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ADVERSE INFLUENCE OF SOME FUNGICIDES ON BREAD WHEAT

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ABSTRACT

Five bread wheat varieties were sprayed with the recommended doses to investigate the effect of three systemic fungicides belonging to triazole group i.e. (Punch), (Sumi-8) and (Fungshow) on leaf rust severity, meiotic aberration, chlorophyll content and yield components **,**.All the used fungicides enhanced the yield components of the wheat varieties and reduced the severity of disease leaf rust disease as compared with the control treatments. The wheat variety Gemmeiza-10 showed the lowest disease severity followed by Sakha-61 , Sids-1 , Gemmeiza-7 then Sakha-93 as a result to use the tested fungicides. Significant differences were found either between the fungicides or between the wheat varieties concerning yield components, chromosome aberration and micronuclei, and pollen viability .The three fungicides showed chromotoxic effects on meiotic cells ,which reduced the meiotic activity and resulted in accumulation of metaphase cells and increased the chromosomes aberrations in the wheat varieties. Punch(Flusilazole) followed by Sumi-8(Diniconazole) were the most effective , while Fungshow(Diniconazole) was the least one in this respect. Also, fungshow and sumi-8 showed the highest percentage of pollen viability (97.77and 97.43), while Punch slightly reduced the percentage of pollen viability (96.82) comparing with the control treatment (98.43).

In general, it could be concluded that although systemic fungicides can be used at the recommended rate for the control of plant diseases and enhance plant growth and yield quantity in breeding programs. care should be taken while using these systemic fungicides and should be exploited judiciously .

INTRODUCTION

Bread wheat (*Triticum aestivum* L.) is liable to attack with some diseases i.e. rusts, smuts, powdery mildew and wilt . The use of fungicides is considered the salvation to control such diseases especially when resistant varieties are absent. Several fungicides were used in modern agriculture for disease control. With the commercialization of the agricultural industry, fungicides are being increasingly used for crop protection and optimum yield from the land. Plants are the main recipients of fungicides regardless of whether they themselves represent the target organisms or whether the targets are pests, pathogenic fungi, bacteria, etc. They are exposed to pesticides from direct application ,through the uptake from soil and water and from atmospheric drift. In-spite of the side effect of such pesticides, it is usually an accepted because of the absence of resistant varieties (Pandy *et.al.*,1994). The harmful effects of pesticides as mutagenic agents to the non-target organisms are worthy of extended study (Ware et.al.,1970 and Amer and Farah,1983).

The main objectives of the present investigation apre to study the effects of some systemic fungicides on wheat leaf rust disease severity,

chlorophyll content, mitosis and meiosis division, pollen fertility and some agronomic traits of five Egyptian bread wheat varieties.

MATERIALS AND METHODS

Three systemic fungicides were tested for their effectiveness against leaf rust disease on 5 bread wheat varieties i.e. Sakha-61 , Sids-1 , Gemmeiza-7 , Gemmeiza-10 and Sakha-93 (Table 2) as well as the meiotic and mitotic of micronuclei, chromosomal aberration , leaf chlorophyll content , and some agronomic characters. This investigation was carried at Gemmeiza Research Station in 2005/2006 growing season.

Experimental design :

Split plot-design was followed in this experiment. The main plots were the fungicides (Table 1), while the wheat cultivars comprised sub-plot treatments (table 2) .Grains of each wheat cultivar were drilled in rows 3.5 m. spaced 15 cm. apart, in plots consisted of 6 rows. The experimental plots were surrounded by a border of highly susceptible cultivars to leaf rust disease such as Giza160 , Giza155 and Little club. For inoculation, the border was inoculated by a mixture of the predominant leaf rust races and talc powder (1 : 5) using baby cyclone methods adopted by Tarvet and Cassell (1951) at booting stage.

