | 4.76 | 24 | 6.35 | 11 | 2.91 | 36 | 9.52 | 89 | 23.54 |
| Total | | 61 | 16.14 | 141 | 37.30 | 69 | 18.25 | 107 | 28.30 | 378 | 100 |
| Total of tow media | | 120 | 16.57 | 255 | 35.22 | 144 | 19.89 | 215 | 29.70 | 724 | 100 |

M.L. = Media and Localities

T.C. = Total count

Table [24]: Total counts of the genus *Penicillium* isolated from the poultry farms at different localities at different times on Dox and Sab. media.

| M.L. | Time | Pre-entry T.C. | % | 15-days T.C. | % | 30-days T.C. | % | 45-days T.C. | % | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dox medium | $L_1$ | - | - | 24 | 10.25 | 45 | 19.23 | 21 | 8.97 | 90 | 38.46 |
| | $L_2$ | - | - | - | - | - | - | - | - | - | - |
| | $L_3$ | 9 | 3.85 | - | - | 39 | 16.66 | 48 | 20.51 | 96 | 41.03 |
| | $L_4$ | 2 | 0.85 | 17 | 7.26 | 24 | 10.25 | 5 | 2.14 | 48 | 20.51 |
| Total | | 11 | 4.70 | 41 | 17.52 | 108 | 46.15 | 74 | 31.62 | 234 | 100 |
| Sab. medium | $L_1$ | - | - | 34 | 17.08 | 48 | 24.12 | 39 | 19.59 | 121 | 60.81 |
| | $L_2$ | - | - | - | - | - | - | - | - | - | |
| | $L_3$ | 6 | 3.02 | - | - | 34 | 17.08 | 17 | 8.54 | 57 | 28.64 |
| | $L_4$ | 7 | 3.52 | 5 | 2.51 | 2 | 1.00 | 7 | 3.52 | 21 | 10.55 |
| Total | | 13 | 653 | 39 | 19.59 | 84 | 42.21 | 63 | 31.65 | 199 | 100 |
| Total of tow media | | 24 | 5.54 | 80 | 18.48 | 192 | 44.34 | 137 | 31.64 | 433 | 100 |

M.L. = Media and Localities

T.C. = Total count

media used and its count was 108 and 84 isolates which constituted 46.15% and 42.21% of the total count of this genus at different localities on Czapek's-agar and sabouraud-agar respectively (Table, 24). Nine species of *Penicillium* were collected and identified namely as *P.roqueforti*, *P.notatum*, *P.oxalicum*, *P.chrysogenum*, *P.decumbens*, *P.wakmani*, *P.canescens*, *P.citrinum* and *P.duclauxi* (Table, 28). It was noticed that *Penicillium* not recorded at Sheblanga locality ($L_2$) on two media used.

4- *Aspergillus:*

The total count of *Aspergillus* was 196 and 87 isolates which constituted 10.81% and 4.23% of the total count on Czapek's-agar and Sabouraud-agar respectively, at different localities. The maximum count of this genus was recorded at El-Safa locality ($L_4$) on Czapek's-agar medium and at Moshtohour locality ($L_3$) on Sabouraud-agar medium. Its count was 92 and 32 isolates which represented 47.18% and 36.80% of the total count of this genus at different localities on Czapek's-agar and Sabouraud-agar respectively. The highest count at different times was presented after 30-days on Czapek's-agar and its count was 81 isolates which represented 41.4% of the total count of this genus at all localities; and after 15-days on Sabouraud-agar and counted 35 isolates which represented 40.20% of the total count of this genus at all localities. *Aspergillus* not recorded at

Table [25]: Total counts of the genus *Aspergillus* isolated from the poultry farms at different localities at different times on Dox and Sab. media.

| M.L. | Time | Pre-entry T.C. | % | 15-days T.C. | % | 30-days T.C. | % | 45-days T.C. | % | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dox medium | $L_1$ | - | - | 12 | 6.1 | 6 | 3.1 | 4 | 2.0 | 22 | 11.28 |
| | $L_2$ | 1 | 0.5 | 3 | 1.5 | 8 | 4.1 | 24 | 12.2 | 36 | 17.94 |
| | $L_3$ | 17 | 8.7 | 1 | 0.5 | 19 | 9.7 | 9 | 4.6 | 46 | 23.59 |
| | $L_4$ | 4 | 2.0 | 13 | 6.6 | 48 | 24.5 | 27 | 13.8 | 92 | 47.18 |
| Total | | 22 | 11.2 | 29 | 14.7 | 81 | 41.4 | 64 | 32.6 | 196 | 100 |
| Sab. medium | $L_1$ | - | - | 22 | 25.3 | - | - | 7 | 8.0 | 29 | 33.3 |
| | $L_2$ | - | - | - | 1 | 1.1 | - | - | - | 1 | 1.1 |
| | $L_3$ | 8 | 9.2 | 4 | 4.6 | 12 | 13.8 | 8 | 9.2 | 32 | 36.8 |
| | $L_4$ | 7 | 8.0 | 8 | 9.2 | 2 | 2.3 | 8 | 9.2 | 25 | 28.8 |
| Total | | 15 | 17.2 | 35 | 40.2 | 14 | 16.1 | 23 | 26.4 | 87 | 100 |
| Total of tow media | | 37 | 13.1 | 64 | 22.6 | 95 | 33.6 | 87 | 30.7 | 283 | 100 |

M.L. = Media and Localities

T.C. = Total count

pre-entry time on Sabouraud-agar at $L_2$ and after 30-days on Sabouraud-agar at $L_1$ and $L_2$ (Table, 25). 13 species of *Aspergillus* were collected and identified as recorded in table 28.

**The Similarity Quationt between different localities:**

A- The genera similarity quationt between $L_1$ and $L_2$ was calculated for the genera isolated at the same time in February and March on the two media used.

The number of similar genera which appeared at two localities compared ($L_1$ & $L_2$) on two media used was 7 genera for Czapek's-agar and 8 genera for Sabouraud-agar medium, while the total number of genera which appeared at two localities compared and two media used was 23 genera. The genera similarity quationt (Q.S.%) was 35 % (on Czapek's-agar) and (on Sabouraud-agar) was 50 % of the total number of genera of two localities compared. The similar genera between $L_1$& $L_2$ for each medium was identified and clarified in table 26.

B- The genera similarity quationt between $L_3$ and $L_4$ was calculated for the genera isolated at the same time in September and October on the two media used:

i- On Czapek's-agar medium:

The total number of genera which appeared at the two localities compared was 19 genera (Tables 20 and 21). The

Table[26]:The Genus similarity Quotiont between ($L_1$ & $L_2$) in Febuary & March 1988 and between ($L_3$ & $L_4$) in september & October 1988, on Dox and Sab. media.

| Genera | $L_1$ & $L_2$ | | $L_3$ & $L_4$ | |
|---|---|---|---|---|
| | Dox | Sab. | Dox | Sab. |
| *Scopulariopsis* | + | + | + | + |
| *Cladosporium* | + | + | + | + |
| *Aspergillus* | + | + | + | + |
| *Alternaria* | + | + | + | + |
| *Chaetomium* | + | + | - | + |
| *Botryotrichum* | + | - | + | + |
| *Doratomyces* | + | + | - | - |
| *Penicillium* | - | - | + | + |
| *Fusarium* | - | - | + | + |
| *Stemphylium* | - | - | + | + |
| *Mycelia sterilia* | - | - | + | + |
| *Rhizopus* | - | + | - | + |
| *Mucor* | - | + | - | - |
| *Curvularia* | - | - | - | + |
| *Sepedonium* | - | - | - | + |
| No. of similar genera | 7 | 8 | 9 | 13 |
| Total No. genera of two locatities compared | 20 | 16 | 19 | 20 |
| Q.S. % | 35 | 50 | 47.368 | 65 |

Q.S. = Similarity Quotiont

number of similar genera which appeared at two localities compared was 9 genera on this medium. The genera similarity quationt was 47.36 % of the total number of genera of two localities compared (Table, 26).

ii- On Sabouraud-agar medium:

On this medium, there was 20 genera (Tables 20 and 21) which represented the total number of genera appeared at the two localities compared. The genera which shared in similarity were 13 genera which appeared at the two localities compared. The similarity quationt of the previous genera was 65 % of the total number of genera of the two localities compared (Table, 26).

**Percentage count and number of cases of isolation:**

The highest number of isolates which recorded at different localities of poultry farm was attributed to heavy showers of *Scopulariopsis*, *Cladosporium*, *Penicillium* and *Aspergillus*.

*Scopulariopsis* represented the highest number of isolates among all genera recorded in this experiment, and its total count at four localities on Czapek's-agar and Sabouraud-agar was 677 and 995 isolates which constituted 37.34% and 48.32% respectively of the total count of fungi (Table, 22). The number of cases of isolation of this genus was 4, 4, 4 and 3 cases, which constituted 15.5%, 7.2%, 10.7% and 3.8% of the total count on Czapek's-agar at $L_1$,

$L_2$, $L_3$ and $L_4$ respectively; while on Sabouraud-agar was 4, 4 , 4 and 4 cases, which represented 23.9%, 10.6%, 5.4% and 8.5% of the total count on Sabouraud-agar at $L_1$, $L_2$, $L_3$, and $L_4$ respectively. *S.brevicaulis* respresented the highest number of cases of isolation among all species in this experiment at all localities as 14 and 14 cases which constituted 26.6% and 28.8% of the total count on Czapek's-agar and Sabouraud-agar respectively (Table, 27).

*Cladosporium* considered as the second genus in the order of total count at four localities and counted 346 and 378 isolates which constituted 19.08% and 18.35% of the total count of fungi collected on Czapek's-agar and Sabouraud-agar respectively (Table, 23). Its number of cases of isolation was 3 ,3,3 and 4 cases, which constituted 4.1%, 2.9%, 7.3% and 4.8% of the total count on Czapek's-agar at $L_1$, $L_2$, $L_3$ and $L_4$ respectively; while on Sabouraud-agar was 2 ,3,4 and 4 cases, which represented 3.3%, 3.9%, 6.6% and 4.2% of the total count on Sabouraud-agar at $L_1$, $L_2$, $L_3$ and $L_4$ respectively. *C.cladosporiodes* whowed the highest number of cases of isolation among all species of this genus at all localities. as 10 and 12 cases which constituted 11.2% and 11.1% of the total count on Czapek's-agar and Sabouraud-agar respectively (Table, 27).

*Penicillium* considered as the third genus and its total count at four localities was 234 and 199 isolates which

of the total count on Czapek's-agar and Sabouraud-agar respectively (Table, 27).

