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TREATMENT OF ECHINOCHLOA CRUS-GALLI (L.) BEAUV WEEDS BY TRICHODERMA HARZIANUM FUNGUS AND IMPROVEMENT OF GROWTH AND PRODUCTIVITY OF RICE (*ORYZA SATIVA* L.) ANBER -33

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Abstract

This study was conducted to evaluate the effect of biocontrol fungi - Trichoderma harzianum.austaralian(T.h.a). and Trichoderma harzianum.Rafai (T.h.n) and Chaetomium elatum (C.e) isolates in improvement of the growth of rice seedlings - class anber -33 and combating Echinochloa weeds which accompaniment to rice cultivation.To attain these aims , three laboratorial experements were carryied out. The first experement included isolation, purification and estimation of fungi frequency in rice field (AL-Najaf AL-Ashraf Governorate), while the second experiment included the use of fungi and their filtrates by planting rice and Echinochloa seeds in petri-dish containing biocontrol fungi. The third experiment acheived by using a spots that containing a soils (200 gm of field samples) treated with studied fungi (held on powerded wheat straw) and comparing the germination and growth (percentage of germination , lengths (cm), fresh and dry weights (gm) of plumile and radicle of rice and Echinochloa seedlings).These experiments was designed by completely randomized design(C.R.D) Results of this study can be summarized as follows.

1- The genous Aspergillus showed the frequency of 23.53% at the start of growing, while Trichoderma reached at the highest frequency of 39.00% at the end of growing.

2- T.h.t. and Rhizoctonia solani (non pathogenic isolate) and their filtrates showed an important results in the field of controlling of Echinochloa weeds grown in petri dishes and spots , Echinochloa germination percentage reached 8.22, 16.55% in petri dishes and 20.56, 12.65% in spots respectively as well as fungi filterates achieved 12.50, 17.50% in petri dishes respectively, in addition T.h.t. and R. solani attained a asignificant differences on rice seedlings growth parameters germination percentage reached 95.32, 80.16% in petri dishes and 93.50,77.50% in spots respectively, as well as fungi filterates acheived 93.51, 81.50% in petri dishes respectively. Also T.h.t. and R. solani and its filtrates attained asignificant results in combating with Echinochloa germination percentage and in reducing of plumile and radicle length ,fresh and dry weight in compare with control treatment.

Key words: *Trichoderma harzianum, Oryza sativa L., Echinochloa crus-galli (L.) Beauv, Germination percentage, Biological control.*

INTRODUCTION

The rice (*Oryza sativa* L.) is conceived as one of major and important cereal crops in the world, and its food importance comes of contains a high amounts of carbohydrates which was easy to digestion that needed by the man in the diet to supply energy. As well as rice proteins have a balanced content of essential amino acids, especially lysine acid in compare with other grains (Tai, 2000), as it contains 6.7-8% protein, 75-80% starch and 0.4% fat and 13.3% water and 0.9% of metals such as iron , calcium ,chlorine, phosphorus (salts and metals) and vitamin A, B (Al-Younis and Al- Shammaa, 1987).

The treatment of plants residues (wheat) with fungi were conceived one of the vital means of raising the nutritional values of the remnants (Van Wyk, Mohulatsi, 2003).

T.harzianum fungus was used in the treatment of a number of plant residues, including sawdust, barley, wheat straw, rice and wheat millet bran, (Khafaji, 1985; Dewan, 1989; Alwan, 2005). Evans, (2002) has pointed that rice cultivation with wheat residues increase the effectiveness of microorganisms and thus obtain a significant increase in plant height. Zeilinger, (2003) also noted that the use of organic fertilizers and the addition of growth promoting fungus(*T. harazianum*) to the soil, increases the rates of flowering of plants because of the mechanisms and enzymes secretions that provides protection for seeds and provide ideal atmosphere for germination and increase the density of the root of plants. Wheat remnants (wheat straw) consists of the following chemical components: dissolved carbohydrates 5.60, semicellulose 25.20, cellulose 33.30, lignin 10.10, crude protein 13.30, and ash 10.50.