The tested fungicides:

Three systemic fungicides belonging to triazole group were used (Table1). These fungicides were sprayed twice using the recommended rates, one after 72 hrs. of inoculation, while the second after 15 days of the first one. Efficacy % of the fungicides were determined according to the equation adopted by Rewal and Jhooty (1985).

$$Efficacy\% = \frac{Infection\ in\ control\ \% - Infection\ in\ treatment\ \%}{Infection\ in\ control\ \%} \times 100$$

Table (1): Trade name, common name, chemical name and application rate of the tested fungicides.

Trade name/ % active ingredient /formulation	Common name	Chemical name	Application rate
Fungshow 12.5 % EC	Diniconazole	**(E)-(RS)-1 (2,4dichloro-phenyl) 4,4di-methyl-2-(1H-1,2,4-tnazol-1-y) pent-1-en-3-01(IUPAC)**	12.5 gm / 100 L.
Sumi-8 (5%) EC	Diniconazole	(E)-(RS)-1 (2,4dichloro-phenyl) 4,4di-methyl-2-(1H-1,2,4-tnazol-1-y) pent-1-en-3-01(IUPAC)	35 ml / 100 L.
Punch 40 % EC	Flusilazole	1- {{bis (4-fluorophenyl) (methyl) silyl}-1H-1,2,4- triazole	18.75 ml / 100 L

Table (2): The used five bread wheat varieties, year of registration and their pedigree

No.	Variety	Year of registration	Pedigree
1	Sakha-61	1980	Inia / RL 4220//7c/ YR' s '- CM 15430-2s-10s-3s-os
2	Sids-1	1995	HD2172/pavon " S"//1158.57 / Maya74"S"Sd46-4Sd-2Sd-1Sd-0Sd.
3	Gemmeiza-7	1998	CMH74 .630/5x//Seri82/3/Agent CGM4611-2GM-3GM-1GM-0GM.
4	Sakha-93	1999	Sakha92/TR819328 S 8871-1S-2S -1S-0S.
5	Gemmeiza-10	2005	MAYA 74 S /ON// 1160 – 147 / 3 / BB / GLL /4 / CHAT S / 5 / CROW S/CGM5820 -3 GM – 1 GM – 2 GM – OGM

Chlorophyll content:

Chlorophyll (a) and (b) of the sprayed and non-sprayed leaves of the used varieties were determined accordipng to Moran and parath (1982). Five leaves of each cultivar were collected either from the sprayed or non-sprayed cultivars after 48 hrs. from spraying the fungicides. Five disks, each of 0.5 cm. in diameter from each variety and treatment were placed in 10 ml. N-dimethyle formamide for the extraction of chlorophyll. Both of chlorophyll (a) and (b) were measured after 7 days using Spectrophotometer at wave - length of 664 and 647 , respectively.

Meiotic irregularities:

Meiotic analysis was studied in the pollen mother cells (PMC' s)of the treated and non-treated varieties. The spikes were collected after the application of the fungicides at anthesis stage, immediately fixed in a 3 : 1 alcohol / glacial acetic acid solution for 24 hrs, then washed with distilled water several times before being stored in *70*% ethanol. Squash preparations of pollen mother cells were made in acteocarmine stain as described by Fayed *et .al.*, (1984). About 12 slide were prepared from 6 randomly selected plants for each variety . The prepared slides were used to determine the meiotic irregularities .

a- Micronuclei:

The number of micronuclei in interphase as well as dividing cells was determined . The determination included the two different distinguishable types of micronuclei i. e. compact and non-compact as reported by Heseman and Fayed (1982).

b- Chromosomal aberration:

The total number of chromosomal aberrations were estimated in dividing cells. The abnormalities includes cells fragments, laggards, strikness, un-ivalents and un-equal distribution of chromosomes.

C- Pollen grain viability:

The percentages of viable and aberated pollen were estimated by testing their stain-ability in acetocarmine staining. Round and darkly stained pollen-grains are considered as viable and functional, while the shriveled or

lightly stained ones are considered as non-viable and non-functional as adopted by Fayed (1990).