Table[27]:Percentage count and number of cases of isolation of air-borne fungal genera isolated from the poultry farms at different localities on Czapek's-agar and Sabouraud-agar media.

| Genera | $L_1$ | | | | $L_2$ | | | | $L_3$ | | | | $L_4$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cz. | | Sab. | | Cz. | | Sab. | | Cz. | | Sab. | | Cz. | | Sab. | |
| | F | % | F | % | F | % | F | % | F | % | F | % | F | % | F | % |
| *Scopulariopsis* | 4 | 15.5 | 4 | 23.9 | 4 | 7.2 | 4 | 10.6 | 4 | 10.7 | 4 | 5.4 | 3 | 3.8 | 4 | 8.5 |
| *Cladosporium* | 3 | 4.1 | 2 | 3.3 | 3 | 2.9 | 3 | 3.9 | 3 | 7.3 | 4 | 6.6 | 4 | 4.8 | 4 | 4.2 |
| *Aspergillus* | 2 | 1.3 | 2 | 1.4 | 3 | 1.5 | 1 | 0.05 | 4 | 2.5 | 3 | 1.5 | 4 | 5.1 | 4 | 1.1 |
| *Penicillium* | 2 | 5.0 | 2 | 5.9 | - | - | - | - | 2 | 5.2 | 2 | 2.7 | 4 | 2.7 | 3 | 0.9 |
| *Alternaria* | 1 | 0.8 | 1 | 0.4 | 1 | 0.6 | 1 | 0.7 | 1 | 0.9 | 2 | 1.5 | 2 | 0.8 | 2 | 1.9 |
| *Rhizopus* | - | - | 1 | 0.8 | 1 | 0.1 | 1 | 0.4 | 1 | 0.1 | 1 | 0.3 | - | - | 1 | 0.2 |
| *Fusarium* | - | - | 1 | 0.2 | - | - | - | - | 3 | 0.9 | 4 | 0.9 | 3 | 1.9 | 4 | 1.2 |
| *Curvularia* | 1 | 0.2 | 1 | 0.2 | - | - | - | - | - | - | 1 | 0.2 | - | - | 3 | 0.7 |
| *Sepedonium* | - | - | - | - | - | - | - | - | - | - | 1 | 0.1 | 1 | 1.4 | 1 | 0.6 |
| *Botryotrichum* | 1 | 0.9 | 1 | 0.2 | 2 | 0.8 | - | - | 1 | 1.0 | 1 | 0.05 | 1 | 0.7 | 1 | 0.3 |
| *Chaetomium* | 1 | 0.2 | 1 | 0.05 | 1 | 0.1 | 1 | 0.2 | 1 | 1.3 | 1 | 0.3 | - | - | 1 | 0.1 |
| *Stemphylium* | 1 | 0.1 | 1 | 0.05 | - | - | 1 | 0.05 | 1 | 0.3 | 1 | 0.2 | 1 | 0.2 | 1 | 0.05 |
| *Nigrospora* | - | - | - | - | 1 | 0.7 | - | - | - | - | - | - | - | - | - | - |
| *Mucor* | 1 | 0.2 | 1 | 0.3 | - | - | 1 | 0.5 | 1 | 0.1 | 1 | 0.05 | - | - | - | - |
| *Drechslera* | 1 | 0.5 | - | - | 1 | 0.1 | - | - | - | - | - | - | - | - | 1 | 0.1 |
| *Doratomyces* | 1 | 0.1 | 1 | 0.1 | 1 | 1.4 | 1 | 0.8 | - | - | - | - | - | - | 1 | 0.1 |
| *Absidia* | - | - | 1 | 0.1 | - | - | 1 | 0.2 | 1 | 0.1 | 1 | 1.2 | - | - | - | - |
| *Epicoccum* | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.9 | 2 | 1.0 |
| *Stachybotrys* | - | - | - | - | 1 | 0.1 | - | - | - | - | - | - | 1 | 0.1 | - | - |
| *Cephalosporium* | - | - | - | - | 1 | 0.3 | - | - | - | - | 1 | 0.6 | 1 | 0.3 | - | - |
| *Circinella* | 1 | 0.1 | - | - | - | - | 1 | 0.1 | 1 | 0.1 | 1 | 0.1 | - | - | - | - |
| *Aphanomyces* | 1 | 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Torula* | - | - | - | - | 1 | 0.2 | 1 | 0.1 | - | - | - | - | - | - | - | - |
| *Cunninghamella* | 1 | 0.5 | - | - | - | - | - | - | 1 | 0.1 | 1 | 0.9 | - | - | - | - |
| *Rhizoctonia* | - | - | - | - | - | - | - | - | 1 | 0.3 | - | - | 1 | 0.2 | - | - |

Cz. = Czapek's-agar

Sab. = Sabouraud-agar

F. = Frequency of occurrence

Occurrence: High = 9-10 cases
Moderate = 5-8 cases
Low = 3-4 cases
Rare = 1-2 cases

Table[28]:Percentage count and number of cases of isolation of air-borne fungal species isolated from the poultry farms at different localities on Czapek's-agar and Sabouraud-agar media.

| species | $L_1$ | | | | $L_2$ | | | | $L_3$ | | | | $L_4$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cz. | | Sab. | | Cz. | | Sab. | | Cz. | | Sab. | | Cz. | | Sab. | |
| | F | % | F | % | F | % | F | % | F | % | F | % | F | % | F | % |
| *Scopulariopsis brevicaulis* | 4 | 11.8 | 4 | 15.0 | 4 | 2.3 | 4 | 3.0 | 3 | 8.7 | 3 | 3.7 | 3 | 3.8 | 3 | 5.1 |
| *S.brumptii* | 2 | 1.4 | 1 | 1.1 | 3 | 2.6 | 4 | 3.1 | - | - | - | - | - | - | 3 | 2.9 |
| *S.constantini* | 2 | 2.3 | 4 | 7.8 | 3 | 2.3 | 2 | 0.5 | 1 | 2.0 | 1 | 1.7 | - | - | 2 | 0.5 |
| *Cladosporium sphaerospermium* | 2 | 1.7 | 1 | 0.5 | 4 | 2.5 | 3 | 2.0 | 1 | 1.5 | 2 | 0.4 | 2 | 1.4 | 3 | 2.0 |
| *C.oxysporum* | 2 | 0.3 | - | - | 2 | 0.3 | 2 | 0.9 | - | - | - | - | - | - | 1 | 0.4 |
| *C.cladosporiodes* | 2 | 2.1 | 3 | 2.8 | 1 | 0.1 | 2 | 1.0 | 4 | 5.6 | 4 | 5.8 | 3 | 3.4 | 3 | 1.5 |
| *C.herbarum* | - | - | - | - | - | - | - | - | 1 | 0.2 | 2 | 0.4 | - | - | 2 | 0.3 |
| *Aspergillus wentii* | 1 | 0.7 | 1 | 1.1 | 2 | 1.1 | - | - | - | - | 1 | 0.4 | - | - | - | - |
| *A.flavipes* | 1 | 0.2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *A.niger* | 2 | 0.2 | - | - | 3 | 0.3 | - | - | 2 | 0.7 | 2 | 0.4 | 3 | 0.4 | 2 | 0.3 |
| *A.ochraceus* | 1 | 0.2 | - | - | - | - | - | - | 2 | 0.1 | - | - | 2 | 0.3 | 2 | 0.1 |
| *A.flavus* | - | - | 1 | 0.3 | - | - | 1 | 0.1 | 3 | 0.8 | 2 | 0.4 | 3 | 0.2 | 3 | 0.4 |
| *A.nidulans* | - | - | - | - | 1 | 0.1 | - | - | 1 | 0.3 | 1 | 0.2 | 2 | 1.3 | - | - |
| *A.clavotus* | - | - | - | - | - | - | - | - | 1 | 0.3 | 1 | 0.1 | - | - | - | - |
| *A.candidus* | - | - | - | - | - | - | - | - | 1 | 0.3 | - | - | 1 | 0.1 | - | - |
| *A.versicolor* | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1.2 | 1 | 0.1 |
| *A.fumigatus* | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.1 | - | - |
| *A.ustus* | - | - | - | - | - | - | - | - | - | - | - | - | 1. | 0.4 | 1 | 0.2 |
| *A.glaucus* | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 0.8 | - | - |
| *A.terreus* | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.3 | - | - |
| *Penicillium roqueforti* | 3 | 5.0 | 3 | 5.9 | - | - | - | - | 1 | 2.6 | 1 | 0.8 | 2 | 0.6 | - | - |
| *P.notatum* | - | - | - | - | - | - | - | - | 2 | 2.5 | 2 | 1.9 | 3 | 0.7 | 3 | 0.5 |
| *P.oxalicum* | - | - | - | - | - | - | - | - | 1 | 0.1 | - | - | 1 | 0.1 | - | - |

Cz. = Czapek's-agar

Sab. = Sabouraud-agar

F. = Frequency of occurrence

Table (28): Cont.

| species | $L_1$ | | | | $L_2$ | | | | $L_3$ | | | | $L_4$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C3. | | Sab. | | C3. | | Sab. | | CZ. | | Sab. | | CZ. | | Sab. | |
| | F | % | F | % | F | % | F | % | F | % | F | % | F | % | F | % |
| *P.chrysogenum* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 0.4 |
| *P.decumbens* | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.1 | - | - |
| *P.waksmani* | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.1 | - | - |
| *P.canescens* | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 0.4 | - | - |
| *P.duclauxi* | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.1 | - | - |
| *P.citrinum* | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.6 | - | - |
| *Alternaria alternata* | 3 | 0.8 | 1 | 0.4 | 3 | 0.6 | 2 | 0.7 | 2 | 0.9 | 4 | 1.5 | 4 | 0.8 | 4 | 1.9 |
| *Rhizopus nigricans* | - | - | 3 | 0.8 | 1 | 0.1 | 2 | 0.4 | 1 | 0.1 | 2 | 0.3 | - | - | 2 | 0.2 |
| *Fusarium moniliforme* | - | - | 1 | 0.2 | - | - | - | - | - | - | - | - | 2 | 0.2 | 1 | 0.1 |
| *F.nivale* | - | - | - | - | - | - | - | - | 1 | 0.1 | 2 | 0.1 | 1 | 0.1 | 1 | 0.1 |
| *F.heterosporum* | - | - | - | - | - | - | - | - | 1 | 0.1 | 2 | 0.2 | 1 | 0.7 | 4 | 0.4 |
| *F.poae* | - | - | - | - | - | - | - | - | - | - | 1 | 0.1 | 1 | 0.2 | 1 | 0.1 |
| *F.oxysporum* | - | - | - | - | - | - | - | - | 2 | 0.1 | 1 | 0.2 | 2 | 0.6 | 1 | 0.1 |
| *F.dimerum* | - | - | - | - | - | - | - | - | 1 | 0.2 | 3 | 0.3 | 1 | 0.1 | 4 | 0.4 |
| *F.semitictum* | - | - | - | - | - | - | - | - | 1 | 0.4 | - | - | - | - | - | - |
| *Curvularia brachyspora* | 1 | 0.2 | 1 | 0.1 | - | - | - | - | - | - | 1 | 0.1 | - | - | 3 | 0.2 |
| *C.clavata* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.2 |
| *C.lunata* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.2 |
| *C.ovoidea* | - | - | 1 | 0.1 | - | - | - | - | - | - | 1 | 0.1 | - | - | 1 | 0.1 |
| *Sepedonium chrysospermum* | - | - | - | - | - | - | - | - | - | - | 1 | 0.1 | 2 | 1.4 | 3 | 0.1 |
| *Botryotrichum atrogriseum* | 3 | 0.9 | 2 | 0.2 | 4 | 0.8 | - | - | 3 | 1.0 | 1 | 0.1 | 3 | 0.7 | 2 | 0.3 |
| *Chaetomium magnum* | 1 | 0.2 | 1 | 0.1 | 2 | 0.1 | 3 | 0.2 | 1 | 1.3 | 2 | 0.3 | - | - | 2 | 0.1 |
| *Stemphylium piriforme* | 1 | 0.1 | 1 | 0.05 | - | - | 1 | 0.05 | 2 | 0.2 | 1 | 0.1 | - | - | 1 | 0.05 |
| *S.botryosum* | - | - | - | - | - | - | - | - | 1 | 0.1 | 1 | 0.1 | 1 | 0.2 | - | - |
| *Nigrospora sphaerica* | - | - | - | - | 1 | 0.7 | - | - | - | - | - | - | - | - | - | - |

Table (28): cont.

