

EFFECT OF SOME TREATMENTS ON HISTOLOGICAL FEATURES OF EGYPTIAN COTTON.

Ahmed, H.S.*; Faten H.M. Ismaeil**; A.L. Wanas***;
M.M. El-Razaz* and S.A. El-Desouky **

* Cotton Institute research center Giza, Egypt.

** Botany Dpt Faculty of Agriculture Benha University

*** Botany Dpt. faculty of Agriculture Domiat Branch Mansoura University

ABSTRACT

Growth- of Egyptian cotton (*Gossypium barbadense* cv. Giza 86) plants were sowings during 2008 and 2009 seasons was obviously affected with foliar application with growth retardants paclobutrazal (PP₃₃₃) at 10&20 ppm), growth promoters Benzyl adenine (BA) at 10&20 ppm, topping with removal of main-stem terminal bud at 12&14 branches and soil addition of fresh Yeast at 20&40 k.g /feddan in the first irrigation.

Also, anatomically, many features of leaf structure clearly modified with most of the applied treatments. Here, all applied treatments increased thickness of midvein, xylem and phloem tissues, lamina, upper and lower epidermis and palisade and spongy tissues as well. In addition, dimensions of main vascular bundle and number of its xylem vessel rows were also increased with all applied treatments. Of the pioneer results in the present study was that the formation of new like bundles upper midvein in the collenchyma layers.

Also, of the new finding was that the formation of new bundles in the cortex in the abscission zone.

INTRODUCTION

In Egypt, cotton is considered one of the major economic crops in which plays the most important role in the Egyptian economy the cotton cultivated area ranged from 150000 to 250000 feddan.

In this respect, despite the drawbacks of supplying nutrients, foliar application, as a technique has great particle utility under certain conditions. In semi-arid regions, a lack of available water in the topsoil and a corresponding decline in nutrient availability during the growing season are common phenomena, (Marschner, 1995). Even though water may still be available in the subsoil.

Therefore, in the present study the growth retardants paclobutrazal (PP₃₃₃) at 10&20 ppm, growth promoter Benzyladenine(BA) at 10&20

ppm were tested as foliar spray substances, Fresh Yeast at 20&40 k.g /feddan addition in soil and topping or decapitation (with removal of main-stem terminal bud at 12&14 branches) treatments.

The main effect of paclobutrazal upon plant growth and development takes place through the alteration of the hormone balance it promotes treated plants to create more cytokinens (Li and Hill. 1989; El-Desouky. 1992. El-Desouky and Abd El-Dayem. 1992a, b and c. Mohamed and El-Desouky. 1992 and Wanas. 1992). Sections were read to detect histological manifestations of noticeable responses resulted from treatments with paclobutrazal (PP₃₃₃ at 10&20 ppm), growth promoters Benzyladenine (BA at 10&20 ppm), topping (with removal of main-stem terminal bud at 12&14 branches) and soil addition of Fresh Yeast (at 20&40 k.g /feddan) in first irrigation. Paclobutrazal. (Williams and Edgerton, 1983). Of ornamentals (McDaniel, 1983); and other plants (Barrett and Bartuska, 1982 and El - Desouky, and Abd-El-Dayem 1992a, b and c) (El- Desouky, 1988). Apparently, paclobutrazal inhibits the biosynthesis of gibberellins (Graebe, 1982), which in turn affects the plant size (Quinlan, 1981).

Besides, the Egyptian soils, is common with most of the arid and semi-arid regions, are relatively rich in most mineral elements required for plant growth, but deficient in organic matter and some mineral elements by the way of intensive cultivation causing depletion of some mineral nutrients should be compensated by fresh Yeast at 20&40 k.g /feddan. Paclobutrazal (PP₃₃₃) at 10&20 ppm, growth promoter Benzyladenine(BA) at 10&20 ppm, topping (with removal of main-stem terminal bud at 12&14 branches) and fresh Yeast at 20&40 k.g /feddan on cotton growth. Also, focusing on various anatomical alterations which took place in leaf structure with the assigned treatments to investigate the responsibility of leaf anatomy for determining the growth habit of cotton plants.

MATERIAL AND METHODS

Two field experiments were carried out at the Experimental Farm of the Faculty of Agriculture at Moshtohor, Benha University. During two successive seasons of 2008 and 2009. Seeds of the Egyptian cotton plant (*Gossypium barbadense*) cultivar Giza 86 were secured from Institute of Cotton Research. Agricultural Research Center, Ministry of Agriculture. Giza.