The strains of growth promoting fungi (non pathogenic) were used in cracking cellulosic links or increasing microbial mass, which leads to increase the protein in the waste that treated by fungi (Zeilinger, 2003), so these objects will be able to produce products free from toxins.

The distinctive role of the fungus *Trichoderma* spp. in the fighting against many pathogens as well as improvement plant growth and productivity, as the fungus worked to reduce the incidence and severity of radicals disease caused by fungus *Fusarium* spp in tomato, eggplant, potato , pean , wheat and rice plants (AL-Rawi, 1997 and Zobaie, 2000 and Harman, 2000 and Sarhan Jasim, 2000, Abdul Aziz, 2001), the mechanisms that used by *T.harzianum* fungus in the fight against diseases were paratisim, enzymes secretion (Chitinase, Cellulase, Protease, β 1,3gluconase), antagonisim, production of antibiotics (Trichodermol, Trichodermin, Gliotoxine, Emodin Chrysophancol), competition and plant growth inducing (Limon et al, 1999 and Harman et al,2004).

The presence of wheat remnants in the rice growing areas as aresult of succession cultivation of rice after wheat for several years which create a new bioavailable society, so must know the presence of biomass as the "quantity and quality" in these soils before and after cultivation and using the most efficiency fungi in the analysis of plant wastes as a result of their enzymatic abilities and increase the availabilities of some nutrients and improvement the soil structure and its retention of moisture.

Recently, a lot of agricultural research institutions interested with finding alternative means for chemical combating which is harmless to plants and have a highly efficient in influencing the aetiology of the plant and to avoid collateral damage left by the chemical pesticide in the environment and human health , as well as the emergence of strains of pathogens resistant to pesticides (Montealegre et al, 2003). AL-Shibli (1998) has been abled to biologically control a types of *Fusarium*spp fungus and *Rhizopus* spp which causing the death of rice seedlings and seeds rot diseases by using the *Trichoderma harzianum*, *Chaetomium elatum* and *Penicillium* spp).

The rice is very sensitive to the weeds, especially in the early stages of growth, the research results indicated that this crop losses of up to 70% of yeilds when do not control ,in addition to its poor quality (Slaton, Norman,2006). So the interesting is taken to combating these weeds by using chemical pesticides and achieved good results in this regard (Hill et al, 2008), but the use of pesticides frequently led to environmental, healthy problems, and appearance of some weed classes resisted to these pesticides (Baltazal and Smith, 1994), so the researchers Oriented to use of alternative methods to combat the weeds in order to reduce the side effects of chemical pesticides, and reduce costs to the lowest possible level, these alternatives ways include the use of biological control fungi.

Because of the scarcity of such studies especially the role of *Trichoderma harzianum* in combating *Echinochloa* weeds which accompanied rice cultivation To achieve this goal, has been to follow the following themes:

1. Isolation and diagnosis the fungi in rice fields.
2. The effect of studied fungi, fungi filterates in the germination and growth of rice and *Echinochloa* seedlings in petri dishes and spots.
3. Test the ability of some fungi in inhibition *Echinochloa* weeds growth.

MATERIALS AND METHODS

1- The laboratorial study carried out in Faculty of Agriculture laboratory / Kufa University, soil samples were given from.

*- Rice fields in the College of Agriculture.

*- Rice fields in AL-Hera district, the two fields are planting within the succession of rice - wheat crops.

2- Laboratery experements.

*- Measurement of physical and chemical properties of the soils .
*- Isolation, purification and estimation of fungi frequency in rice field.
*- Study the effect of studied fungi , fungi filterates in the germination and growth of rice and *Echinocholoa* seedlings in petri dishes and spots that containing a soils (200 gm of field samples).