| species | $L_1$ | | | | $L_2$ | | | | $L_3$ | | | | $L_4$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CZ. | | Sab. | | CZ. | | Sab. | | CZ. | | Sab. | | CZ. | | Sab. | |
| | F | % | F | % | F | % | F | % | F | % | F | % | F | % | F | % |
| *Drechslera euphorbiae* | 3 | 0.5 | - | - | 1 | 0.1 | - | - | - | - | - | - | - | - | 1 | 0.1 |
| *Doratomyces phillipsii* | 1 | 0.1 | 1 | 0.1 | 2 | 1.4 | 2 | 0.8 | - | - | - | - | - | - | 1 | 0.1 |
| *Absidia glauca* | - | - | 2 | 0.1 | - | - | 1 | 0.2 | 1 | 0.1 | 2 | 1.2 | - | - | - | - |
| *Epicoccum nigrum* | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 0.3 | 4 | 1.0 |
| *Stachybotrys atra* | - | - | - | - | 1 | 0.1 | - | - | - | - | - | - | 1 | 0.1 | - | - |
| *Cephalosporium curtipes* | - | - | - | - | 1 | 0.2 | - | - | - | - | - | - | - | - | - | - |
| *C.roseogriseum* | - | - | - | - | 1 | 0.1 | - | - | - | - | 1 | 0.6 | 1 | 0.3 | - | - |
| *Circinela spinosa* | 1 | 0.1 | - | - | - | - | 1 | 0.1 | 1 | 0.1 | 1 | 0.1 | - | - | - | - |
| *Aphanomyces laevis* | 1 | 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Mucor racemosus* | - | - | 1 | 0.1 | - | - | - | - | 1 | 0.1 | - | - | - | - | - | - |
| *M.strictus* | 1 | 0.2 | 1 | 0.2 | - | - | 2 | 0.5 | - | - | - | - | - | - | - | - |
| *M.circinolloides* | - | - | - | - | - | - | - | - | - | - | 1 | 0.1 | - | - | - | - |
| *Torula herbarum* | - | - | - | - | 2 | 0.2 | 1 | 0.1 | - | - | - | - | - | - | - | - |
| *Cunninghamella echinulata* | 1 | 0.5 | - | - | - | - | - | - | 1 | 0.1 | 2 | 0.9 | - | - | - | - |
| *Rhizoctonia solani* | - | - | - | - | - | - | - | - | 1 | 0.3 | - | - | 1 | 0.2 | - | - |
| *Mycelia sterilia* | - | - | - | - | - | - | - | - | 3 | 0.7 | 3 | 0.6 | 2 | 0.1 | 1 | 0.3 |

## IV-Fungi Isolated From Poultry Fodder Samples:

### A. Fungal count:

Results listed in table 29 revealed that, the viable count differ from one month to another. A total of 447 fungal isolates were isolated from poultry fodder samples which stored in the period of August 1988 to July 1989 in our laboratory from which 64 isolates were recorded at January 1989 and considered as the highest number recorded overall the period, while 20 isolates only were recorded at August and showed the lowest count overall the period.

In descending order according to the total count of fungi, the identified genera from stored poultry fodder samples were: *Aspergillus*, *Penicillium*, *Scopulariopsis*, *Mucor*, *Cephalosporium*, *Absidia*, *Rhizopus*, *Cunninghamella*, *Cladosporium*, *Aphanomyces*, *Alternaria* and *Syncephalastrum*.

It was appeared that, *Aspergillus* represented the highest occurrence in poultry fodder samples under test, and counted 211 isolates which represented 47.20% of the total count of fungi isolated from examined sample. Nine species of this genus were identified, of which *A.flavus* represented high occurrence of all species recorded, broad spectrum and counted 134 isolates which represented 63.51% of the total count of this genus.

*Penicillium* was the second genus in order of dominance. It was of high occurrence and counted 98 isolates which constituted 21.92% of the total fungal count in the tested samples. This genus was represented by three species namely *P.notatum*, *P.oxalicum* and *P.roqueforti*, from which *P.notatum* was of high occurrence (10 cases), broad spectrum and counted 72 isolates which represented 73.47% of the total count of this genus.

*Mucor* was the third in order of occurrence. It was of high occurrence and counted 39 isolates which represented 8.72% of the total fungal count in the tested samples. Three species of this genus were identified, from which *M.circinelloides* represented the highest count of the genus.

*Rhizopus* resembled *Mucor* in its order of occurrence. It counted 9 isolates which represented 2.01% of the total fungal count in the tested samples. This genus was represented by one species namely *R.nigricans*.

*Absidia* came next in order of occurrence. It was of moderate occurrence and counted 10 isolates which represented 2.24% of the total fungal count in the tested samples. Two species namely *A.glauca* and *A.butleri* of this genus were identified.

*Scopulariopsis* was also of moderate occurrence and counted 47 isolates which constituted 10.51% of the total fungal count in the tested samples. This genus was represented by one species namely *S.brevicaulis*.

*Cunninghamella* was also of moderate occurrence and counted 7 isolates which represented 1.57% of the total fungal count in the tested samples. *C.echinulata* was the only species identified from this genus.

*Cephalosporium* was also of moderate occurrence and counted 11 isolates which constituted 2.46% of the total fungal count in the tested samples. Two species of this genus were identified namely *C.roseogriseum* and *C.curtipes*.

*Aphanomyces* and *Cladosporium* were of low occurrence. Each of them counted 5 isolates which represented 1.12% of the total fungal count in the tested samples. Two species represented the genus *Cladosporium* which were, *C. sphaerospermium* and *C. cladosporiodes*, while one species only represented the genus *Aphanomyces* and identified as *A.laevis*.

*Alternaria* was also of low occurrence and counted 3 isolates which represented 0.67% of the total fungal count. This genus was represented by three species namely; *A.alternata*, *A.cheiranthi* and *A.brassicicola*.

Table[29]: Number of Fungi isolated from poultry fodder samples stored from August 1988 until July 1989.

| Genera & species | No. of isolates per month | | | | | | | | | | | | F | $T_1$ | Species % | $T_2$ | Genus % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Aug. 1988 | Sep. | Oct. | Nov. | Dec. | Jan. 1989 | Feb. | Mar. | Apr. | May | June | July | | | | | |
| *Aspergillus spp.* | 6 | 6 | 5 | 40 | 15 | 21 | 12 | 2 | 5 | 10 | 6 | 6 | 12 | 134 | 63.51 | | |
| *A.flavus* | 1 | – | – | 6 | 1 | 2 | 3 | – | 1 | 2 | 3 | – | 8 | 19 | 9.00 | | |
| *A.niger* | – | – | – | – | 1 | 8 | 3 | 2 | – | – | – | – | 4 | 14 | 6.64 | | |
| *A.ochraceus* | 5 | 3 | – | – | – | – | – | – | – | – | – | – | 2 | 8 | 3.79 | 211 | 47.20 |
| *A.terreus* | – | – | – | – | – | 4 | 1 | – | 15 | – | – | – | 3 | 20 | 9.48 | | |
| *A.nidulans* | – | – | – | – | – | – | 2 | 3 | 1 | – | – | – | 3 | 6 | 2.84 | | |
| *A.fumigatus* | – | – | – | – | – | – | – | 3 | 2 | – | – | – | 2 | 5 | 2.37 | | |
| *A.wentii* | – | – | – | – | – | – | – | 2 | – | – | – | – | 1 | 2 | 0.95 | | |
| *A.ustus* | | | | | | | | | | | | | | | | | |
| *A.sydowi (versicolor g.)* | – | – | – | – | 3 | – | – | – | – | – | – | – | 1 | 3 | 1.42 | | |
| *Penicilium spp.* | 8 | 10 | 8 | – | – | 5 | 3 | 5 | 3 | 13 | 5 | 12 | 10 | 72 | 73.47 | | |
| *P.notatum* | – | – | – | – | 13 | – | – | – | – | – | – | – | 1 | 13 | 13.27 | 98 | 21.92 |
| *P.oxalicum* | – | – | – | – | – | 9 | – | 4 | – | – | – | – | 2 | 13 | 13.27 | | |
| *P.roqueforti* | | | | | | | | | | | | | | | | | |
| *Scopulariopsis brevicaulis* | – | – | 1 | – | 17 | 10 | 8 | 11 | – | – | – | – | 5 | 47 | 100 | 47 | 10.51 |
| *Mucor spp* | – | – | 7 | 7 | 5 | – | 2 | – | – | – | – | – | 4 | 21 | 53.85 | | |
| *M.circinelloides* | – | 5 | 1 | – | – | – | – | – | – | – | – | – | 2 | 6 | 15.38 | 39 | 8.72 |
| *M.griseo-cyanus* | – | – | – | – | – | – | – | – | – | – | 12 | – | 1 | 12 | 30.77 | | |
| *M.ambiguus* | | | | | | | | | | | | | | | | | |
| *Absidia spp.* | – | – | – | – | – | 2 | 3 | – | – | – | – | – | 2 | 5 | 50 | 10 | 2.23 |
| *A.glauca* | – | – | – | – | – | 1 | 1 | 1 | 2 | – | – | – | 4 | 5 | 50 | | |
| *A.butleri* | | | | | | | | | | | | | | | | | |
| *Rhizopus nigricans* | – | 1 | – | – | – | 1 | 2 | 2 | – | 1 | 1 | 1 | 7 | 9 | 100 | 9 | 2.01 |
| *Cunninghamella echinulata* | – | – | – | – | – | 1 | 3 | 2 | 1 | – | – | – | 4 | 7 | 100 | 7 | 1.56 |
| *Aphanomyces laevis* | – | – | – | – | – | – | – | 2 | 1 | – | – | 2 | 3 | 5 | 100 | 5 | 1.11 |

Note: F = Frequency of occurrence .
High occurrence = 7 - 12 cases
Moderate occurrence = 4 - 6 cases
Low occurrence = 2 - 3 cases
Rare occurrence = 1 case
$T_1$ = Total Number of the species
$T_2$ = Total Number of the genus

Table (29) Conl.

| Genera & species | No. of isolates per month | | | | | | | | | | | | F | $T_1$ | Species % | $T_2$ | Genus % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Aug. 1988 | Sep. | Oct. | Nov. | Dec. | Jan. 1989 | Feb. | Mar. | Apr. | May | June | July | | | | | |
| *Cephalosporium spp* | | | | | | | | | | | | | | | | | |
| *C.roseogriseum* | - | - | 4 | - | - | - | - | - | - | 2 | - | - | 2 | 6 | 54.55 | | |
| *C.curtipes* | - | - | - | - | - | - | - | - | - | 3 | 2 | - | 2 | 5 | 45.45 | 11 | 2.46 |
| *Cladosporium spp.* | | | | | | | | | | | | | | | | | |
| *C.sphaerospermium* | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | 1 | 20 | | |
| *C.cladosporiodes* | - | - | - | - | - | - | - | - | - | 2 | 2 | - | 2 | 4 | 80 | 5 | 1.12 |
| *Alternaria spp.* | | | | | | | | | | | | | | | | | |
| *A.alternata* | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 1 | 33.33 | | |
| *A.cheiranthi* | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 1 | 33.33 | 3 | 0.67 |
| *A.brassicicola* | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | 1 | 33.33 | | |
| *Syncephalastrum racemosum* | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | 1 | 100 | 1 | 0.22 |
| *Mycelia sterilia* | - | - | - | - | - | - | - | 1 | - | - | - | - | 1 | 1 | 100 | 1 | 0.22 |
| Total of isolates in every month | 20 | 25 | 26 | 33 | 57 | 64 | 43 | 40 | 31 | 33 | | 32 | 23 | | | 447 | 100 | 447 | 100 |
| % of isolates in evey month | 4.47 | 5.59 | 5.82 | 11.86 | 12.75 | 14.32 | 9.62 | 8.95 | 6.94 | 7.38 | 7.16 | 5.15 | | | 100 | | 100 |

*Syncephalastrum* was of rare occurrence and represented by one species which constituted 0.22% of the total fungal count. This genus was represented by one species identified as *S.racemosum*.

**B-Screening for aflatoxins present in poultry fodder sample:**

Poultry fodder sample was obtained from Misr-food Company at Sariaquos Qalubia and stored in our laboratory at normal climatic conditions. Fifty grams of the sample was taken monthly and detected for aflatoxins.

From the data obtained and illustrated in table 30, it was obvious that aflatoxins were found in the sample at the first three months (at the begening of stroage) and detected at the fourth month (November, 1988) and then increased gradually until reached their maximum at the sixth month (January, 1989) and then decreased gradually after prolonged storage at the same conditions until disappeared at the ninth month (April 1989).

**-$R_f$ values:** The $R_f$ values and colours of authentic aflatoxins $B_1$, $B_2$, $G_1$ and $G_2$ were measured chromatographed on silica gel DC-60 aluminium sheets, and viewed under U.V. light (366 nm) and presented in table 31. $R_f$ determined by two solvent systems as shown in the same table.