Cotton seeds well treated with Rizolex at 50 g/kg seeds as fungicide were sown on the first weak at April and first weak of May during 2008 and 2009 season at the rate of 10 seeds per hill. The experiment was arranged in a randomized complete block design with

four replicates the experiment unit was 3 x 3.5 meter, including five rows with a distance of 30 cm between hills.

At 37 days from sowing, hills were thinned to two seedlings. Then, different agricultural practices including irrigation, weed and pest control were done according to the management system in the Faculty Farm.

Different applied treatments were as follows: -

- 1- Control (untreated) Spraying with only distilled water as a control treatment.
- 2- Spraying with Paclobutrazal (PP₃₃₃) the relatively new plant growth retardant (0.23%) 10 ppm equal 4.23 g / 100 liter
- 3- Spraying with Paclobutrazal (PP₃₃₃) 20 ppm equal 8 g /100 liter distilled water
- 4- Spraying with the Benzyladenine (BA) 10 ppm equal 1 g /100 liter distilled water
- 5- Spraying with Benzyladenine (BA) / 20 ppm equal 2 g / 100 liter distilled water
- 6- Addition with the Fresh Yeast to the soil at 20 kg. /feddan.
- 7- Addition with the Fresh Yeast to the soil at 40 kg. / Feddan.
- 8- Manual topping or decapitation (with removal of main-stem terminal bud or cutting the tip of the main stem) at 12 fruiting branched.
- 9- Manual topping or decapitation (with removal of main-stem terminal bud or cutting the tip of the main stem) at 14 fruiting branched

Cotton plants were foliar sprayed with Paclobutrazal (PP₃₃₃) treatments three times at 50, 70 and 90 days after sowing ,Benzyladenine (BA), treatments three times at 80, 100 and 120 days after sowing using hand operated compressed air sprayer at the rate of 10 liter/ plot with 1 ml/ liter of Twin 20 was used as wetting and spreading agent with the rate of 1ml/litre to all sprayers treatments with Paclobutrazal (PP₃₃₃) as foliar sprayers starting at the age of 50 days after sowing and Benzyladenine (BA), as foliar sprayers starting at the age of 80 days after sowing . Spraying in each time for each treatment took place uniformly with equal amount of spraying solution of the appropriate concentration of different assigned treatments. Each plant of each treatment sprayed with equal amounts of spraying solution as all others.

Meanwhile, fresh Yeast was added to the irrigation water starting with the first irrigation with the rate of 20 or 40 kg. /feddan and repeated five times untill the first irrigation.

In case of topping (decapitation), it was done by removing the terminal bud in the stage of 12 or 14 fruiting flowering branches.

Histological samples:

During the vegetative and reproductive growth of cotton plant samples for anatomical studies were taken as the following system.

Specimens were taken for the histological studies at the age of 120 days after sowing from:-

Leaves: the leaf lies on the node number four below the apical top.

Flowering pedicel: specimens were taken in the base of flowering pedicel (i.e., the site of its connection with the flowering branch i.e., the site of the abscission zone. meanwhile, the elongation sections were taken from that segment includes a part of the base of flowering pedicel and small part of its flowering branch.

Specimens of the assigned cotton leaves as well as the abscission zone of flowers or bolls were sectioned using the microtome.

Specimens were *killed and fixed* for at least 48 hrs. in F.A.A. (10 ml formalin, 5ml glacial acetic acid and 85 ml ethyl alcohol 70%). The selected material were then washed in 50% ethyl alcohol, dehydrated in a series of ethyl alcohol (70, 90, 95 and absolute), infiltrated in xylene added in paraffin wax of matting point 60-63 C°, sectioned in a thickness of 20 microns for flower pedicel and 15 microns for leaves (Sass, 1951), stained with the double stain method (fast green and safranin), cleared in xylene and mounted in Canada balsam (Johanson, 1940).

The following measurements and counts were estimated:-

Characters anatomical studied :-

a)- flower:- third flower

- | | |
|--|---------------------------------|
| 1-Diameter of whole section | 2-Thickness of cuticle layer |
| 3- Thickness of epidermal | 4- Thickness of collenchyma |
| 5-Thickness of parenchyma | 6-Number of cortical layers |
| 7- Thickness of cortex | 8-Thickness of fiber layer |
| 9- Thickness of phloem region | 10- xylem |
| Thickness of xylem region. | Number of xylem rows. |
| X number of xylem vessels in the row. | Diameter of widest xylem vessel |
| Wall thickness of widest vessel | |
| 11- Thickness of Resin ducts (epithelial cells). | |
| 12- Total number of Resin ducts (epithelial cells) | 13- Pith layer |
| 14-Thickness of the widest vessel wall. | |
| Number of pith parenchyma layer | Thickness of Pith layers |
| Thickness of one Pith layers | |