ISOLATION, DIAGNOSIS OF FUNGI IN THE SOILS CULTIVATED WITH RICE

Soil samples were collected randomly from the study region before planting for adepths of 0-30 cm to conduct chemical , physical and biological analyzes, wheras the fungi were grown by using dilutions plate method on the media PDA To calculate the number of fungal genera and species in one gram of soil as dry weight, dishes were incubated at a temperature of 25 ± 2°C.
The colonies were purified on PDA, WA media For the purpose of diagnosis, according tothe approved taxonomic keys (Barmett, 1965; Moustafa, 1982; Moubasher and Aisha, 1987; Burgess et al 1988; Domsch et al, 2003).

THE EFFECT OF STUDIED FUNGI, FUNGI FILTERATES IN THE GERMINATION AND GROWTH OF RICE AND ECHINOCHLOA SEEDLINGS IN PETRI DISHES AND SPOTS.

Carling and Leiner (1986) method was adopted, PDA media was poured in Petri dishes 9 cm diameter that planted by *R. solani*, *F. pseudogrameniarum*, *F.oxysporum* , *T. harzianum* (*T.h.a*) (*T.h.t*) and *C.elatum* fungi into three replicates of eachfungi then incubated at a temperature of 25 ± 2º, after 48 hours petri dishes and spots (200 gm of field samples treated with studied fungi (held on powerded wheat straw) were planted with rice and *Echinochloa* seeds, sterilized with sodiumhypochloride of concentration 4% for 4-5 minutes (25 seeds per each dish) just 1 cm from the edge of the dish. After 10 days,the seedling lengths, moist and dry weight for each of plumile and radicle were calculated .

The laborataries experiment was designed as completely randomized design (C.R.D), treatment means has been compared according to less significant difference (L.S.D) at 0.05.

RESULTS AND DISCUSSIONS

PHYSICAL AND CHEMICAL PROPERTIES

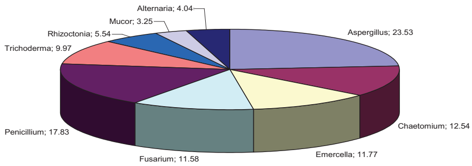
The results appeared that the surface soil texture in AL-Herra fields was Silty Clay, while it was Silty-Clay-Loam in Faculty of Agriculture fields (Table 1). The bulk density values for rice soils in the surface horizon (AP) has been up to 1.38, 1.35 gm. cm^{-3} in AL-Herra and Faculty of Agriculture soils, respectively, while the values of pH for all samples were between 7.83 and 7.60 in AL-Herra and Faculty of Agriculture soils, respectively, and this is consistent with what (Hayatsu, 1993) referred to, while salinity values were ranged between 2.1 and 2.6 ds.m-1 ECe in AL-Herra and the Faculty of Agriculture soils, respectively, so these good values for salinity because of the appropriate washing processes.

Table 1. Some physical and chemical properties of studied soils in the AL-Herra and the Faculty of Agriculture, for agriculture seasons 2010

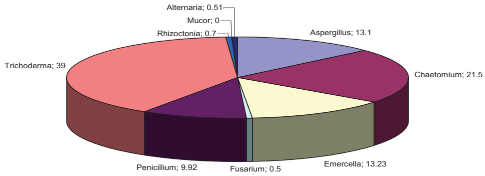
Property	AL-Herra	Faculty of Agriculture
Soil Texture	Silty-clay	Silty-clay-Loam
Bulk density	1.38	1.35
pH	7.83	7.60
ECe ds.m^{-1}	2.1	2.6

ISOLATION, DIAGNOSIS OF FUNGI IN THE SOILS CULTIVATED WITH RICE FREQUENCY OF THE FUNGI GENUS IN THE STUDIED SOILS

The results of isolation from the soil surrounding the rhizospher of rice in two regions appeared that there are 14 species of fungi within 9 genus which are *Alternaria*, *Aspergillus*, *Chaetomium*, *Fusarium*, *Mucor*, *Penicillium*, *Rhizoctonia* and *Trichoderma* as shown in Figure (1), these results has coincided with previous studies which has been isolated of a number of fungi from the soil cultivated with economic plants (Dewan, 1994 and AL-Helo, 1995 and Moussawi 2003). *Aspergillus* genus was the most frequen species of fungi before planting, as this percentage was reached 23.53%, while *Trichoderma* genus frequency was the most frequent species of fungi in the end of season, that ratios reached 39.00%.