Disease assessment:

Leaf rust disease severity for each sprayed as well as the non-sprayed cultivar was assessed according to the modified scale 0 -100 of Peterson *et al*., (1948) at mature stage.

Yield components:

At mature stage , the following parameters were taken, plant height, number of kernels/ spike, spike weight , number of spikes/1/4 m^2, 1000 kernel weight, grain yield / m^2 either in sprayed or non-sprayed varieties .

RESULTS AND DISCUSSION

Data analysis reveal the presence of significant differences between all the tested fungicides, varieties, interaction between them concerning with the studied characters. Table (3) show the effect of the tested fungicides as a main treatment on the studied characters as follow :

Concerning leaf rust severity data show that, the tested fungicides reduced disease severity compared with the control treatment (76.00%). The fungicide Punch (Flusilazole) and sumi-8(Diniconazole)were the best in reducing disease severity (5.00%) for both fungicides followed by Fungshow 12.5% (10.33%).Similar results were obtained by Abdel-Hak *et. al*., (1987) who used three systemic fungicides i.e. dichlobutrazol (Vigil), propioconazol (Tilt) and triadimefon (Bayleton)against stripe rust of wheat .All the tested fingicides reduced the disease by 67 to 75 % and led to significant increments in the yield by 38 to 59 %.Sundin *et al.,* (1999) used triazole seed treatments to supper spore production by *Puccinia recondite*.They found that fenpropimorph, prochloraz, triadimenol, tridemorph were equal in suppressing the fungus except chlorothalonil fungicide.

Concerning the effect of systemic fungicides on plant physiology and biochemical processes such as chlorophyll content, data reveal that spray of the tested fungicides on wheat plants resulted in an increase in mean of chlorophyll (a) and (b) values. The fungicide Punch occupied the first rank in this respect (3.59 and1.471) followed by fungshow (2.890 and 1.359) then sumi-8 (2.658 and 1.217) compared with the control treatment (1.492 and 1.492). The increase of chlorophyll (a) and (b) may be due to a retardation of the rise in hydrolytic enzymes usually accompanying senescence of leaves , including wheat leaves. In this respect , Forster, (1978) stated that the leaves of treated seeds of barley and wheat contained a significantly higher content of chlorophyll, carotenoids, xanthophyllus and nucleic acids than did the control leaves and added that the fungicides prevented the rise of protease acid, rib- nuclease and esterase activities (Tripathi *et.al.*,1980). Also, Tripathi and Schlosser (1980) reported that Carbendazim maintained the integrity of the chloroplast and other all organelles of wheat leaves.

Concerning the effect of fungicides as a main treatments on agronomic traits, significant differences were found between the fungicides either in increasing or decreasing comparing with the control treatments:-

On plant height, the fungicide sumi-8 resulted in the highest mean of plant height (96.81cm.), while both of the fungicides punch and fungshow showed mean plant height(93.78 and 91.05 cm., respectively) less than that of the control treatment (95.88 cm.).

Regarding spike weight, the fungicide Punch occupied the first rank (2.691 gm.), followed by Fungshow (2.384gm.) then Sumi-8 (2.307 gm.) comparing with the control(2.065 gm.).

On no. of kernels / spike, the fungicides Sumi-8 and Punch gave the highest mean (61.13 and 59.20,respectively), while Fungshow gave 51.93 as a mean no. of kernels/ spike.

On 1000 kernel weight, significant differences were found between the fungicides punch and sumi-8 (47.86 and 46.29 gm., respectively) and the fungicide fungshow (44.78 gm) compared with the control treatment (41.02 gm).

Concerning number of spikes /1/4 m^2, the fungicide punch showed the highest mean of number of spikes /1/4 m^2 (34.13) and grain yield /m^2 (263.70 gm), followed by sumi-8 (31.80 and 242.40 gm, respectively), then the fungicide fungshow (32.93 and 233.00gm, respectively) compared to the control treatment (31.07and 25.50gm).

Table (3) : Effect of some systemic fungicides on mean leaf rust severity, chlorophyll content, and some agronomic traits of five Egyptian wheat varieties.