Table (30): Monthly detection of aflatoxins on the poultry fodder sample stored from August (1988) until July (1989).

| Month | Quantity of Aflatoxins by µg/kg | | | | M.C | % |
|---|---|---|---|---|---|---|
| | $B_1$ | $B_2$ | $G_1$ | $G_2$ | gm/50 gm fodder | |
| 1988 | | | | | | |
| August | - | - | - | - | 6.500 | 13.000 |
| September | - | - | - | - | 5.310 | 10.620 |
| October | - | - | - | - | 4.012 | 8.024 |
| November | - | - | - | 40 | 3.910 | 7.820 |
| December | - | - | - | 80 | 3.472 | 6.944 |
| 1989 | | | | | | |
| January | - | - | 200 | 160 | 3.095 | 6.190 |
| February | - | - | - | 100 | 2.741 | 5.482 |
| March | - | - | - | 60 | 2.416 | 4.832 |
| April | - | - | - | - | 2.109 | 4.218 |
| May | - | - | - | - | 1.736 | 3.472 |
| June | - | - | - | - | 1.378 | 2.756 |
| July | - | - | - | - | 0.815 | 1.630 |

M.C. = Moisture content of poultry fodder

Table [31]: Colours of fluorescence and $R_f$ values of authentic aflatoxins as viewed under U.V. light (366 nm) after TLC.

| Aflatoxins | colours | $R_f$ value for solvent system I | $R_f$ value for solvent system II |
|---|---|---|---|
| $B_1$ | Blue | 0.87 | 0.62 |
| $B_2$ | Blue | 0.79 | 0.56 |
| $G_1$ | Green | 0.69 | 0.42 |
| $G_2$ | Green | 0.62 | 0.40 |

**-Solvent system I:**

| Chloroform | : | Methanol |
|---|---|---|
| 97 | : | 3 |

**Solvent system II:**

| Chloroform | : | Acetone | : | Water |
|---|---|---|---|---|
| 88 | : | 12 | : | 2 |

C-Screening for aflatoxins produced by the obtained isolates on yeast extract-sucrose medium (YES):

Thin layer chromatographic analysis of the purified chloroform extracts of the fermentation medium of each of the aflatoxins-positive isolates revealed that one or more fluorescing spots with $R_f$ values identical to those of standard aflatoxins were obtained.

Table 32 showed that, a total of 134 isolates of *Aspergillus flavus* were screened for aflatoxins production. It was clear that, 39 isolates produced aflatoxin $B_1$, 18 isolates produced aflatoxin $B_2$ and 6 isolates only produced more than one aflatoxin, while the remaining isolates showed no aflatoxins production in YES medium. The six isolates which produced more than one aflatoxin were classified as follows: 3 isolates (Nos. 5, 125 & 246) produced aflatoxins $B_2$ & $G_2$, one isolate (No. 89) produced aflatoxins $B_1$ & $B_2$, one isolate (No. 182) produced aflatoxins $B_1$ & $G_2$ and one isolate (NO. 355) produced aflatoxins $B_1$ & $G_1$. The isolates Nos. 430 & 435 which were isolated at July 1989 showed the production of highest amount of aflatoxin $B_1$ and yielded a quanitity equal to 600 and 800 $\mu g/l$ respectively. Isolate NO. 435 was selected for further studies.

Table (32): Screening for aflatoxins produced by *Aspergillus flavus* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| Sl. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 1 | August (1988) | $B_1$ | 40 | 1.60 | 8 | 9 |
| 2 | " | $B_1$ | 20 | 1.49 | 5 | 7 |
| 3 | " | $B_1$ | 120 | 1.61 | 14 | 18 |
| 4 | " | -ve | - | 2.52 | - | - |
| 5 | " | $B_2$ | 140 | 1.88 | 24 | 26 |
| | | $G_2$ | 20 | | | |
| 6 | " | -ve | - | 2.10 | - | - |
| 27 | September | -ve | - | 2.40 | - | - |
| 28 | " | -ve | - | 2.05 | - | - |
| 29 | " | -ve | - | 1.04 | - | - |
| 30 | " | $B_1$ | 80 | 1.91 | 18 | 22 |
| 31 | " | -ve | - | 2.00 | - | - |
| 32 | " | $B_2$ | 20 | 2.11 | 6 | 7 |
| 51 | October | $B_1$ | 180 | 1.63 | 21 | 23 |
| 52 | " | $B_1$ | 20 | 1.95 | 7 | 7 |
| 56 | " | -ve | - | 2.00 | - | - |
| 67 | " | -ve | - | 2.31 | - | - |
| 68 | " | -ve | - | 2.25 | - | - |
| 72 | November | $B_1$ | 160 | 2.42 | 19 | 22 |
| 73 | " | -ve | - | 2.33 | - | - |
| 74 | " | -ve | - | 1.16 | - | - |
| 75 | " | -ve | - | 2.05 | - | - |
| 76 | " | -ve | - | 1.97 | - | - |
| 77 | " | -ve | - | 2.22 | - | - |

Table (32) Cont.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 78 | November(1988) | $B_1$ | 20 | 1.89 | 14 | 17 |
| 79 | » | -ve | - | 2.34 | - | - |
| 80 | » | $B_1$ | 140 | 2.26 | 16 | 20 |
| 81 | » | $B_2$ | 40 | 2.47 | 10 | 12 |
| 82 | » | $B_1$ | 20 | 2.51 | 8 | 9 |
| 83 | » | $B_1$ | 120 | 1.95 | 17 | 19 |
| 84 | » | -ve | - | 1.98 | - | - |
| 85 | » | -ve | - | 3.06 | - | - |
| 86 | » | $B_1$ | 200 | 2.11 | 24 | 27 |
| 87 | » | $B_1$ | 20 | 2.64 | 6 | 8 |
| 88 | » | $B_2$ | 180 | 1.97 | 18 | 19 |
| 89 | » | $B_1$ | 20 | 2.71 | 8 | 11 |
| | | $B_2$ | 20 | | | |
| 90 | » | $B_1$ | 160 | 1.68 | 16 | 19 |
| 91 | » | -ve | - | 2.45 | - | - |
| 98 | » | -ve | - | 2.32 | - | - |
| 99 | » | $B_2$ | 20 | 2.53 | 4 | 6 |
| 100 | » | $B_2$ | 40 | 1.97 | 9 | 10 |
| 101 | » | -ve | - | 2.31 | - | - |
| 102 | » | -ve | - | 2.05 | - | - |
| 103 | » | -ve | - | 2.91 | - | - |
| 104 | » | -ve | - | 2.49 | - | - |
| 105 | » | -ve | - | 1.38 | - | - |
| 106 | » | $B_1$ | 140 | 1.46 | 15 | 18 |
| 107 | » | $B_2$ | 20 | 2.07 | 7 | 8 |

Table (32) Cont.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 108 | November(1988) | $B_1$ | 20 | 2.82 | 5 | 7 |
| 109 | " | $B_1$ | 200 | 2.03 | 25 | 27 |
| 110 | " | $B_1$ | 40 | 2.21 | 9 | 12 |
| 111 | " | -ve | - | 2.91 | - | - |
| 112 | " | $B_2$ | 20 | 1.94 | 5 | 6 |
| 113 | " | -ve | - | 2.73 | - | - |
| 114 | " | -ve | - | 2.81 | - | - |
| 115 | " | -ve | - | 1.95 | - | - |
| 116 | " | $B_2$ | 20 | 1.87 | 4 | 7 |
| 117 | " | -ve | - | 2.10 | - | - |
| 125 | December | $B_2$ | 60 | 2.75 | 16 | 20 |
| | | $Q_2$ | 20 | | | |
| 126 | " | $B_1$ | 160 | 1.77 | 15 | 19 |
| 127 | " | -ve | - | 2.42 | - | - |
| 128 | " | $B_1$ | 20 | 1.95 | 7 | 7 |
| 129 | " | -ve | - | 1.99 | - | - |
| 130 | " | $B_2$ | 20 | 3.26 | 7 | 8 |
| 131 | " | $B_2$ | 40 | 1.91 | 8 | 11 |
| 132 | " | $B_2$ | 140 | 2.54 | 16 | 20 |
| 153 | " | -ve | - | 1.85 | - | - |
| 154 | " | -ve | - | 1.93 | - | - |
| 155 | " | -ve | - | 2.05 | - | - |
| 156 | " | -ve | - | 2.12 | - | - |
| 157 | " | -ve | - | 1.72 | - | - |
| 158 | " | $B_1$ | 20 | 1.59 | 6 | 7 |
| 176 | " | -ve | - | 2.34 | - | - |

Table (32) Cont.

| Sl. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 182 | January (1989) | $B_1$ | 140 | 1.94 | 16 | 19 |
| | | $Q_2$ | 20 | | | |
| 183 | " | -ve | - | 1.99 | - | - |
| 184 | " | -ve | - | 2.31 | - | - |
| 185 | " | -ve | - | 2.05 | - | - |
| 186 | " | -ve | - | 1.94 | - | - |
| 187 | " | $B_2$ | - | 1.92 | 5 | 6 |
| 188 | " | -ve | - | 1.89 | - | - |
| 189 | " | -ve | - | 2.07 | - | - |
| 190 | " | $B_1$ | 120 | 1.86 | 16 | 17 |
| 191 | " | $B_1$ | 40 | 1.73 | 9 | 12 |
| 217 | " | -ve | - | 1.91 | - | - |
| 218 | " | $B_1$ | 160 | 1.80 | 15 | 19 |
| 219 | " | -ve | - | 2.37 | - | - |
| 220 | " | $B_1$ | 80 | 2.02 | 19 | 22 |
| 221 | " | $B_2$ | 20 | 1.85 | 6 | 7 |
| 222 | " | $B_2$ | 20 | 2.31 | 6 | 7 |
| 223 | " | -ve | - | 2.54 | - | - |
| 224 | " | -ve | - | 2.71 | - | - |
| 225 | " | -ve | - | 1.94 | - | - |
| 226 | " | -ve | - | 2.05 | - | - |
| 227 | " | -ve | - | 1.71 | - | - |
| 246 | February | $B_2$ | 60 | 1.89 | 22 | 24 |
| | | $Q_2$ | 40 | | | |
| 247 | " | -ve | - | 1.97 | - | - |
| 248 | " | -ve | - | 2.25 | - | - |
| 249 | " | $B_1$ | 120 | 1.79 | 16 | 18 |

Table (32) Cont.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 250 | February(1989) | -ve | - | 2.47 | - | - |
| 251 | " | -ve | - | 2.15 | - | - |
| 267 | " | -ve | - | 1.94 | - | - |
| 268 | " | $B_1$ | 180 | 1.83 | 18 | 19 |
| 285 | " | -ve | - | 2.71 | - | - |
| 286 | " | -ve | - | 2.05 | - | - |
| 287 | " | $B_2$ | 20 | 1.97 | 6 | 6 |
| 288 | " | $B_1$ | 40 | 1.93 | 10 | 12 |
| 312 | March | -ve | - | 2.19 | - | - |
| 313 | " | -ve | - | 1.38 | - | - |
| 339 | April | $B_1$ | 120 | 2.05 | 15 | 18 |
| 340 | " | $B_1$ | 80 | 1.99 | 13 | 16 |
| 341 | " | $B_2$ | 140 | 1.75 | 16 | 20 |
| 342 | " | $B_1$ | 20 | 1.98 | 6 | 7 |
| 355 | " | $B_1$ | 20 | 1.89 | 9 | 12 |
| | | $G_1$ | 20 | | | |
| 383 | May | -ve | - | 2.25 | - | - |
| 384 | " | $B_2$ | 40 | 2.03 | 8 | 11 |
| 385 | " | -ve | - | 2.09 | - | - |
| 386 | " | -ve | - | 1.97 | - | - |
| 387 | " | -ve | - | 2.30 | - | - |
| 388 | " | -ve | - | 1.95 | - | - |
| 389 | " | $B_1$ | 20 | 1.96 | 5 | 7 |
| 390 | " | -ve | - | 1.94 | - | - |
| 391 | " | $B_1$ | 60 | 1.85 | 9 | 11 |
| 392 | " | -ve | - | 2.14 | - | - |

Table (32) Cont.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 407 | June (1980) | -ve | - | 1.73 | - | - |
| 408 | " | $B_1$ | 80 | 1.91 | 16 | 17 |
| 409 | " | -ve | - | 2.32 | - | - |
| 410 | " | $B_1$ | 120 | 1.88 | 16 | 18 |
| 411 | " | $B_1$ | 20 | 2.03 | - | - |
| 412 | " | -ve | - | 2.21 | - | - |
| 430 | July | $B_1$ | 600 | 2.06 | 34 | 40 |
| 431 | " | -ve | - | 2.35 | - | - |
| 432 | " | $B_1$ | 160 | 2.26 | 17 | 20 |
| 435 | " | $B_1$ | 800 | 2.38 | 38 | 47 |
| 436 | " | -ve | - | 2.15 | - | - |
| 447 | " | $B_2$ | 80 | 2.05 | 15 | 17 |

St. No. = Strain number
$Q_1$ = Quality of aflatoxins
$Q_2$ = Quantity of aflatoxins by µg/l.