Before planting



After planting

Figure 1. the percentage (%) for isolated fungi genus frequency in 1 gm dry soil of rice soils in AL-Herra and the Faculty of Agriculture fields before and after cultivation

THE EFFECT OF STUDIED FUNGI IN THE GERMINATION AND GROWTH OF RICE AND ECHINOCHLOA SEEDLINGS IN PETRI DISHES

The results found that fungi *T.h.a, T.h.t.* and *C.e* led to a significant increase in the percentage of germination of rice seedlings that attained 96.34, 95.32 and 92.30%, respectively, while it did not get any death of seedlings with these fungi as shown in the table (2), this is due to that the fungus (*T.h*) may secrete substances act on the decomposition of the outer shell of the grains, which facilitates the process of germination, such as enzyme Cellulase, or secretion motivational material to germinate and grow like Indole Acetic Acid (Dewan and others, 1994; Harman, 2000), these results agreed with Dewan, (1989) and al-Moussawi, (2005), who pointed to the existence of the motivational impact of growth promoting fungi in germination and growth of wheat and sunflower seedling, respectively.

It is noticeable, the fungus *(R. s*) achieved a germination rate of 80.16% and gave an increase in lengths of plumile and radicle of rice seedlings that reached 6.97, 2.21 cm, respectively, as well as in fresh weight and dry for them, and this result different if compared with previous studies that refers, the (*R.s*) fungus has ahigh pathogenesis - capacity (Diwan al-Bahadli, 1985). This may be due to genetic differences among them (Barreto et al, 2003).

The results showed , as shown in the table (2) that the fungus (*F.pg., T.h.t. , F. o* and *R. s.*) were the most influential fungi in reducing *Echinochloa* germination rate , which reached (8.10, 8.22, 12.33 and 16.55%) , respectively, in compared with control of 84.10%. Also notes the high proportion of dead seedlings when treated with *F. o., F. p., R. s.* And *T.h.t.* fungus, that reached 5.17, 4.57, 4.49, 2.05%, respectively, in compared control of 1.02% ,as well as (*F.pg., T.h.t., F.o* and *R.s.*) achieved significant reducing in the lengths (cm) , fresh and dry weights (gm) of plumile and radicle of *Echinchloa* plants grown in a petri dish table (2) , this result may be due to fungal parasitism of *F. pg*. And *R. s*. And analyst enzymes produced that lead to seeds rot, or the excretion of some toxic substances such as Fusaric acid Zearalenone and Trichothecin, which led to the killing of seeds embryos directly (Lauren and Greenhalph, 1987 and Dowd and others, 1989), which was due to high pathogenesis capacity of these fungi (Diwan, al Bahadli, 1985).

As can be seen from the mentioned table the effect of some studied fungi in length of plumile and radicle of *Echinochloa*, wheras *T.h.t*, *F. o*., *F. pg*, and. *R. s*. reduce plumile and radicle lengths, t the plumile lengths rates when treated with these fungi reached 1.89 , 1.65, 1.54 and 1.43 cm, respectively,in compared with control, which amounted to 4.75 cm, while radicle lengths amounted to 0.72, 0.66, 0.63 and 0.59 cm, respectively, in compared with control that was 2.15 cm, as for the fungi *T.h.a* And *C. e* led to a significant increase in plumile and radicle lengths, which amounted 6.95 , 6.83 cm for plumile, and 3.38, 3.20 cm for radicle respectively in compared with control, 4.75, 2.15 cm for plumile and radicle respectively. With regard to combating *Echinochloa* weeds, it is noted in the table (3) that the fungus isolate *T.h.t* and non-pathogenic fungus *R.s*. were contributed significantly in reduction of the percentage of seeds germination of this isolation in its effective role in the combating the weeds biologicaly, this may be attributable due to genetic changes between isolates (Barreto et al, 2003).