Character	Fungicides				
	Punch	**Sumi-8**	**Fungshow**	**Control**	**L.S.D.**
Leaf rust	5.00	5.00	10.33	76.00	2.681
Chlorophyll a	3.890	2.658	2.890	1.492	0.102
Chlorophyll b	1.471	1.217	1.359	0.571	0.052
Plant height	93.78	96.81	91.05	95.88	2.59
Spike weight	59.20	61.13	51.93	54.27	4.21
No. of kernels/spike	2.691	2.307	2.389	2.065	0.197
1000 kernel weigh	47.86	46.29	44.78	41.02	0.86
No of spikes/1/4 m^2.	34.13	31.80	32.93	31.07	1.80
Grain yield / m^2	263.40	242.40	233.00	205.50	3.75

Response of the tested bread wheat varieties(sub-treatment):

Data analysis of the response of the used wheat varieties presented in Table (4) showed significant differences concerning the studied characters as follow: -

The lowest mean of leaf rust severity was shown by Gemmeiza-10 (2.50%), Sakha-61(7.50%),Sids-1(10.00%),Gemmeiza-7(10.50%)and Sakha-93(10.67%) .

While the highest means of chlorophyll (a) and (b) were obtained by Gemmeiza-7and Gemmeiza-10(2.821,1.276and 2.794, 1.238,respectively).

On the other hand, the highest means of plant height were obtained by sids-1 followed by Gemmeiza-7 (109.40 and 103.10 cm., respectively).

The highest means of no. of spike weight and no. of kernels/ spike were shown by Gemmeiza-7(2.627gm. , 63.67) , sakha-93 (2.488, 61.75) and sids-1 (2.431 , 55.25). The highest means of 1000 kernel weight were obtained by showed Sids-1 (48.31 gm), Gemmeiza7 (47.09gm), Sakha-93(46.40gm), Sakha-61 (42.86gm) then Gemmeiza-10 (40.26gm).

Concerning the number of spikes / 1/4 m^2, the highest means wee obtained by Sids-1 (36.67), Sakha-63 (35.83), Sakha-61 (34.83), Gemmeiza-10 (28.58) then Gemmeiza-7 (26.92).

The grain yield/ m^2 , the wheat variety Sids-1 gave the highest mean (286.00gm) followed by Sakha-93 (256.20gm), Gemmeiza-7 (231.90gm), Gemmeiza =10 9221.00gm) then Sakha-61 (185.80gm).

Application of systemic fungicides resulted in a yield increase in excess of that expected on the bases of the amount of disease and the degree of control as reported by Dickinson (1981). Also, Carlson,(1970) stated that some fungicides has unique growth stimulatory properties when applied to plants of wheat, barley, peanuts, sorghum, and broad bean. Schmling and Clark (1970) suggested that the stimulatory effects included increased plant height of beans from foliar spray, green foliage of wheat and barley , increased germination vigor's of beans and increased yield of grain from seed treatment. Griffiths and Scott (1977) observed that application of systemic fungicides invariably increased grain yield in barley plants with benomyl, ethirimol, traidimefon and tridemorph for the control of powdery mildew. Peat and Shipp (1981) proved that the major effect of benomyl at 2000 to 5000 ppm increased the development of tillers. They pointed that this due to rapid initiation of tillers, and not to rapid growth. An increase in the number of tillers will increase the yield. Fehrman (1981) said that this response can be explained by suggesting that benomyl changes the normal pattern of apical dominance and , hence, allows a more rapid lateral growth.

Table (4) : Response of the tested bread wheat varieties as affected by spraying with fungicides concerning the studied characters.