Bioassay test or *Bacillus megaterium* test was carried out by injection of 25 µl and 50 µl of each aflatoxin in discs of filter paper measured 0.5 cm in diameter and placed on a plate surface containing 10 ml of tryptone-yeast-glucose agar medium, this was carried for the isolates that showed positive bioassay results. From table (32), it was obvious that isolate N0.435 gave the largest inhibition zone (38 mm in diameter for 25 µl and 47 mm for 50 µl).

The results obtained from table 33 revealed that 19 isolates of *Aspergillus niger* were screened for aflatoxins production, only 8 isolates produced aflatoxins, while the others failed to produce aflatoxins in the used YES medium. The eight positive isolates were classified as: 3 isolates (Nos. 119, 120, & 266) produced aflatoxin $B_1$, 4 isolates (Nos. 121, 273, 369 & 418) produced aflatoxin $B_2$ and one isolate (No. 354) produced aflatoxin $G_2$. The isolate No.266 was isolated at February and isolate N0.369 was isolated at May and they produced the highest amount of aflatoxins of $B_1$ and $B_2$ respectively with amount of 40 µg/l each . In the bioassay test, *A.niger* isolate N0.266 showed the widest inhibition zone (10 mm in diameter for 25 µl and 12 mm for 50 µl).

Table 34 clarified that 8 isolates of *Aspergillus terreus* were screened for aflatoxins production. It was

Table [33]: Screening for aflatoxins produced by *Aspergillus niger* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 7 | August (1988) | -ve | - | 3.01 | - | - |
| 92 | November | -ve | - | 1.89 | - | - |
| 118 | " | -ve | - | 2.00 | - | - |
| 119 | " | $B_1$ | 20 | 1.85 | 6 | 7 |
| 120 | " | $B_1$ | 20 | 1.93 | 5 | 7 |
| 121 | " | $B_2$ | 20 | 1.99 | 6 | 7 |
| 122 | " | - | - | 1.62 | - | - |
| 144 | December | -ve | - | 2.13 | - | - |
| 206 | January (1989) | -ve | - | 2.61 | - | - |
| 207 | " | -ve | - | 2.06 | - | - |
| 266 | February | $B_1$ | 40 | 2.18 | 10 | 12 |
| 272 | " | -ve | - | 2.53 | - | - |
| 273 | " | $B_2$ | 20 | 2.07 | 6 | 7 |
| 354 | April | $G_2$ | 20 | 3.21 | 7 | 7 |
| 368 | May | -ve | - | 2.89 | - | - |
| 369 | " | $B_2$ | 40 | 2.58 | 9 | 10 |
| 417 | June | -ve | - | 1.98 | - | - |
| 418 | " | $B_2$ | 20 | 2.34 | 5 | 7 |
| 419 | " | -ve | - | 3.01 | - | - |

St. No. = Strain number

$Q_1$ = Quality of aflatoxins

$Q_2$ = Quantity of aflatoxins by µg/l.

Table [34]: Screening for aflatoxins produced by *Aspergillus terreus* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 8 | August(1988) | $G_2$ | 20 | 2.91 | ó | 8 |
| 9 | " | $G_2$ | 20 | 1.88 | ó | 7 |
| 10 | " | $B_2$ | 20 | 2.20 | 5 | ó |
| 11 | " | $B_1$ | 40 | 1.75 | 12 | 15 |
| | | $G_2$ | 20 | | | |
| 12 | " | -ve | - | 2.15 | - | - |
| 43 | September | -ve | - | 2.07 | - | - |
| 44 | " | $G_2$ | 20 | 1.95 | 7 | 7 |
| 45 | " | -ve | - | 2.21 | - | - |

St. No. = Strain number

$Q_1$ = Quality of aflatoxins

$Q_2$ = Quantity of aflatoxins by µg/l.

obvious that 5 isolates produced aflatoxins, while the remaining isolates did not produce these aflatoxins. The five postive isolates were classified as:3 isolates (Nos.8,9 & 44) produced aflatoxin $G_2$, one isolate (N0.10) and one isolate (N0.11) produced aflatoxins $B_1$ & $G_2$. The isolate No.11 was isolated at August 1988 and produced the highest amount of aflatoxin and yielded 40 $\mu g/l$ of $B_1$ and 20 $\mu g/l$ of $G_2$. Also this isolate showed the widest inhibition zone in the bioassay test (12 mm in diameter for 25 $\mu l$ and 15 mm for 50 $\mu l$).

Table 35 revealed that 14 isolates of *Aspergillus ochraceus* were screened for aflatoxins production, only 6 isolates produced aflatoxins, while the rest of isolates failed to produce aflatoxins. The six positive isolates were classified as:4 isolates (Nos.151, 200, 209 & 276) produced aflatoxin $G_2$ and two isolates (Nos.208 & 294) produced aflatoxin $B_2$. The isolates No.151 & 276 produced the highest quantity of aflatoxin $G_2$ (40 $\mu g/l$) each, while each of the remaning positive isolates yielded 20 $\mu g/l$ of aflatoxin $G_2$ or $B_2$. In the bioassay test, the isolate No.151 showed the largest inhibition zone (12 mm in diameter for 25 $\mu l$ and 15 mm for 50 $\mu l$).

Table [35]: Screening for aflatoxins produced by *Aspergillus ochraceus* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 151 | December(1988) | $G_2$ | 40 | 1.56 | 12 | 15 |
| 198 | January(1989) | -ve | - | 2.09 | - | - |
| 199 | " | -ve | - | 2.02 | - | - |
| 200 | " | $G_2$ | 20 | 2.01 | 7 | 7 |
| 201 | " | -ve | - | 2.07 | - | - |
| 208 | " | $B_2$ | 20 | 1.69 | 6 | 7 |
| 209 | " | $G_2$ | 20 | 1.95 | 6 | 7 |
| 210 | " | -ve | - | 2.09 | - | - |
| 211 | " | -ve | - | 2.11 | - | - |
| 274 | February | -ve | - | 1.97 | - | - |
| 275 | " | -ve | - | 2.03 | - | - |
| 276 | " | $G_2$ | 40 | 1.85 | 10 | 14 |
| 294 | March | $B_2$ | 20 | 1.79 | 5 | 6 |
| 295 | " | -ve | - | 2.01 | - | - |

St. No. = Strain number
$Q_1$ = Quality of aflatoxins
$Q_2$ = Quantity of aflatoxins by µg/l.

Table [36]: Screening for aflatoxins produced by *Aspergillus nidulans* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 232 | January(1989) | -ve | - | 2.33 | - | - |
| 233 | " | -ve | - | 2.16 | - | - |
| 234 | " | $B_2$ | 20 | 2.01 | 6 | 7 |
| 235 | " | -ve | - | 2.35 | - | - |
| 269 | February | $G_2$ | 40 | 1.92 | 10 | 13 |
| 329 | April | -ve | - | 2.07 | - | - |
| 330 | " | -ve | - | 1.55 | - | - |
| 331 | " | $G_1$ | 20 | 2.08 | 5 | 8 |
| 332 | " | $G_2$ | 20 | 2.21 | 5 | 7 |
| 333 | " | $B_2$ | 20 | 2.12 | 5 | 6 |
| 334 | " | -ve | - | 2.45 | - | - |
| 335 | " | -ve | - | 2.51 | - | - |
| 336 | " | $G_2$ | 20 | 2.03 | 6 | 7 |
| 337 | " | -ve | - | 2.21 | - | - |
| 338 | " | -ve | - | 2.23 | - | - |
| 343 | " | $G_1$ | 20 | 1.92 | 7 | 7 |
| 344 | " | $G_1$ | 20 | 1.95 | 6 | 7 |
| 345 | " | $G_1$ | 20 | 2.04 | 6 | 7 |
| 356 | " | -ve | - | 3.02 | - | - |
| 357 | " | $G_2$ | 20 | 2.21 | 5 | 7 |

St. No. = Strain number

$Q_1$ = Quality of aflatoxins

$Q_2$ = Quantity of aflatoxins by µg/l.

Table 36 indicated that 20 isolates of *Aspergillus nidulans* were screened for aflatoxins production. It was obvious that 10 isolates produced aflatoxins as follows: 2 isolates (Nos.234 & 333) produced aflatoxin $B_2$, 4 isolates (Nos.331, 343, 344 & 345) produced aflatoxin $G_1$ and 4 isolates (Nos.269, 332, 336 & 357) produced aflatoxin $G_2$. The remaining isolates did not gave these aflatoxins in the used medium. The isolate No.269, isolated at February 1989, produced the highest amount of aflatoxin $G_2$ and yielded 40 µg/l. Also, this isolate showed the largest inhibition zone in the bioassay test (10 mm in diameter for 25 µl and 13 mm for 50 µl).

Table 37 clarified that there were 6 isolates of *Aspergillus fumigatus* screened for aflatoxins production, one isolate (No. 253) produced aflatoxin $B_2$ at a rate of 40 µg/l. Three isolates produced aflatoxin $G_2$, two of them (Nos. 254 & 326 yielded 20 µg/L and one (No. 325) gave 40 µg/L. Also one isolate (No. 346) produced aflatoxin $B_1$ at a rate of 20 µg/l. The isolate No. 324 did not produce aflatoxins. In the bioassay test, the isolate No. 325 showed the largest inhibition zone (10 mm in diameter for 25 µl and 13 mm for 50 µl). In the same table, there were 5 isolates of *Aspergillus wentii*, 3 of which did not produce aflatoxins, while the others produced aflatoxins $B_2$ (No.310) and $G_2$ (No. 352) at a rate of 20 µg/l each. In the bioassay

Table[37]: Screening for aflatoxins produced by *Aspergillus* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No. | Isolation Month | Species | $Q_1$ | $Q_2$ by µg/l | Dry wt. by gm | Bioassay test Inhibition zone/mm 25 µl/mm | 50 µl/mm |
|---|---|---|---|---|---|---|---|
| | | *A.fumigatus* | | | | | |
| 253 | Feb.(89) | | $B_2$ | 40 | 1.95 | 10 | 12 |
| 254 | " | | $G_2$ | 20 | 2.06 | 6 | 9 |
| 324 | March | | -ve | - | 2.25 | - | - |
| 325 | " | | $G_2$ | 40 | 2.00 | 10 | 13 |
| 326 | " | | $G_2$ | 20 | 2.13 | 5 | 7 |
| 346 | April | | $B_1$ | 20 | 2.32 | 5 | 7 |
| | | *A.wentii* | | | | | |
| 308 | March(89) | | -ve | - | 0.77 | - | - |
| 309 | " | | -ve | - | 1.09 | - | - |
| 310 | " | | $B_2$ | 20 | 0.86 | 5 | 7 |
| 351 | April | | -ve | - | 1.21 | - | - |
| 352 | " | | $G_2$ | 20 | 0.95 | 6 | 7 |
| | | *A.ustus* | | | | | |
| 327 | March(89) | | -ve | - | 1.85 | - | - |
| 328 | " | | -ve | - | 1.93 | - | - |
| | | *A.sydowi* | | | | | |
| 148 | Decem.(88) | | $B_2$ | 60 | 1.80 | 12 | 15 |
| 149 | " | | -ve | - | 1.92 | - | - |
| 152 | " | | $B_1$ | 20 | 1.76 | 18 | 23 |
| | | | $B_2$ | 80 | | | |

St. No. = Strain number.

$Q_1$ = Quality of aflatoxins.