Table 2. Effect of studied fungi in the germination rate, seedlings death , lengths (cm), fresh and dry weights (gm) of plumile and radicle of rice and *Echinochloa* plants grown in a petri dish

Fungi species		germination % rate	lengths (cm)		plumile weights (gm)		weights radicle (gm)	
			Plumile	radicle	fresh	dry	fresh	dry
A.niger	R	79.35	6.15	1.73	0.191	0.045	0.073	0.028
	E	74.30	2.12	0.86	0.130	0.038	0.043	0.018
A. terreus	R	63.25	5.92	1.43	0.181	0.041	0.064	0.025
	E	65.18	2.33	0.97	0.142	0.035	0.041	0.017
A. oryzae	R	60.64	5.30	1.36	0.110	0.037	0.042	0.011
	E	61.73	2.19	0.87	0.101	0.031	0.036	0.010
C globosumKunze	R	87.15	9.28	4.04	0.341	0.082	0.133	0.048
	E	87.21	6.65	3.01	0.251	0.062	0.071	0.035
C.elatum	R	92.30	9.92	4.33	0.362	0.092	0.140	0.050
	E	91.44	6.83	3.20	0.277	0.076	0.080	0.040
F.oxysporum	R	16.45	2.61	0.061	0.134	0.023	0.048	0.013
	E	12.33	1.65	0.66	0.071	0.019	0.024	0.008
F.pseudogramiarum	R	12.98	2.26	0.52	0.124	0.022	0.037	0.012
	E	08.10	1.54	0.63	0.065	0.017	0.021	0.006
P.griseofulvum	R	63.68	4.85	1.58	0.183	0.063	0.073	0.021
	E	66.22	3.75	1.25	0.135	0.037	0.040	0.020
P.oxalicum	R	92.65	7.91	3.04	0.321	0.068	0.113	0.035
	E	90.38	4.87	2.20	0.201	0.042	0.050	0.025
E.nidulans	R	89.53	7.92	3.15	0.325	0.071	0.119	0.036
	E	89.50	5.08	2.25	0.216	0.048	0.056	0.026
T.harzianum .t.	R	95.32	10.06	4.41	0.365	0.095	0.152	0.054
	E	08.22	1.89	0.72	0.082	0.020	0.026	0.011
T.harzianum .a.	R	96.34	10.14	4.62	0.372	0.106	0.161	0.062
	E	92.24	6.95	3.38	0.281	0.085	0.086	0.049
R. solani	R	80.16	6.97	2.21	0.173	0.081	0.087	0.029
	E	16.55	1.43	0.59	0.061	0.016	0.020	0.006
Control	R	87.40	7.43	2.91	0.311	0.066	0.110	0.032
	E	84.10	4.75	2.15	0.214	0.041	0.056	0.027
L.S.D. 0.01	R	5.715	2.475	1.479	0.0477	0.0149	0.0217	0.0124
	E	5.322	2.097	1.003	0.0619	0.033	0.011	0.010

Wheras R= Rice, E=Echinochloa Seedlings. radicle

THE EFFECT OF FILTRATES OF STUDIED FUNGI IN THE GERMINATION AND GROWTH OF RICE AND *ECHINOCHLOA* SEEDLINGS IN PETRI DISHES