Character	Cultivars					
	Sakha-93	Sakha-61	Gemmeiza-7	Gemmeiza-10	Sids-1	L.S.D
Leaf rust	10.67	7.50	10.50	2.50	10.00	2.998
Chlorophyll a	2.611 b	2.794 a	2.821 a	2.480 c	2.581bc	0.102
Chlorophyll b	1.177 b	1.238 a	1.276 a	0.988 d	1.093 c	0.522
Plant height	109.40 a	84.53 d	103.10 b	83.91 d	90.94 c	2.900
Spike weight	2.431 ab	1.973 c	2.627 a	2.288 b	2.488 a b	0.220
No.of kernels/spike	55.25 b	50.33 b	63.67 a	52.17 b	61.75 b	4.711
1000 kernel weigh	48.31 a	40.26 d	47.09 b	42.86 c	46.40 b	0.966
No of spikes/1/4 m^2.	36.67 a	28.58 b	26.92 b	34.83 a	35.42 a	2.015
Grain yield / m^2	286.00 a	221.00 d	231.90 c	185.80 e	256.20 b	4.188

Effect of fungicides on chromosomal aberrations:

Data in Table (5) show that the tested fungicide punch increased the mean value of chromosomal aberrations (3.592) followed by sumi-8 (3.439), while the least value of aberration obtained with the fungicide fungshow (2.70). Significant differences were found in interaction between

fungicides and varieties . The wheat variety Sids-1 was the most affected by the fungicides application, which showed the highest mean of chromosomal aberration (4.512) followed by Sakha-61 (2.939), Gemmeiza-7 (2.303), Gemmeiza-10 (1.520) then Sakha-93 (1.390).Genetic changes sometimes induced by pesticides, their metabolites and residues are expressed by various endpoints, which induced structural changes in chromosomes and chromatids called chromosomal aberrations (breaks, deletions, inversation, gaps, translocations and rings)or other disturbances (stickiness, cluping and erosion). Kaymak and Muranli (2006) treated seeds of *Triticum aestivum* L. and *Hordeum vulgare* L. with various concentrations of logran herbicide (125, 250, and 500µg /ml) for 3 and 6 hrs. They found that the percentages of abnormal cells were seen to increase with increasing the period and concentrations. The most dominant types of observed abnormalities were C-mitosis, distributed metaphase and anaphase and stickiness . All the used concentrations of Logran significantly induced a number of chromosomal aberrations in root tip cells and decreased mitotic index of *Hordeum vulgare* L. and *Triticum aestivum* L.

Table (5) Effect of some fungicides on chromosomal aberrations of five bread wheat varieties and their interactions.

Fungicides	Sids-1	Gemmeiza7	Gemmeiza10	Sakha-61	Sakha-93	Mean
Punch	5.860 b	2.860 f	1.940 h	4.820 c	2.480 g	3.592 A
Sumi-8	6.720 a	3.150 e	1.580 ij	3.953 d	1.790 hi	3.439 B
fungshow	4.090 d	2.600 g	2.560 g	2.980 ef	1.290 k	2.704 C
Control	1.380 jk	0.600 l	0.001 m	0.001 m	0.001 m	0.396 D
Mean	4.512 A	2.303 C	1.520 D	2.939 B	1.390 E	

L.S.D. at 0.05 % Fungicides : 0.096 Varieties : 0.107 Fung. X Vars.: 0.215

Effect of fungicides on micronuclei :

Data analysis show that spraying fungicides increased micronuclei values in cells of flowers comparing with the control treatment (Table 6). Significant differences were found either between the fungicides or the wheat varieties. Also, there were a great interaction between the fungicides and the sprayed varieties. The fungicide Punh gave the highest mean values of micronuclei (0.381) ,followed by Fungshow (0.361) , then Sumi-8 (0.334), while it was 0.150 in the control treatment.