Cortex bundles

- | | |
|----------------------------|-----------------------------|
| Number of lateral bundles. | Diameter of lateral bundles |
| Thickness of xylem region. | Thickness of phloem |
| Thickness of fiber layers | |

b)- Leaves:

- | | |
|-------------------------|--------------------|
| 1-Thickness of mithofel | 2- Lamina |
| Thickness of cuticle | Upper – lower |
| epidermis | Thickness of upper |

Thickness of lower epidermis.	Thickness of palisade tissue
Number of palisade layers	Thickness of spongy tissue
Number of spongy layers	
3-Thickness of Lamina	4-Thickness Of midvein
5- Thickness of fiber	6-Resin ducts (epithelial cells).
Thickness of Resin ducts.	Total number of Resin ducts
7- Collenchyma tissue	
Thickness of upper Collenchyma tissue.	
Thickness of lower Collenchyma tissue.	
Number of upper Collenchyma tissue	
Number of lower Collenchyma tissue	
8-Vascular bundle	
Length of main vascular bundle.	Width of main vascular bundle
Number of like- bundle.	Number of xylem rows
X no. of xylem. Vessels in the row	
Diameter of widest xylem vessel.	Wall thickness of widest vessel
9- Thickness of xylem tissue	10- Thickness of phloem tissue
<u>new formed like- bundles</u>	
Number of like-bundle	

RESULTS AND DISCUSSION:

Histological studies:

Due to the vegetative, reproductive and yield characteristics obtained in 2008 season; we planned to study the histological features in the pedicel of the third flower survived on the 4th apical fruiting branch in cotton plants in different applied treatments i.e., PP₃₃₃, BA at 10, 20ppm for each, fresh yeast at two rates of 20, 40k.g/feddan and topping at 12, 14 branches. This histological study has been carried out during 2009 season. This study was done in transverse and longitudinal sections in the pedicel of the third flower survived on the 4th apical fruiting branch. This histological study aimed to find any alteration could be took place in different tissues in the zone of abscission later in the basal of flower pedicel. Also cross sections were taking in the midvein layer with adjacent area of leaf blade in the same time and treatments as in case of flower pedicel. The anatomical feature in flower pedicel, midvein in leaf could be related to all significant effects has been achieved in vegetative, reproductive and yield characteristics. El-Desouky et al, (2001 a&b) Also, anatomically, many features of leaf structure clearly modified with most of the applied treatments. Here, all applied treatments significantly increased thickness of midvein, xylem and phloem tissues, lamina, upper and lower epidermis and palisade and spongy tissues as well In addition,

dimensions of main vascular bundle and numbers of its xylem vessel rows were also significantly increased with all applied treatments. This increment may be ensure the essentiality of increasing the cross sectional area of phloem for improving both growth and productivity of cotton plants.

New histological findings of the study:

During section examination, pioneer findings were founded. Since intact vascular bundles were created in the cortex tissue in pedicel flower in two treatments, first it was paclobutrazal at the two applied concentrations and fresh yeast at the two applied rates was the second. Meanwhile, these cortical bundles did not found in sections of pedicel flower either of control plants or of other treatments i.e., BA and topping. Here, of interest is to note that this new formed bundles represent an additional pathway of photosynthates and different transmittable nutrients from different plant parts (i.e. sources) to bolls (i.e. sinks): That could be simply reflected upon each of boll retention and the number of abscised bolls as well as increasing boll weight and its final yield. That could be driving us to suggest such treatments to be practically applied.

Leaf anatomy:

Different histological feature of the Mean counts and measurements of certain histological features (in micron) in transverse section through the midvein of the 4th apical but leaf lies was used in this part of study in case of different applied treatments. The data obtained are shown in Tables (1,2) and fig.(1,2).

Also data in Table (1) show that; either treatments had no effect as in case of topping at 14 branches or increased with the rest of treatment exists that reduction existed with topping at 12 branches. Yet, the mean thickness of Resin ducts as shown in Table (1) was increased to reach 103.5, 110.7, 112.5, 119.7, 126.0, 170.0, 184.5 and 189.0 with PP₃₃₃ at 10, PP₃₃₃ at 20, BA 10, BA at 20, topping at 12, topping at 14, fresh yeast at low rate, fresh yeast at height rate and BA at 10ppm respectively.