Table (3) clarify that the filtrates of *T.h.a* ,*T.h.t.* And *C.e* fungi has led to a significant increase in the percentage of germination of seeds of rice, amounted to 94.87 , 93.51 and 93.12%, respectively, in compared with the control, which was 85.32%. This explains the abilities of this fungi to secret some of the catalysts materials like growth regulators or increasing nutrients availability (Dewan, 1989; Ghisalberti et al, 1990; Musawi, 2005). The results showed also that the effect of *T.h.a ,T.h.t.*, and *C.e* fungi filtrates in increase the lengths of plumile and radicle in compared with the control, where gave significant differences amounted to 3.13, for plumile and 2.01,1.98,1.96 cm for radical. Also the result showed that the fungi *F.o* and *F.pg*. led to a reduction in the germination rates of rice seeds significantly that attained 24.43 , 20.23%, respectively, in compared with the control , which amounted to 85.32%. also the percentage of dead seedlings were amounted to 4.62 and 5.24%, respectively, in compared with control, which was 0% , these fungi have ability to secrete toxins that affect the growth indicators of the rice plant.

As the table shows , the affect of fungi *F.o* and *F.pg*. on plumile and radicle lengths ,that reached 0.43, 0.38 cm for plumile respectively, while the length of the radicle has reached 0.25, 0.23 cm, respectively, in compared with the control that was 1.86 cm for plumile and 1.15 cm for radicle, due to the ability of these fungi to secrete some toxic substances and inhibiting the roots when used in a high concentrations (Decal, 2000).The results are shown in the table (3) that the fungus *R.s*. attained a germination rate of 81.50% and an increase in plumile and radicle lengths stood at 1.76 and 0.94 cm, respectively, and in the fresh and dry weight of rice seeds, this result is inconsistent with many of the studies that indicate that the fungus *R.s.* due to its ability to secrete enzymes and toxins for plant (Dixon, 1993), this may be attributed to get agenetic changes in this isolates, or may be due to genetic modification between isolates (Barretoetal,2003).

The results also shown that fungi *F.pg., T.h.t., F.o* and *R. s*. were the most influential studied fungi in reducing germination ratio of Echinochloa seeds, which attained 9.20, 12.50, 14.34 and 17.50%, respectively, in compared to with control treatment that was 85.53%. It also notes raising of dead seedlings proportion of Echinochloa when treated with fungi *F.pg., F.o., R.s*. and *T.h.t.*, whereas reached 4.22, 3.95, 2.80 and 2.06%, respectively, in compared with control which reached 1.02%. As can be seen from the table(3) the effect of studied fungi filtrates on reduction of plumile and radicle lengths of *Echinochloa* significantly when treated with *T.h.t, R.s., F.o.,* and *F.pg*., that reached 0.72, 0.51, 0.37 and 0.32 cm, respectively, in compared with control treatment, which was 1.34 cm for plumile ,while radicle lengths stood at 0.36, 0.25, 0.21, 0.19 cm, respectively, in compared with control, which was 0.81 cm ,also they were most influential in reducing significantly the fresh weight for plumile and radicle of *Echinchloa.*

The results indicate that *T.h.a.* And *C.e.* isolates achieved significant differences y in germination ratio of *Echinochloa* reached 95.15, 93.55%, respectively, while it did not get any death of seedlings with these fungi, table (3), also achieved a significant increase in the plumile and radicle lengths, that was 2.85, 2.64 cm for plumile and 1.53, 1.51 cm for radicle respectively, in compared with control treatment, which amounted to 1.34 and 0.81 cm for both plumile and radicle respectively.

It also led to a significant increase in fresh and dry weight for plumile and radicle, that was 0.084, 0.072 gm for plumile and 0.063, 0.051 cm for radicle (fresh) respectively, this is due to that these fungi have the ability to provide aprotection for the seed and plants seedlings from pathogens, as well assecretion of some motivational material for the germination and growth of seedlings.

THE EFFECT OF STUDIED FUNGI IN THE GERMINATION AND GROWTH OF RICE AND ECHINOCHLOA SEEDLINGS IN PLASTIC SPOTS.