On the other hand, the wheat variety Sids-1 was the most affected one by spraying the fungicides , which showed the highst mean of micronuclei (0.521), followed by Sakha-61 (0.344), Gemmeiza-7 (0.270), Gemmeiza-10 (208). While the variety Sakha-93 was the least affected (0.190).Cytogenic abnormalities can be detected in mitotic and meiotic divisions as a result of fungicides spraying. Mohan (1975) observed aberrations in onion meristematic cells after treatment with Carboxin and Oxycarboxin, both the fungicides caused a lowering of mitotic index and differential concentration of chromosomes. He reported that treatment with fungicides resulted in a greater frequency of abnormal anaphase and telophase cells and induction of polyploidy and binucleate cells. Grant and Zura (1982) analysed 12 different

species sprayed with selected herbicides (picloran simazine and diurone) at application rate used in agriculture. They determined cytogenetic effects in somatic and meiotic cells of flower buds and observed a significant but differential increase in the frequency of aberrant cells in various species, the highest being in the mid season of spraying and the lowest in the off-season. Also. Recently , Dane and Dalgic (2005) investigated the effect of different concentrations of the systemic fungicide benomyl on the mitotic division in onion (*Allium cepa*) root tip cells during germination. They suggested that all concentrations cause abnormalities in mitotic cell divisions and the mitotic frequency in the onion root tip cells decreased as the concentration of benomyl solution increased.

Table (6): **Effect of some fungicides on micronuclei aberration of five bread wheat varieties and their interactions.**

Fungicides	Sids-1	Gemmeiza7	Gemmeiza10	Sakha-61	Sakha-93	Mean
Punch	0.567 b	0.373 e	0.330 g	0.347 f	0.290 h	0.381 A
Sumi-8	0.410 c	0.280 h	0.323 g	0.397 cd	0.260 i	0.334 C
Fungshow	0727 a	0.297 h	0.180 l	0.393 cd	0.210 k	0.361 B
Control	0.380 de	0.130 m	0.001 n	0.240 j	0.001 n	0.150 D
Mean	0.521 A	0.270 C	0.208 D	0.344 B	0.190 E	

L.S.D. at 0.05 % Fungicides : 0.007 Varieties : 0.003 Fung. X Vars : 0.016

Types of micronuclei, compact and non-compact, were also detected (Hesseman and Fayed, 1982). As presented in Table (7) , the frequency of non-compact micronuclei was more than that of compact types in the varieties (Figs. A & b). Concerning the origin of micronuclei, it is worth to note that the compact was originated from chromosome fragments and non – compact types was recorded from eliminated chromosomes. The results emphasized the above suggestion in meiotic division of the varieties, because the increase in the frequencies of fragments and laggards were roughly accompanied in many cases with an increase in the frequencies of compact and non-compact micronuclei, respectively.

The types of chromosomal aberrations presented in Table (7) show that , the types observed in meiosis were fragments, stickiness, laggards, univalent and unequal distribution of chromosomes (Figs. C , d , e, and f). Fragments and stickiness represent the most frequent types of chromosomal aberrations in meiosis of the studied materials. The other kinds of aberrations were found in low frequencies.

Data in Table (8) show the effect of three systemic fungicides on the pollen viability of five wheat flowers. All the fungicides reduced the pollen viability as compared with the un-sprayed plants of the wheat varieties (control treatments). The fungicide fungshow gave the highest percentage of pollen viability (97.77%)followed by Sumi-8 (97.43%) .While, the fungicide punch showed the lowest percentage of pollen viability (96.82). Concerning the wheat varieties, Sids-1 showed the lowest percentage of pollen viability (95.506) followed by Sakha-61(96.705) .While the wheat variety Sakha-93 gave the highest percentage of pollen viability (98.903), followed by Gemmeiza-10 and Gemmeiza-7 (98.782 and 98.222), respectively.

F

f

But *et.al.,* (1973) suggested that spraying fungicides before, during and after bloom is a common practice, this may impair fruit setting by reducing pollen viability on the receptivity of the stigma and may be impair with the fertilization process. Also, Grant (1982) reported that pollen sterility and seed setting are assumed to be consequences of chromosome aberrations inducing in the meiotic stage and added that pesticides that induce chromosome aberrations in meiosis also reduce pollen viability.

Table (7): Effect of some fungicides on types of micronuclei and chromosomal aberrations of five bread wheat varieties.