Of interest, as shown in Table (2) the creation of some structures like- bundles in the main vein in the leaf. These like- bundles were formed above the vascular tissue in the midvein. These like- bundles did not present in case of control. Yet, these bundles found in different applied treatments. Also, it could be noticed that its number was highest and reached five in case of PP₃₃₃ at 20ppm but only reached to the number three with each of PP₃₃₃ at 10ppm, BA at the two applied concentrations and fresh yeast at the highest rate. Yet, topping at 12, 14 branches and fresh yeast at the lowest rate only gave two of these like-bundles structures for each.

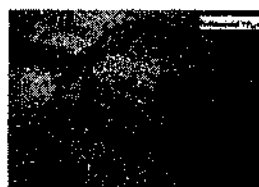
Table (1): Mean counts and measurements of certain histological features (in micron) in transverse section through the midvein of the 4th apical cotton (*Gossypium barbadense* cv. Giza 86) plants as affected by some agronomic treatment.

Characteristics Treatments	Thickness Of lamina	Thickness Of midvein	Thickness of fiber	Resin ducts		Collenchyma tissue		
				Thickness of Resin ducts	Total no. of Resin ducts	Upper		lower
						Thickness	No. of collenchy ma layers	
Control	279.00	1726.20	90.00	99.00	0.0	580.50	6.0	480.60
Paclobutrazol	275.00	1984.50	72.00	170.00	6.0	621.00	8.0	630.00
	287.00	1806.00	94.50	119.70	4.0	585.00	8.0	517.50
Benzyladenine	211.00	1724.10	76.50	189.00	7.0	576.00	7.0	518.40
	297.50	1736.70	69.30	126.00	7.0	466.20	8.0	527.40
topping at	324.90	2016.00	94.50	103.50	2.0	612.90	8.0	630.00
	252.90	1764.00	90.00	112.50	3.0	540.00	8.0	526.50
Yeast at level	272.70	1944.60	90.00	110.70	7.0	630.00	9.0	601.20
	350.10	1751.40	81.00	184.50	5.0	462.60	7.0	432.00

Table (2): Mean counts and measurements of certain histological features (in micron) in transverse section through the midvein of the 4th apical cotton (*Gossypium barbadense* cv. Giza 86) plants as affected by some agronomic treatment.

Characteristics	Treatments	Vascular bundle						Thickness of xylem tissue	Thickness of Phloem region
		Length of main vascular bundle	Width of main vascular bundle	No of like-bundles	No. of xylem rows	X' no. of Vessels in the row	Diameter of widest xylem vessel	Wall thickness of widest vessel	
Control	00 ppm	571.50	1117.20	0.0	65.0	9.0	43.20	7.20	121.50
Paclbutrazol	10ppm	729.00	1306.20	3.0	60.0	9.0	58.50	9.00	99.00
	20	711.00	1207.50	5.0	64.0	10.0	43.20	8.10	103.50
Benzyladenine	10ppm	663.30	1092.00	3.0	56.0	10.0	45.00	9.00	105.30
	20	614.70	987.00	3.0	54.0	8.0	40.50	8.10	90.00
topping at	12 branch	695.70	1211.70	2.0	64.0	10.0	37.80	7.20	122.40
	14	630.00	1050.00	2.0	44.0	9.0	42.30	8.10	90.00
Yeast at level	20kg	629.10	1230.60	2.0	60.0	10.0	44.10	8.10	108.90
	40kg	571.50	1081.50	3.0	53.0	10.0	42.30	8.10	99.00

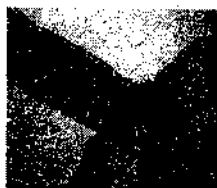
تأثير الباكلوبوترازول على الصفات التشريحية للورقة



Effect of PP₃₃₃ at 10ppm

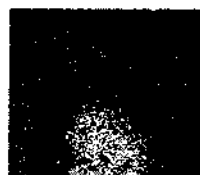


control



Effect of PP₃₃₃ at 10ppm

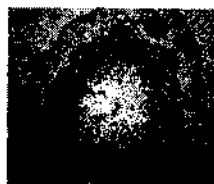
تأثير الباكلوبوترازول على الصفات التشريحية
لعنق الزهرة (القطاع العرضي) .