$Q_2$ = Quantity of aflatoxins by µg/l.

Table (38) Coun.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 41 | September(88) | $G_1$ | 80 | 2.02 | 12 | 15 |
| 42 | " | -ve | - | 2.53 | - | - |
| 53 | October | -ve | - | 2.61 | - | - |
| 54 | " | $B_2$ | 60 | 2.40 | 9 | 11 |
| 55 | " | $B_1$ | 20 | 2.50 | 12 | 15 |
| 60 | " | $G_1$ | 40 | 2.51 | 12 | 14 |
| 61 | " | $G_1$ | 60 | 2.33 | 5 | 7 |
| 62 | " | $G_2$ | 20 | 2.65 | - | - |
| 69 | " | -ve | - | 2.04 | - | - |
| 70 | " | -ve | - | 2.36 | - | - |
| 212 | January(1989) | -ve | - | 1.92 | 22 | 25 |
| 213 | " | $B_2$ | 20 | 2.03 | 9 | 11 |
| 228 | " | $G_1$ | 80 | 2.42 | - | - |
| 229 | " | -ve | - | 1.93 | 5 | 7 |
| 230 | " | $B_2$ | 20 | 1.82 | 18 | 21 |
| 255 | February | $G_1$ | 100 | 2.08 | 10 | 12 |
| 256 | " | $B_1$ | 40 | 2.32 | 12 | 15 |
| 257 | " | $B_2$ | 20 | 2.60 | - | - |
| 289 | March | $G_1$ | 40 | 2.01 | 10 | 14 |
| 314 | " | -ve | - | 2.09 | - | - |
| 315 | " | $B_2$ | 20 | 2.44 | 6 | 7 |
| 316 | " | $G_2$ | 20 | 1.95 | 5 | 7 |
| 317 | " | -ve | - | 2.46 | - | - |

Table (38) Cont.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 347 | April(1989) | $B_1$ | 40 | 2.40 | 12 | 16 |
| | | $G_2$ | 40 | | | |
| 348 | " | $G_1$ | 60 | 2.35 | 9 | 12 |
| 349 | " | $B_2$ | 20 | 2.09 | 22 | 24 |
| | | $G_1$ | 80 | | | |
| 370 | May | -ve | - | 1.97 | - | - |
| 371 | " | -ve | - | 2.05 | - | - |
| 372 | " | $B_1$ | 20 | 2.01 | 5 | 7 |
| 373 | " | -ve | - | 2.02 | - | - |
| 374 | " | $-B_2$ | 40 | 2.23 | 9 | 11 |
| 375 | " | $G_2$ | 20 | 2.51 | 6 | 7 |
| 376 | " | -ve | - | 1.87 | - | - |
| 377 | " | -ve | - | 2.01 | - | - |
| 378 | " | -ve | - | 2.04 | - | - |
| 379 | " | $B_2$ | 60 | 2.13 | 15 | 18 |
| | | $G_2$ | 20 | | | |
| 380 | " | -ve | 1.96 | - | - | |
| 381 | " | $B_1$ | 20 | 1.99 | 7 | 7 |
| 382 | " | -ve | - | 1.87 | - | - |
| 402 | June | $G_1$ | 60 | 2.07 | 12 | 14 |
| 403 | " | $B_2$ | 20 | 2.04 | 5 | 7 |
| 404 | " | -ve | - | 1.97 | - | - |
| 405 | " | $B_2$ | 40 | 1.95 | 9 | 13 |
| 406 | " | -ve | - | 1.89 | - | - |

Table (38) cont.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 425 | July(1989) | $B_1$ | 80 | 2.13 | 16 | 20 |
| | | $G_1$ | 60 | | | |
| 426 | " | -ve | - | 1.95 | - | - |
| 427 | " | -ve | - | 1.99 | - | - |
| 428 | " | $B_2$ | 60 | 2.01 | 9 | 11 |
| 429 | " | -ve | - | 2.21 | - | - |
| 437 | " | $B_2$ | 20 | 2.04 | 5 | 7 |
| 438 | " | $B_1$ | 20 | 2.11 | 5 | 7 |
| 439 | " | $G_1$ | 40 | 2.32 | 10 | 13 |
| 440 | " | -ve | - | 2.02 | - | - |
| 441 | " | $B_1$ | 80 | 2.35 | 12 | 15 |
| 445 | " | -ve | - | 2.18 | - | - |
| 446 | " | $B_2$ | 40 | 2.12 | 8 | 11 |

St. No. = Strain number

$Q_1$ = Quality of aflatoxins

$Q_2$ = Quantity of aflatoxins by µg/l.

aflatoxins and yielded a total quantity of 220 and 280 μg/l respectively. Isolate No.33 was selected for further studies and gave the largest inhibition zone (29 mm in diameter for 25 μl and 34 mm for 50 μl).

Table 39 revealed that 13 isolates of *Penicillium oxalicum* were screened for aflatoxins production. Only 4 isolates produced aflatoxins, while the remaining isolates failed to produce aflatoxins in the used medium. The four positive isolates were classified as: 3 isolates produced aflatoxin $B_1$ at a rate of 20 μg/l (Nos.134 & 181) and 40 μg/L (No.162), and one isolate (No.159) produced aflatoxin $G_2$ at a rate of 20 μg/L. The isolate No.162 produced the highest amount of aflatoxin $B_1$ and showed the largest inhibition zone (9 mm in diameter for 25 μl and 12 mm for 50 μl).

Table 40 clarified that 13 isolates of *Penicillium roqueforti* were screened for aflatoxins production, only seven of them produced aflatoxins as follows: 3 isolates (Nos.192, 196 & 292) produced aflatoxin $B_2$, one isolate (No.215) produced aflatoxin $B_1$, 2 isolates (Nos.193 & 195) produced aflatoxin $G_1$ and one (No.197) produced aflatoxin $G_2$. The rest of isolates were negative for aflatoxins production. The isolate No.192 was isolated at Jenuary 1989 and produced the highest amount of aflatoxin $B_2$ in a

Table [39]: Screening for aflatoxins produced by *Penicillium oxalicum* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 134 | December(88) | $B_1$ | 20 | 3.07 | 5 | 7 |
| 135 | " | -ve | - | 2.53 | - | - |
| 136 | " | -ve | - | 2.30 | - | - |
| 137 | " | -ve | - | 1.66 | - | - |
| 159 | " | $G_2$ | 20 | 1.65 | 7 | 7 |
| 160 | " | -ve | - | 1.55 | - | - |
| 161 | " | -ve | - | 2.45 | - | - |
| 162 | " | $B_1$ | 40 | 1.52 | 9 | 12 |
| 163 | " | -ve | - | 2.33 | - | - |
| 178 | " | -ve | - | 2.36 | - | - |
| 179 | " | -ve | - | 2.58 | - | - |
| 180 | " | - | - | 2.61 | - | - |
| 181 | " | $B_1$ | 20 | 1.73 | 5 | 7 |

St. No. = Strain number
$Q_1$ = Quality of aflatoxins
$Q_2$ = Quantity of aflatoxins by µg/l.

Table[40]:Screening for aflatoxins produced by *Penicillium roqueforti* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|---|
| 15 | January(1989) | $B_2$ | 80 | 1.66 | 19 | 22 |
| 193 | " | $G_1$ | 40 | 1.82 | 10 | 12 |
| 194 | " | -ve | - | 2.53 | - | - |
| 195 | " | $G_1$ | 60 | 1.91 | 9 | 11 |
| 196 | " | $B_2$ | 20 | 2.35 | 5 | 7 |
| 197 | " | $G_2$ | 20 | 2.22 | 5 | 7 |
| 214 | " | -ve | - | 2.61 | - | - |
| 215 | " | $B_1$ | 20 | 1.96 | 5 | 7 |
| 216 | " | -ve | - | 2.62 | - | - |
| 290 | March | -ve | - | 2.59 | - | - |
| 291 | " | -ve | - | 2.72 | - | - |
| 292 | " | $B_2$ | 40 | 1.85 | 9 | 12 |
| 293 | " | -ve | - | 2.31 | - | - |

St. No. = Strain number

$Q_1$ = Quality of aflatoxins

$Q_2$ = Quantity of aflatoxins by µg/l.

quantity of 80 μg/L, and gave an inhibition zone measured as 19 mm in diameter for 25 μl and 22 mm for 50 μl.

Table 41 revealed that 47 isolates of *Scopulariopsis brevicaulis* were screened for aflatoxins production. It was obvious that 29 isolates produced aflatoxins, while the remainging isolates did not produce aflatoxins. The positive isolates were classified as: 8 isolates produced aflatoxin $B_1$, 12 isolates produced aflatoxin $B_2$, one isolate produced aflatoxin $G_1$ and 8 isolates produced aflatoxin $G_2$. The isolate No. 170 was isolated at December 1988 and isolate No.265 was isolated at February 1989 and they produced the highest amount of aflatoxin $B_2$ and $G_2$ respectively, and each of them yielded 100 μg/L. In the bioassay test, the isolate No.265 showed the largest inhibition zone (20 mm in diameter for 25 μl and 23 mm for 50 μl).

Table 42 showed that 21 isolates of *Mucor circinelloides* were screened for aflatoxins production, only 6 of which produced aflatoxin $G_2$, while the remaning isolates failed to produce aflatoxins. The isolate No.56 isolated at October 1988 produced the highest amount of aflatoxins and showed the largest inhibition zone (12 mm in diameter for 25 μl and 15 mm for 50 μl). In the same table, 6 isolates of *M.griseo-cyanus* were screened for aflatoxins production, 3 of which produced aflatoxin $G_2$ while the

Table [41]: Screening for aflatoxins produced by *Scopulariopsis brevicaulis* isolates, obtained from poultry fodder, on yeast extract- Sucrose medium.

| Sl. No | Isolation Month | $Q_1$ / $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition zone/mm 25 µl | 50 µl |
|---|---|---|---|---|---|
| 71 | October (1988) | -ve - | 1.76 | - | - |
| 138 | December (1988) | -ve - | 1.66 | - | - |
| 139 | " | $B_2$ 40 | 1.49 | 10 | 12 |
| 140 | " | -ve - | 1.64 | - | - |
| 141 | " | $B_2$ 40 | 1.61 | 10 | 12 |
| 142 | " | $Q_2$ 60 | 1.57 | 9 | 13 |
| 143 | " | -ve - | 1.80 | - | - |
| 144 | " | $B_2$ 80 | 1.57 | 19 | 22 |
| 145 | " | $B_1$ 80 | 1.50 | 19 | 22 |
| 146 | " | $B_2$ 40 | 1.48 | 10 | 12 |
| 147 | " | $Q_2$ 60 | 1.49 | 10 | 14 |
| 164 | " | $B_1$ 20 | 1.66 | 5 | 7 |
| 165 | " | $B_1$ 40 | 1.52 | 10 | 12 |
| 166 | " | $Q_1$ 60 | 1.58 | 12 | 14 |
| 167 | " | -ve - | 1.78 | - | - |
| 168 | " | $Q_2$ 80 | 1.40 | 13 | 16 |
| 169 | " | -ve - | 1.90 | - | - |
| 170 | " | $B_2$ 100 | 1.55 | 18 | 21 |
| 236 | January (1989) | $B_1$ 40 | 1.53 | 10 | 12 |
| 237 | " | -ve - | 1.85 | - | - |
| 238 | " | -ve - | 1.76 | - | - |
| 239 | " | -ve - | 1.91 | - | - |
| 240 | " | -ve - | 1.95 | - | - |
| 241 | " | $B_2$ 20 | 1.60 | 5 | 7 |
| 242 | " | $Q_2$ 20 | 1.57 | 5 | 7 |

Table (41) Cont.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition 25 µl | zone/mm 50 µl |
|---|---|---|---|---|---|---|
| 243 | January(1989) | $B_1$ | 60 | 1.41 | 9 | 11 |
| 244 | " | -ve | - | 1.72 | - | - |
| 245 | " | $B_2$ | 80 | 1.32 | 19 | 22 |
| 258 | February | $B_2$ | 20 | 1.84 | 5 | 7 |
| 259 | " | -ve | - | 2.18 | - | - |
| 260 | " | -ve | - | 2.54 | - | - |
| 261 | " | $B_2$ | 20 | 1.76 | 5 | 7 |
| 262 | " | $G_2$ | 20 | 1.91 | 6 | 7 |
| 263 | " | $B_2$ | 80 | 1.25 | 20 | 22 |
| 264 | " | $B_1$ | 20 | 1.83 | 5 | 7 |
| 265 | " | $G_2$ | 100 | 1.25 | 20 | 23 |
| 303 | March | -ve | - | 2.56 | - | - |
| 304 | " | $B_2$ | 20 | 2.30 | 6 | 7 |
| 305 | " | $G_2$ | 60 | 1.48 | 10 | 14 |
| 306 | " | -ve | - | 2.76 | - | - |
| 307 | " | -ve | - | 2.75 | - | - |
| 318 | " | $B_1$ | 20 | 2.51 | 5 | 7 |
| 319 | " | $G_2$ | 20 | 1.96 | 5 | 7 |
| 320 | " | $B_1$ | 20 | 1.65 | 5 | 7 |
| 321 | " | -ve | - | 2.42 | - | - |
| 322 | " | $B_2$ | 80 | 1.39 | 19 | 22 |
| 323 | " | -ve | - | 1.04 | - | - |

St. No. = Strain number

$Q_1$ = Quality of aflatoxins

$Q_2$ = Quantity of aflatoxins by µg/l.