Fungicides	Variety	Percentage of types of micronuclei		Percentage of types of chromosomal aberrations				
		Compact	Non-compact	Fragments	Stickiness	aggards	Univalent chromosome	Unequal distribution
Punch	Sids 1	(0.34)	(0.40)	(1.03)	(1.73)	(1.03)	(1.03)	(1.03)
	Gemmiza 7	(0.20)	(0.10)	(0.71)	(0.36)	(0.71)	(0.36)	(0.71)
	Gemmiza 10	(0.11)	(0.18)	(-)	(-)	(-)	(1.55)	(0.39)
	Sakha 61	(0.13)	(0.26)	(1.32)	(1.32)	(-)	(0.87)	(1.32)
	Sakha 93	(-)	(0.21)	(1.24)	(-)	(0.83)	(-)	(0.41)
Sumi-8	Sids 1	(0.12)	(0.29)	(1.26)	(2.94)	(0.84)	(0.84)	(0.84)
	Gemmiza 7	(0.14)	(0.14)	(1.35)	(0.45)	(1.35)	(-)	(-)
	Gemmiza 10	(0.06)	(0.26)	(0.79)	(0.40)	(0.40)	(-)	(-)
	Sakha 61	(0.20)	(0.20)	(1.03)	(1.03)	(1.03)	(0.51)	(1.03)
	Sakha 93	(0.07)	(0.19)	(-)	(0.90)	(-)	(-)	(0.90)
Fungshow	Sids 1	(0.28)	(0.28)	(1.75)	(1.17)	(-)	(-)	(1.17)
	Gemmiza 7	(0.15)	(0.22)	(0.52)	(0.52)	(0.52)	(-)	(1.04)
	Gemmiza 10	(0.13)	(0.20)	(0.85)	(1.71)	(-)	(-)	(-)
	Sakha 61	(0.14)	(0.21)	(-)	(1.70)	(0.43)	(-)	(0.85)
	Sakha 93	(0.07)	(0.11)	(-)	(0.86)	(-)	(-)	(0.43)
Control	Sids I	(0.08)	(0.30)	(0.69)	(0.34)	(-)	(-)	(0.34)
	Gemmiza 7	(-)	(0.13)	(-)	(0.60)	(-)	(-)	(-)
	Gemmiza 10	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	Sakha 61	(0.08)	(0.16)	(-)	(-)	(-)	(-)	(-)
	Sakha 93	(-)	(-)	(-)	(-)	(-)	(-)	(-)

Table (8) Effect of some fungicides on pollen viability of five bread wheat varieties and their interactions.

Fungicides	Sids-1	Gemmeiza7	Gemmeiza10	Sakha-61	Sakha-93	Mean
Punch 40%	92.290 n	97.773 i	98.630 e	96.993 j	98.400 f	96.820 D
Sumi-8(5%)	95.700 l	98.117 g	98.870 bc	95.570 m	98.880 bc	97.430 C
Fungshow12.5%	96.993 j	98.330 f	98.430 f	96.330 k	98.780 cd	97.770 B
Control	97.040 j	98.677 de	98.980 b	97.937 h	99.553 a	98.430 a
Mean	95.506 D	98.222 B	98.782 A	96.705 C	98.903 A	

L.S.D. at 0.05 % Fungicides ; 0.057 Varieties : 0.0175x t value Fung. X vars :0.128

It could be stated that , the highest effects of fungicides on micronuclei, chromosomal aberration and pollen viability may be due to the active ingredient in each fungicide. Punch 40% has 7.5gm a.i./ 100 L , fungshow (1.875 gm a.i./100L) and sumi – 8 (1.75gm a.i./100L) . Reviewing the obtained results, it could be concluded that there is a positive correlation between the active ingredient and the value of aberrations.