Effect of PP₃₃₃ at 10ppm

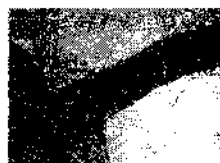
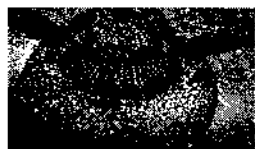


control

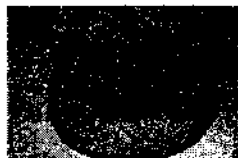
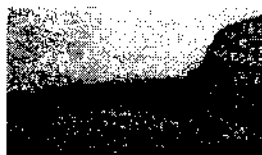


Effect of PP₃₃₃ at 20ppm

تأثير البنزيل ادينين على الصفات التشريحية للورقة

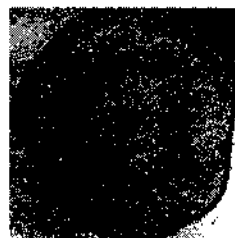
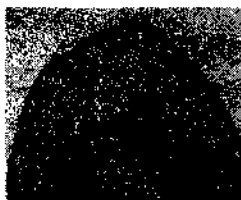
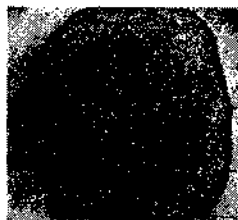


Benzyl adenine at 10ppm

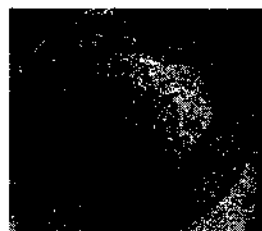
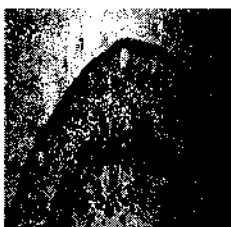
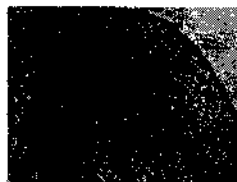


control

Benzyl adenine at 20ppm



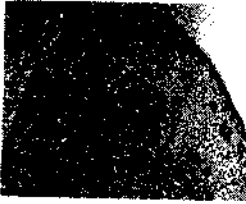
Benzyl adenine at 10ppm



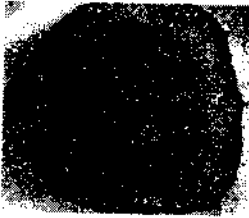
control

Benzyl adenine at 20ppm

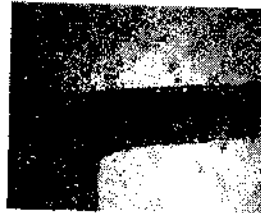
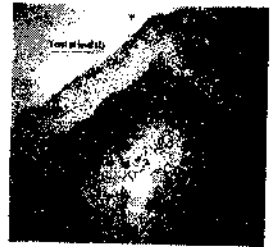
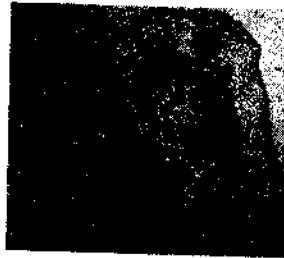
تأثير الخميرة على الصفات
النشيرية لعق الزهرة
القطاع العرضي .