Table[42]: Screening for aflatoxins produced by *Mucor* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| Sl. No. | Isolation Month | Species | $Q_1$ | $Q_2$ by µg/l | Dry wt. by gm | Bioassay test Inhibition zone/mm 25 ul/mm | 50 ul/mm |
|---|---|---|---|---|---|---|---|
| | | *Mucor circinelloides* | | | | | |
| 46 | Oct.(88) | | $G_2$ | 20 | 1.27 | 5 | 7 |
| 47 | " | | $G_2$ | 00 | 1.19 | 10 | 14 |
| 48 | " | | -ve | - | 2.20 | - | - |
| 49 | " | | $G_2$ | 20 | 1.18 | 6 | 7 |
| 56 | " | | $G_2$ | 80 | 1.90 | 12 | 15 |
| 63 | " | | -ve | - | 1.98 | - | - |
| 66 | " | | -ve | - | 1.66 | - | - |
| 93 | November | | -ve | - | 1.00 | - | - |
| 94 | " | | -ve | - | 1.33 | - | - |
| 95 | " | | -ve | - | 1.63 | - | - |
| 96 | " | | -ve | - | 2.05 | - | - |
| 97 | " | | $G_2$ | 40 | 1.05 | 10 | 12 |
| 123 | " | | -ve | - | 1.80 | - | - |
| 124 | " | | -ve | - | 1.92 | - | - |
| 150 | December | | -ve | - | 1.69 | - | - |
| 171 | " | | $G_2$ | 40 | 1.20 | 10 | 12 |
| 172 | " | | -ve | - | 1.95 | - | - |
| 174 | " | | -ve | - | 2.30 | - | - |
| 175 | " | | -ve | - | 2.50-- | | |
| 283 | Febr.(89) | | -ve | - | 1.98-- | | |
| 284 | " | | -ve | - | 2.05-- | | |
| | | *M.Griseo-cyanus* | | | | | |
| 21 | Sept.(88) | | -ve | - | 2.21-- | | |
| 22 | " | | $G_2$ | 40 | 1.21 | 10 | 12 |
| 23 | " | | -ve. | - | 1.95-- | | |
| 24 | " | | -ve | - | 1.98-- | | |
| 25 | " | | $G_2$ | 80 | 1.02 | 12 | 15 |
| 50 | Octob.(88) | | $G_2$ | 60 | 1.10 | 10 | 14 |

Sl. No. = Strain number.

$Q_1$ = Quality of aflatoxins.

$Q_2$ = Quantity of aflatoxins by µg/l.

remaining isolates did not produce aflatoxins. The isolate No.25 which isolated at September 1988 prduced the highest amount of aflatoxin $G_2$ in a quantity of 80 µg/L and showed an inhibition zone measured as 12 mm in diameter for 25 µl and 15 mm for 50 µl.

Table 43 indicated that 12 isolates of *Mucor ambiguus* were screened for aflatoxins production. Only 4 isolates (Nos.395, 414, 416 & 422) produced aflatoxin $G_2$, while the others did not produce aflatoxins. Each of the isolates Nos.395 & 416 produced an amount of aflatoxin $G_2$ equals 40 µg/l and showed an inhibition zone measured as 10 mm in diameter for 25 µl and 12 mm for 50 µl.

Table 44 showed that 5 isolates of *Absidia glauca* were screened for aflatoxins production, 2 of which produced aflatoxin $G_2$ at a rate of 20 µg/L, while the remaining isolates failed to produce aflatoxins. In the same table, 5 isolates of *A.butleri* were screened, 3 of which produced aflatoxin $G_2$, while the remaining isolates were negative for aflatoxins production. Isolate No.311 yieded a quantity of 40 µg/l of aflatoxin $G_2$ and gave an inhibition zone measured as 10 mm in diameter for 25 µl and 12 mm for 50 µl.

Table 45 clarified that 7 isolates of *Cunninghamella echinulata* were screened for aflatoxins production. Two isolates (Nos.277 & 296) produced aflatoxin $G_2$, while the

Table[43]:Screening for aflatoxins produced by *Mucor ambiguus* isolates obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No | Isolation Month | $Q_1$ | $Q_2$ by µg/l | Dry wt. of gm/100 mm medium | Bioassay test Inhibition 25 µl | Bioassay test zone/mm 50 µl |
|---|---|---|---|---|---|---|
| 393 | June(1989) | -ve | - | 1.52 | - | - |
| 394 | " | -ve | - | 1.07 | - | - |
| 395 | " | $Q_2$ | 40 | 1.34 | 10 | 12 |
| 396 | " | -ve | - | 2.01 | - | - |
| 397 | " | -ve | - | 2.04 | - | - |
| 398 | " | -ve | - | 1.92 | - | - |
| 413 | " | -ve | - | 1.87 | - | - |
| 414 | " | $Q_2$ | 20 | 1.93 | 6 | 7 |
| 415 | " | -ve | - | 2.03 | - | - |
| 416 | " | $Q_2$ | 40 | 1.65 | 10 | 12 |
| 422 | " | $Q_2$ | 20 | 1.89 | 5 | 7 |
| 423 | " | -ve | - | 2.02 | - | - |

St. No. = Strain number

$Q_1$ = Quality of aflatoxins

$Q_2$ = Quantity of aflatoxins by µg/l.

Table[44]: Screening for aflatoxins produced by *Absidia* isolates, obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No. | Isolation Month | Species | $Q_1$ | $Q_2$ by µg/l | Dry wt. by gm | Bioassay test Inhibition zone/mm 25 ul/mm | 50 ul/mm |
|---|---|---|---|---|---|---|---|
| | | *Absidia glauca* | | | | | |
| 203 | Jan. (89) | | -ve | - | 2.30 | - | - |
| 204 | " | | $Q_2$ | 20 | 2.15 | 5 | 7 |
| 280 | February | | -ve | - | 2.25 | - | - |
| 281 | " | | -ve | - | 1.98 | - | - |
| 282 | " | | $Q_2$ | 20 | 2.13 | 6 | 7 |
| | | *A.butleri* | | | | | |
| 231 | Jan. (89) | | -ve | - | 2.28 | - | - |
| 252 | February | | $Q_2$ | 20 | 2.09 | 6 | 7 |
| 311 | March | | $Q_2$ | 40 | 2.07 | 10 | 12 |
| 358 | April | | -ve | - | 2.18 | - | - |
| 359 | " | | $Q_2$ | 20 | 2.11 | 5 | 7 |

St. No. = Strain number.

$Q_1$ = Quality of aflatoxins.

$Q_2$ = Quantity of aflatoxins by µg/l.

rest of isolates were negative for aflatoxins production. Isolate No.296 produced aflatoxin $G_2$ in amounts of 60 µg/l and showed an inhibition zone measured as 10 mm in diameter for 25 µl and 14 mm for 50 µl. Also, there were 9 isolates of *Rhizopus nigricans*, 2 of them (Nos.270 & 424) produced aflatoxins $G_2$ and one (No.360) produced aflatoxin $B_2$. Isolate No.270 produced aflatoxin $G_2$ at a rate of 40 µg/l and gave an inhibition zone measured as 10 mm for diameter for 25 µl and 12 mm for 50 µl. In addition, there were 5 isolates of *Aphanomyces laevis* were negative for aflatoxins production. Also, there was one isolate of each of *Syncephalastrum racemosum* and *Cladosporium sphaerospermium* produced aflatoxin $B_1$ in a quantity of 20 µg/L and showed an inhibition zone of 5 mm in diamerter for 25 µl and 7 mm for 50 µl. In addition, there was one isolate of *Mycelia sterelia* did not produce aflatoxins.

Table 46 revealed that 4 isolates of *Cladosporium cladosporiodes* were screened for aflatoxins production. Two isolates produced aflatoxin $B_1$, one isolate produced aflatoxin $B_2$ and one isolate did not produce aflatoxins. In the same table, 6 isolates of *Cephalosporium roseogriseum*, 3 of them (Nos.58, 64 & 364) produced aflatoxin $G_2$, while the remaining isolates did not produce aflatoxins. Isolate No.64 showed an inhibition zone of 9 mm in diameter for 25 µl and 11 mm for 50 µl. In addition, there were 5 isolates of

Table[45]: Screening for aflatoxins produced by different genera of fungi, obtained from poultry fodder, on yeast extract-Sucrose medium.

| St. No. | Isolation Month | Species | $Q_1$ | $Q_2$ by µg/l | Dry wt. by gm | Bioassay test (I.Z.) 25 ul/mm | 50 ul/mm |
|---|---|---|---|---|---|---|---|
| | | *Cunninghamella echinulata* | | | | | |
| 202 | Jan. (89) | | -ve | - | 1.40 | - | - |
| 277 | February | | $G_2$ | 20 | 1.32 | 5 | 7 |
| 278 | » | | -ve | - | 1.02 | - | - |
| 279 | » | | -ve | - | 1.08 | - | - |
| 296 | March | | $G_2$ | 60 | 1.00 | 10 | 14 |
| 297 | » | | -ve | - | 1.25 | - | - |
| 350 | April | | -ve | - | 1.38 | - | - |
| | | *Rhizopus nigricans* | | | | | |
| 26 | Sept. (89) | | -ve | - | 1.31 | - | - |
| 205 | Jan. (89) | | -ve | - | 0.98 | - | - |
| 270 | February | | $G_2$ | 40 | 1.25 | 10 | 12 |
| 271 | » | | -ve | - | 1.08 | - | - |
| 298 | March | | -ve | - | 0.95 | - | - |
| 299 | » | | -ve | - | 1.05 | - | - |
| 360 | May | | $B_2$ | 20 | 1.05 | 5 | 7 |
| 424 | June | | $G_2$ | 20 | 1.18 | 7 | 7 |
| 434 | July | | -ve | - | 1.35 | - | - |
| | | *Aphanomyces laevis* | | | | | |
| 301 | March (89) | | -ve | - | 0.56 | - | - |
| 302 | » | | -ve | - | 0.28 | - | - |
| 353 | April | | -ve | - | 0.92 | - | - |
| 442 | July | | -ve | - | 0.85 | - | - |
| 443 | » | | -ve | - | 0.82 | - | - |
| | | *Syncephalastrum racemosum* | | | | | |
| 177 | Decem. (88) | | $B_1$ | 20 | 0.78 | 5 | 7 |
| | | *Cladosporium Sphaerospermium* | | | | | |
| 173 | Decem. (88) | | $B_1$ | 20 | 0.56 | 5 | 7 |

Table (45) Conl.