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التاثير العكسى لبعض المبيدات الفطرية على قمح الخبز

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*** البنك القومى للجينات والموارد الوراثية - مركز البحوث الزراعية**

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لدراسة تاثير ثلاثة مبيدات جهازية تنتمى لمجموعة الترايزول وهى بانش – سومى ايت – فانجشو على شدة الاصابة بمرض صدا الاوراق والانقسام الميتوزى ومحتوى الكلورفيل ومكونات المحصول تم رش هذة المبيدات على خمسة اصناف من قمح الخبز بالمعدلات الموصى بها وقد ادى رش هذة المبيدات الى زيادة مكونات المحصول فى الاصناف الخمسة وقللت من شدة الاصابة بمرض صدا الاوراق مقارنة بمعاملة الكنترول .

أوضحت النتائج وجود فروق معنوية سواء بين المبيدات او بين الأصناف بخصوص مكونات المحصول والانحرافات الكروموسومية وتكوين النوى الصغير(**micronuclei**) وحيوية حبوب اللقاح . أظهر الصنف جميزة-10 أقل شدة إصابة نتيجة لاستخدام المبيدات يلية الأصناف سخا-61 و سدس-1 و جميزة-7 ثم سخا-93 . وقد أظهرت المبيدات الثلاثة انحرافات فى الخلايا الميوزية وتأثير على الكروموسومات حيث قللت من نشاط الانقسام الميوزى وأحدثت تراكمات للخلايا فى الطور المتوسط كما زادت من الانحرافات الكروموسومية فى الأصناف الخمسة .ولقد كان المبيد بانش الاكثر تاثيرا يلية سومى ايت بينما كان المبيد فنجشو أقلها في هذا المجال.

أظهر كل من مبيدي الفنجشو و سومى ايت أعلي نسبة في حيوية حبوب اللقاح بينما قلل المبيد بانش نسبة حيوية حبوب اللقاح قليلا مقارنة بمعاملة الكنترول . وبصفة عامة فانه على الرغم من استخدام المبيدات الفطرية بالمعدلات الموصى بها لمقاومة امراض النباتات ودورها فى نمو النباتات وزيادة مكونات المحصول الا انه يجب اتخاذ الحيطة والحذر عند استخدام هذة المبيدات .

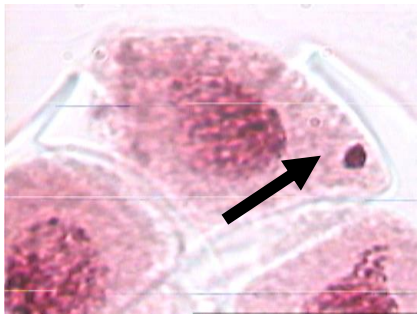

Fig A : compact

Fig B : non-compact

Fig: A and B – types of micronuclei compact and non-compact

Fig “G”: pollen fertility

Fig “H”: pollen sterility

Figs “G and H”: shape of fertile and sterile pollen grains in wheat

Fig “C” : fragment chromosome

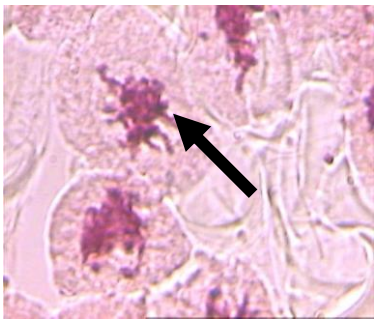

Fig “D” : stickiness chromosome

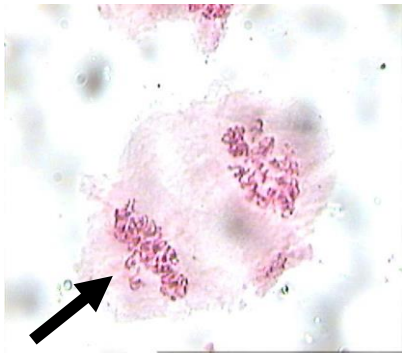

Fig “E” : laggard chromosome

Fig “F” : unequal distribution of chromosomes

Figs “C, D, E, and F: types of chromosomal aberrations :fragment, stickiness, laggard and unequal distribution of chromosomes.