Yeast extract at 20k.g/feddan



control



Yeast extract at 20k.g/feddan



control



Yeast extract at 40k.g/feddan

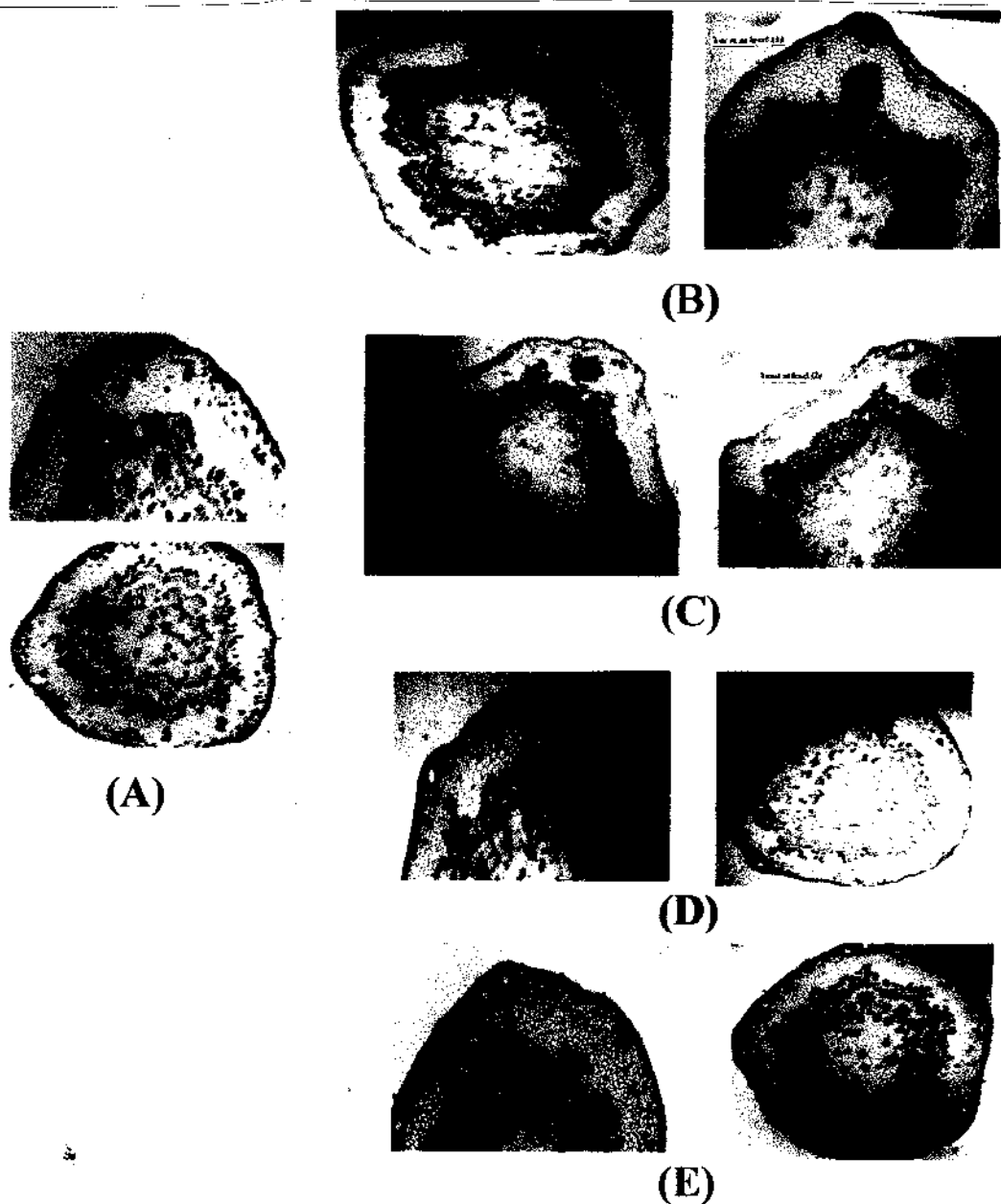


Fig. (4): Transverse section of the pedicel of third flower survived on the 4th apical fruiting branch in cotton plant as affected by some agronomic treatments (100 X).

A- Control

B- Yeast extract at 20kg/sedan.

C- Yeast extract at 40kg/sedan. **D-** Decapitation at 12 branches

E- Decapitation at 14 branches

Histology of flower pedicel:

Different histological feature of the Mean counts and measurements of certain histological features (in micron) in transverse section through the pedicel of third flower survived on the 4th apical fruiting branch lies on the 4th from the apical but was used in this part of study in case of different applied treatments. The data obtained are shown in Tables (3,4) and fig(3,4).

Data in Table (3) indicated that PP₃₃₃ at 20ppm had no effect on total number of Resin ducts (epithelial cells) while topping at the two No. of branches decreased it, yet, the rest of treatments i.e. PP₃₃₃ at 10 and 20ppm, BA at 10ppm and the two rates of fresh yeast increased this No. of resin ducts (epithelial cells) here, the highest rate of fresh yeast gave the highest No. that reached 11 in comparing with 8 that of control.

Also data in Table (3) clearly show that the mean thickness of resin ducts (epithelial cells) was increase with different applied treatment to reach its maximum with fresh yeast at 40k.g/feddan.

As for the thickness of fiber layer, data in Table (3) show that its increase was existed with different applied treatments but that was slightly with each of PP₃₃₃ at 20ppm, BA at 10, 20ppm and the two topping treatments and it was highly with each of PP₃₃₃ at 10ppm and the two rates of fresh yeast.

In this respect, the number of cortical like- bundles was 2.67, 2.0, 1.67 and 1.33 for fresh yeast at 40kg., fresh yeast at 20kg. PP₃₃₃ at 10ppm and PP₃₃₃ at 20ppm. Also it could be notes that were more pronounced in case of PP₃₃₃ 185.4 and 140.4 when compared with fresh yeast 94.86 and 72.52. These effects were prolonged to the thickness of each of xylem, phloem and fiber region Table (4). In this respect, PP₃₃₃ as shown in Table (4) was more pronounced and more effective for increasing all these traits when compared with fresh yeast and fiber region Table (4). In this respect, PP₃₃₃ as shown in Table (4) was more pronounced and more effective for increasing all these traits when compared with fresh yeast.