| St. No. | Isolation Month | Species | $Q_1$ | $Q_2$ by µg/l | Dry wt. by gm | Bioassay test(I.Z 25 ul/mm | 50 ul/mm |
|---|---|---|---|---|---|---|---|
| | | *Mycelia sterelia* | | | | | |
| 300 | March(SP) | | -ve | - | 0.68 | - | - |
| | | *Cladosporium cladosporiodes* | | | | | |
| 3d1 | May(SP) | | $B_1$ | 20 | 0.86 | 5 | 7 |
| 3d2 | " | | -ve | - | 1.02 | - | - |
| 400 | June | | $B_2$ | 40 | 0.80 | 9 | 13 |
| 401 | " | | $B_1$ | 40 | 0.78 | 10 | 12 |
| | | *Cephalosporium roseogrisoum* | | | | | |
| 57 | Oct.(88) | | -ve | - | 0.90 | - | - |
| 58 | " | | $G_2$ | 20 | 0.95 | 5 | 7 |
| 64 | " | | $G_2$ | 40 | 0.79 | 9 | 11 |
| 65 | " | | -ve | - | 0.98 | - | - |
| 3d3 | May | | -ve | - | 0.89 | - | - |
| 3d4 | " | | $G_2$ | 20 | 0.82 | 5 | 7 |
| | | *C.curtipes* | | | | | |
| 3d5 | May(SP) | | -ve | - | 0.95 | - | - |
| 3d6 | " | | $G_2$ | 20 | 0.86 | 6 | 7 |
| 3d7 | " | | $G_{2'}$ | 40 | 0.69 | 10 | 12 |
| 420 | June | | $G_2$ | 20 | 0.78 | 6 | 7 |
| 421 | " | | -ve | - | 0.91 | - | - |
| | | *Alternaria alternata* | | | | | |
| 444 | July(SP) | | -ve | - | 1.71 | - | - |
| | | *A.chetranthi* | | | | | |
| 488 | July(SP) | | $G_2$ | 20 | 1.52 | 5 | 7 |
| | | *A.brassicicola* | | | | | |
| 399 | June(SP) | | -ve | - | 1.81 | - | - |

St. No. = Strain number

$Q_1$ = Quality of aflatoxins

$Q_2$ = Quantity of aflatoxins by µg/l.

*Cephalosporium curtipes*, 3 of them produced aflatoxin $G_2$, while the other two isolates did not produce aflatoxins. Isolate No.367 produced the highest amount of aflatoxin $G_2$ and showed the largest inhibition zone measured as 10 mm in diameter for 25 µl and 12 mm for 50 µl. In the same table, one isolate of *Alternaria cheiranthi* produced aflatoxin $G_2$ at a rate of 20 µg/l and gave an inhibition zone measured as 5 mm in diameter for 25 µl and 7 mm for 50 µl. Also, there was one isolate of each of *Alternatia alternata* and *Alternaria brassicicola* was negative for aflatoxins production.

**D-Inhibition of aflatoxins on YES medium and effect of pH:**

The strains No.435 of *Aspergillus flavus* and No.33 of *Penicillium notatum* were selected for studying the effect of some alephatic acids such as propionic, oxalic, citric and tartaric acids at pH 2.5, 3.2, 4, 4.5 and 5.0 on the inhibition of aflatoxins production.

Table 46 revealed that, the effect of propionic and oxalic acids showed complete inhibition of growth and aflatoxins production of *A.flavus* (isolate No. 435) at all pH values. Tartaric and citric acids showed no growth and no aflatoxins production at pH 2.5, 3.2 and 4, while at pH 4.5 and 5.0 the tested isolates produced very small amount of aflatoxin $B_1$ compared with the control which grows at pH 7.5. The dry weight also decreased than the control.

Table [46]: Effect of different Alephatic acids at different pH values on the growth and production of aflatoxins of *Aspergillus flavus* strain No.435 isolated from poultry fodder, on YES medium.

| Acid | pH | Growth | Aflatoxins by µg/L | | | | Dry wt. by gm |
|---|---|---|---|---|---|---|---|
| | | | $B_1$ | $B_2$ | $G_1$ | $G_2$ | |
| Tartaric | 5 | ++ | 80 | - | - | - | 1.455 |
| | 4.5 | + | 20 | - | - | - | 0.765 |
| | 4 | no growth | - | - | - | - | - |
| | 3.2 | no growth | - | - | - | - | - |
| | 2.5 | no growth | - | - | - | - | - |
| Citric | 5 | ++ | 40 | - | - | - | 1.722 |
| | 4.5 | + | 20 | - | - | - | 0.722 |
| | 4 | no growth | - | - | - | - | - |
| | 3.2 | no growth | - | - | - | - | - |
| | 2.5 | no growth | - | - | - | - | - |
| Oxalic | 5 | no growth | - | - | - | - | - |
| | 4.5 | no growth | - | - | - | - | - |
| | 4 | - | - | - | - | - | - |
| | 3.2 | - | - | - | - | - | - |
| | 2.5 | - | - | - | - | - | - |
| Propionic | 5.5 | no growth | - | - | - | - | - |
| | 5 | - | - | - | - | - | - |
| | 4.5 | - | - | - | - | - | - |
| | 4 | - | - | - | - | - | - |
| | 3.2 | - | - | - | - | - | - |
| | 2.5 | - | - | - | - | - | - |
| Control | 7.5 | +++ | 800 | - | - | - | 2.229 |

Table 47 revealed that the effect of propionic, oxailc and tartaric acids showed complete inhibition of growth and aflatoxins production of *Penicillium notatum* (isolate No.33) at all pH values. Citric acid showed no growth and no aflatoxins production at pH 2.5, 3.2 and 4, while at pH 4.5 and 5.0 the tested isolate produced very small amount of aflatoxin $G_1$ compared with the control which grows at pH 7.5. Aflatoxin $B_2$ at pH 4.5 and 5.0 was the same amount as control, while aflatoxin $B_1$ was disappeared.

**E- Inhibition of aflatoxins on poultry fodder by aflagin (50% propionic acid and 50% vermiculite):**

The selectd strains (*Aspergillus flavus* isolate No. 435 and *Penicillium notatum* isolate No.33) were grown on poultry fodder as a natural medium and different concentrations of propionic acid (50% propionic acid and 50% vermiculte and 50 ml autoclaved water added to the fodder. Each strain was grown on autoclaved and non-autoclaved fodder, then aflatoxin produced was estimated.

The results obtained from table 48 indicated that *A.flavus* isolate No.435 which growing on autoclaved fodder gave a very small amount of aflatoxin $B_1$ (40 µg/kg) at a concentration of 15 milligrams per 50 grams of fodder and at the other concentrations, aflatoxin was completely

Table [47]: Effect of different alephatic acids at different pH values on the growth and production of aflatoxins of *Penicillium notatum* strain No.33 isolated from poultry fodder, on YES medium.

| Acid | pH | Growth | Aflatoxins by µg/L | | | | Dry we. by gm |
|---|---|---|---|---|---|---|---|
| | | | $B_1$ | $B_2$ | $G_1$ | $G_2$ | |
| Tartaric | 5 | no growth | - | - | - | - | - |
| | 4.5 | - | - | - | - | - | - |
| | 4 | - | - | - | - | - | - |
| | 3.2 | - | - | - | - | - | - |
| | 2.5 | - | - | - | - | - | - |
| Citric | 5 | + | - | 20 | 20 | - | 0.449 |
| | 4.5 | + | - | 20 | 20 | - | 0.430 |
| | 4 | no growth | - | - | - | - | - |
| | 3.2 | no growth | - | - | - | - | - |
| | 2.5 | no growth | - | - | - | - | - |
| Oxalic | 5 | no growth | - | - | - | - | - |
| | 4.5 | no growth | - | - | - | - | - |
| | 4 | - | - | - | - | - | - |
| | 3.2 | - | - | - | - | - | - |
| | 2.5 | - | - | - | - | - | - |
| Propionic | 5.5 | no growth | - | - | - | - | - |
| | 5 | - | - | - | - | - | - |
| | 4.5 | - | - | - | - | - | - |
| | 4 | - | - | - | - | - | - |
| | 3.2 | - | - | - | - | - | - |
| | 2.5 | - | - | - | - | - | - |
| Control | 7.5 | +++ | 20 | 20 | 240 | - | 2.567 |

inhibited. The same isolate was grown on non-autoclaved sample in order to interact with other fungi associated fodder and the quantity produced of aflatoxin $B_1$ was 60 and 20 $\mu g$ at the concentrations of 15 and 25 milligrams respectively, while at other concentrations no aflatoxin was produced (Table 49).

Table 50 revealed that *Penicillium notatum* isolate NO.33 gave 20 $\mu g$ of aflatoxin $G_1$ at the concentration of 15 milligrams on autoclaved fodder and with the other concentrations, aflatoxin was completely disappeared. When the same isolate was grown on non-autoclaved sample 20 $\mu g$ of aflatoxin $B_2$ and 40 $\mu g$ of aflatoxin $G_1$ was obtained at concentration of 15 milligrams, then it gave 20 $\mu g$ of aflatoxin $G_1$ at concentration of 25 milligrams. At other concentrations no aflatoxin was produced (Table 51).

Table[48]: Effect of different concentrations of propionic acid on production of aflatoxins of *Aspergillus flavus* strain No. 435 on autoclaved poultry fodder

| Conc. of prop. acid by gm/50 gm fodder | Growth | Aflatoxins by µg/kg | | | | Total by µg/kg |
|---|---|---|---|---|---|---|
| | | $B_1$ | $B_2$ | $G_1$ | $G_2$ | |
| 0.015 | +++ | 40 | - | - | - | 40 |
| 0.025 | +++ | - | - | - | - | - |
| 0.045 | ++ | - | - | - | - | - |
| 0.065 | ++ | - | - | - | - | - |
| 0.075 | ++ | - | - | - | - | - |
| 0.095 | ++ | - | - | - | - | - |
| Control | +++ | 600 | - | - | - | 600 |

Table[49]: Effect of different concentrations of propionic acid on production of aflatoxins of *Aspergillus flavus* strain No. 435 on non-autoclaved poultry fodder.

| Conc. of prop. acid by gm/50 gm fodder | Growth | Aflatoxins by µg/kg | | | | Total by µg/kg |
|---|---|---|---|---|---|---|
| | | $B_1$ | $B_2$ | $G_1$ | $G_2$ | |
| 0.015 | +++ | 60 | - | - | - | 60 |
| 0.025 | +++ | 20 | - | - | - | 20 |
| 0.045 | ++ | - | - | - | - | - |
| 0.065 | ++ | - | - | - | - | - |
| 0.075 | ++ | - | - | - | - | - |
| 0.095 | ++ | - | - | - | - | - |
| control | +++ | 600 | - | - | - | 600 |

Table[50]: Effect of different concentrations of propionic acid on production of aflatoxins of *Penicillium notatum* strain No.33 on autoclaved poultry fodder.

| Conc. of prop. acid by gm/50 gm foddre | Growth | Aflatoxins by µg/kg | | | | Total by µg/kg |
|---|---|---|---|---|---|---|
| | | $B_1$ | $B_2$ | $G_1$ | $G_2$ | |
| 0.015 | +++ | - | - | 20 | - | 20 |
| 0.025 | +++ | - | - | - | - | - |
| 0.045 | ++ | - | - | - | - | - |
| 0.065 | ++ | - | - | - | - | - |
| 0.075 | ++ | - | - | - | - | - |
| 0.095 | ++ | - | - | - | - | - |
| Control | +++ | 20 | 20 | 180 | - | 220 |

Table[51]: Effect of different concentrations of propionic acid on production of aflatoxins of *Penicillium notatum* strain No.33 on non-autoclaved poultry fodder.

| Conc. of prop. acid by gm/50 gm fodder | Growth | Aflatoxins by µg/kg | | | | Total by µg/kg |
|---|---|---|---|---|---|---|
| | | $B_1$ | $B_2$ | $G_1$ | $G_2$ | |
| 0.015 | +++ | - | 20 | 40 | - | 60 |
| 0.025 | +++ | - | - | 20 | - | 20 |
| 0.045 | ++ | - | - | - | - | - |
| 0.065 | ++ | - | - | - | - | - |
| 0.075 | ++ | - | - | - | - | - |
| 0.095 | ++ | - | - | - | - | - |
| Control | +++ | 20 | 20 | 180 | - | 220 |