The results showed in the table (4) that there is considerable variation in the impact of the isolated fungi in seed germination and growth of rice and *Echinchloa* seedlings , the two fungi *F. o. ,F.pg*. were more shorthand for the percentage of germination of rice seeds that reached 10.34, 9.20%, respectively, in compared with control 86.25%, while in *Echinochloa*, the fungi *F.pg., R. s., F. o*. and

T.h.t. were the most influential fungi in reduced germination rate, which amounted to 8.21, 12.65, 16.24 and 20.56 %, respectively in compared with control 85.15 % ,as a result the above fungi were achieved significant reduction in the lengths of shoot and root and fresh and dry weights of rice and *Echinochloa* seedlings (SaadEddin, 1999).

Table 3. Effect of filtrates of studied fungi in the germination rate, seedlings death, lengths (cm), fresh and dry weights (gm) of plumile and radicle of rice and *Echinochloa* plants grown in petri dish

Fungi species		germination % rate	lengths (cm)		plumile weights (gm)		weights radicle (gm)	
			Plumile	radicle	fresh	dry	fresh	dry
A.niger	R	82.06	1.98	1.10	0.060	0.021	0.022	0.006
	E	71.06	1.35	0.65	0.048	0.012	0.014	0.005
A. terreus	R	65.20	1.21	0.95	0.045	0.012	0.021	0.005
	E	68.82	1.05	0.045	0.046	0.011	0.013	0.004
A. oryzae	R	62.17	1.05	0.90	0.041	0.014	0.022	0.004
	E	64.19	0.95	0.047	0.044	0.010	0.011	0.004
C globosumKunze	R	88.50	2.85	1.88	0.080	0.026	0.031	0.009
	E	87.43	2.13	1.03	0.061	0.036	0.042	0.006
C.elatum	R	93.12	2.97	1.96	0.082	0.031	0.038	0.010
	E	93.55	2.64	1.51	0.072	0.046	0.051	0.008
F.oxysporum	R	24.43	0.43	0.25	0.031	0.011	0.015	0.002
	E	14.34	0.37	0.21	0.012	0.007	0.009	0.001
F.pseudogramiarum	R	20.23	0.38	0.23	0.028	0.010	0.014	0.002
	E	09.20	0.32	0.19	0.010	0.006	0.008	0.001
P.griseofulvum	R	65.09	1.75	1.21	0.055	0.027	0.029	0.003
	E	74.89	1.27	0.73	0.031	0.017	0.020	0.002
P.oxalicum	R	91.41	1.90	1.20	0.063	0.030	0.035	0.003
	E	91.44	1.34	0.80	0.036	0.020	0.024	0.003
E.nidulans	R	90.41`	2.01	1.28	0.065	0.033	0.047	0.006
	E	90.02	1.41	0.83	0.041	0.023	0.030	0.003
T.harzianum .t.	R	93.51	3.05	1.98	0.202	0.081	0.091	0.012
	E	12.50	0.72	0.36	0.021	0.010	0.015	0.003
T.harzianum .a.	R	94.87	3.13	2.01	0.231	0.091	0.103	0.021
	E	95.15	2.85	1.53	0.084	0.052	0.063	0.009
R. solani	R	81.50	1.76	0.94	0.041	0.021	0.022	0.004
	E	17.50	0.51	0.25	0.014	0.008	0.011	0.002
Control	R	85.32	1.86	1.15	0.102	0.037	0.043	0.013
	E	85.53	1.34	0.81	0.035	0.024	0.030	0.004
L.S.D. 0.01	R	3.119	1.088	0.619	0.087	0.041	0.025	0.004
	E	43.420	1.031	0.491	000223	0.0188	0.0205	0.0021