These new findings are of great interest since, these bundles with the two types of vascular tissues could be enhanced, accelerate and maximize the amount of minerals and water are being absorbed from soil and directed to leaves as well as photosyntheates from leaves to different aerial plant parts and roots as well. This effect could be mainly or partially the direct reason for increasing flowers, bolls and lint yield to reach the significant level in most case especially of those plants treated with either PP₃₃₃ or with the addition of fresh yeast to soil with irrigation water in the first one.

Table (3): Mean counts and measurements of certain histological features in transverse section through the pedicel of third flower survived on the 4th apical fruiting branch in cotton (*Gossypium barbadense* cv. Giza 86) plants as affected by some agronomic treatments.

Treatments	Characteristics	Total No. Resin ducts (epithelial cells) f	Thickness of Resin ducts (epithelial cells)	pith		
				No. of pith Parenchyma layers	thickness of pith layers	thickness of one pith layers
Control	00ppm	7.0	116.10	23.0	740.00	55.80
Paclobutrazol	10ppm	9.0	163.80	30.0	949.50	31.59
	20	10.0	144.00	24.0	742.50	30.87
Benzyladenine	10ppm	9.0	165.6	31.0	1129.50	36.36
	20	8.0	140.40	25.0	730.80	29.16
topping at	12 branch	6.0	120.00	25.0	1152.00	46.80
	14	7.0	122.500	23.0	1198.80	52.11
Yeast at level	20kg	10.0	153.00	26.0	817.20	31.41
	40kg	11.0	193.50	25.0	1071.00	42.84

Table (4) : Mean counts and measurements of certain histological features in transverse section through the pedicel of third flower survived on the 4th apical fruiting branch in cotton (*Gossypium barbadense* cv. Giza 86) plants as affected by some agronomic treatments.

Characteristics Treatments ppm	No. of cortical like bundles	Diameter of lateral bundles	Thickness of xylem region	Thickness of phloem	Thickness of fiber layers
Control 00ppm	00.00	00.00	00.00	00.00	*00.00
Paclobutrazol 10ppm	1.67	185.40	58.23	50.36	12.73
20	1.33	140.40	36.36	29.43	15.86
Benzyladenine 10ppm	00.00	00.00	00.00	00.00	*00.00
20	00.00	00.00	00.00	00.00	*00.00
topping at 12 branch	00.00	00.00	00.00	00.00	*00.00
14	00.00	00.00	00.00	00.00	*00.00
Yeast at level 20kg	2.00	72.52	32.60	16.13	11.33
40kg	2.67	94.86	35.40	18.40	06.33

REFERENCES

- Barrett, J.E. and C.H. Bartuska (1982): PP₃₃₃ effects on stem elongation dependent on site of application. Hort. Sci., 17:737 – 738.
- El-Desouky, S.A. (1988): Growth regulators in relation to nodule formation on pea roots and to nitrate reductase and nitrogenase activities. Ph.D. Thesis, Univ. of Agric., Brno, Czechoslovakia.
- El-Desouky, S.A. (1992): Response of tomato plants (*Lycopersicon esculentum* Mill) to some growth regulators. Egypt. J. Appl. Sci., 7 (3): 181-199.
- El-Desouky, S.A. and H.M.M. Abd El-Dayem (1992 a): Response of sesame plants (*Sesamum indicum* L.) to the foliar application of Paclobutrazol (PP₃₃₃) and Ethrel (CEPA). Egypt. J. Appl. Sci, 7 (12): 102-119.
- El-Desouky, S.A. and H.M.M. Abd El-Dayem (1992 b): Response of rapeseed plants (*Brassica napus* L.) to foliar spray with some growth regulators. 1- Growth, seed yield and seed contents. Egypt. J. Appl. Sci., 7 (12): 479-496.
- El-Desouky, S.A. and H.M.M. Abd El-Dayem (1992 c): Response of rapeseed plants (*Brassica napus* L.) to foliar spray with some growth regulators 1-
- El-Desouky, S. A. ; Z. M. Khedr ; A. L. Wanas and H. S. Ahmed (2001 a): Response of the Egyptian cotton plant to foliar spray with some macro-nutrients (NPK) and the growth regulator paclobutrazol (PP₃₃₃). I- Effects on vegetative growth, leaf anatomy and chemical components. Annals of Agricultural Science, Moshtohor.. 39: 4, 2087-2107. 43 ref.
- El-Desouky, S.A. ; Z.M. Khedr ; A. L. Wanas and H.S. Ahmed (2001 b): Response of the Egyptian cotton plant to foliar spray with some macro-nutrients (NPK) and the growth regulator paclobutrazol (PP₃₃₃). 2- Effects on reproductive growth, anatomy of flower pedicel and yield components. Annals of Agricultural Science, Moshtohor. 39: 4, 2109-2125. 29 ref.
- Graebe, J.E. (1982). Gibberellins biosynthesis in cell a free systems from height plants In : Warning PF (ed.) plant growth substances (1982). Academic press, London, pp.71 – 80.

- Johnson, D.A. (1940):** Plant micro technique. New York and London Me Grow- Hill Book Co., Inc. pp. 27- 154
- Li, Q.F. and M.J. Hill (1989):** Effect of the growth regulator Paclobutrazol on plant growth and seed production of Lotus comicalities L. New Zealand J. of Agric. Res., 32(4): 507-514.
- Marschner, H. (1995):** Mineral nutrition and yield response. In: mineral nutrition of higher plants 2nd ed., Academic press, pp. 184-200.
- McDaniel, G.L. (1983):** Growth retardation activity of paclobutrazol on chrysanthemum. Hort. Sci., 18: 199-200.
- Mohamed, S.M. and S.A. El-Desouky (1992):** Response of Chlorophytum comosum and Peperomia to some growth regulators Egypt. J. Appl. Sci., 7 (6):625-645.
- Quinlan, J.D. (1981):** New chemical approaches to the control of fruit tree form and size. Acta. Hort., 120: 95-106.
- Sass, J.E. (1951):** Botanical Micro technique. Iowa state college Press, Ames, Iowa, pp. 228.
- Wanas, A.L. (1992):** Botanical studies on some members of Fabaceae family. M. Sc. Thesis, Fac. of Agric. Moshtohor, Zagazig Univ.
- Williams, M.W. and L.J. Edgerton (1983):** Vegetative growth control of apple and pear trees with ICI PP₃₃₃ (Paclobutrazol), a chemical analog of Bayleton. Acta. Hort., 137: 111-116

تأثير بعض المعاملات على الصفات التشريحية للقطن المصري.

حامد سيداحمد أحمد * - فاتن حسن محمود اسماعيل ** - احمد لطفي ونس *** -

مصطفى محمد مصطفى الرزاز * - سعيد على الدسوقي **

*معهد بحوث القطن - مركز البحوث الزراعيه -الجيزه -مصر

** كليه الزراعة بمشتهر جامعه بنها -قسم النبات الزراعى

*** كليه الزراعة بدمياط جامعه المنصوره -قسم النبات الزراعى

تم اجراء تجربتان حقليتان بقسم النبات الزراعى بكلية الزراعة بمشتهر جامعة بنها فى مواعدين للزراعة المبكرة والمتأخرة خلال موسمى الزراعة 2008 و 2009 على نبات القطن المصرى صنف جيزه 86 .

تهدف التجربة الى دراسة تأثير الرش الورقى بمشط النمو الباكلوبيوترازول بتركيز 20 و 10 جزى فى المليون وبمشجع النمو البنزيل ادنين بتركيز 10 و 20 جزى فى المليون واطافة الخميرة الحية الى التربة مع ماء الرى ولمدة خمس ريات بدأ من رية الحياة

بمعدل 20 & 40 كيلو جرام للفدان واجراء التطويش للقيمة النامية على 12 & 14 فرع شمرى .

وقد اوضحت القياسات التشريحية التى تم اجرائها ان كل المعاملات ادت الى زيادة سمك العرق الوسطى وانسجة الخشب واللحاء وسمك حافة النصل والبشرة العليا والسفلى كما ادت الى زيادة كل من النسيج العمادى والاسفنجى بالاضافة الى زيادة ابعاد الحزمة الوعائية وعدد افروع الخشب مما انعكس على الناتج النهائى وزيادة محصول الفدان من القطن الزهر كما ادت بعض المعاملات الى تحسين صفات جودة التيلة وزيادة نسبة الزيت .
والجدید فی هذه الدراسة :-

- * تكون فيما يشبه الحزم الوعائية فى الجزىء العلوى من انسجة العرق الوسطى فى منطقة النسيج الكولانشيمى للورقة.
- * تكون فيما يشبه الحزم الوعائية فى منطقة القشرة فى منطقة التساقط لأعناق الأزهار. اطلقنا على هذه الحزم مصطلح (like- bundles).
- * زيادة عدد القنوات الراتنجية (Resin ducts) فقد وجد ان هناك علاقة بين عددها وزيادة نسبة الزيت فى البذرة .