The fungi *T.h.a., T.h.t.*, and *C.e* have achieved the highest rates in the rice seed germination that reached 94.15, 93.50 and 92.55%, respectively, while the results of the *Echinochloa* indicated that *T.h.a* And *C.e* led to a significant increase in the percentage of germination of 95.75, 92.25%, respectively. This may be attributed ,that these fungi are secreted cellulase enzyme (Decal and others, 2000), and as a result, it led to a significant increase in the lengths of shoot and root of rice and *Echinochloa* seedlings ,or to their ability to secrete some of growth regulators and catalysts for the germination and growth of plants as wheat, rice, and these results agreed with what referred by Dewan, Musawi (2005); Dewan and others, (2007). The fungus *R.s*. achieved germination rate of rice seedlings of 77.50%, also gave increase in lengths plumile and radical that reached 17.75, 9.56 cm, respectively, as well as in fresh and dry weight, this result is inconsistent with previous studies indicating that the fungus *R.s.* characterized with the high pathogenesis ability (Diwan and Bahadli, 1985) ,as well as characterized by its ability to secrete enzymes and pathogenic toxins for plants, so this is inconsistent with Hamoudi (1999), Alwan (2005), or may be due to genetic differences between isolates (Barreto et al, 2003) Table(4).

Table 4. Effect of studied fungi (held on wheat straw) in the germination rate , seedlings death, lengths (cm), fresh and dry weights (gm) of plumile and radical of rice and *Echinochloa* plants grown in spots.

Fungi species		germination % rate	lengths (cm)		plumile weights (gm)		weights radicle (gm)	
			Plumile	radicle	fresh	dry	fresh	dry
A.niger	R	74.31	17.32	11.17	0.319	0.082	0.091	0.036
	E	76.06	9.34	3.92	0.317	0.061	0.069	0.026
A. terreus	R	67.21	16.34	10.44	0.315	0.078	0.086	0.031
	E	68.82	7.10	3.21	0.212	0.057	0.058	0.021
A. oryzae	R	63.21	16.84	10.77	0.320	0.080	0.081	0.026
	E	65.70	8.06	3.41	0.215	0.067	0.057	0.016
C globosumKunze	R	88.53	21.94	14.11	0.496	0.133	0.142	0.058
	E	86.43	13.34	6.14	0.428	0.101	0.114	0.041
C.elatum	R	92.55	22.17	14.31	0.411	0.139	0.154	0.065
	E	92.25	14.46	7.18	0.475	0.110	0. 117	0.046
F.oxysporum	R	10.34	4.61	1.55	0.165	0.051	0.059	0.012
	E	16.24	6.23	1.53	0.112	0.031	0.038	0.009
F.pseudogramiarum	R	09.20	4.54	1.22	0.151	0.035	0.042	0.011
	E	08.21	5.10	1.22	0.111	0.025	0.031	0.008
P.griseofulvum	R	72.19	18.07	11.65	0.401	0.092	0.099	0.029
	E	70.89	9.43	4.59	0.237	0.071	0.078	0.029
P.oxalicum	R	91.44	19.86	13.16	0.472	0.112	0.123	0.043
	E	90.84	12.15	5.74	0.318	0.083	0.088	0.031
E.nidulans	R	89.20	20.71	13.31	0.490	0.113	0.130	0.044
	E	91.58	12.80	5.78	0.321	0.085	0.091	0.036
T.harzianum .t.	R	93.50	22.54	14.53	0.530	0.144	0.171	0.069
	E	20.56	7.75	2.25	0.198	0.037	0.045	0.019
T.harzianum .a.	R	94.15	23.71	14.65	0.561	0.151	0.186	0.074
	E	95.75	14.85	7.75	0.481	0.131	0.142	0.054
R. solani	R	77.50	17.75	9.56	0.201	0.105	0.112	0.033
	E	12.65	4.12	1.18	0.103	0.023	0.030	0.007
Control	R	86.25	19.65	12.91	0.467	0.109	0.121	0.041
	E	85.15	12.16	5.61	0.315	0.081	0.086	0.030
L.S.D. 0.01	R	5.147	2.245	1.079	0.0275	0.0112	0.0153	0.0164
	E	6.716	2.119	1.625	0.0351	0.0180	0.0122	0.0141

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