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Cotton in Greece covers 209 000 ha today, 93% of which are irrigated. It has been cultivated in Greece for many centuries, showing considerable increase from the 17th century and then. About sixty thousand Greek families now produce cotton and it is the second most important agricultural source of foreign currency for the National Economy of Greece.

Cotton Research started in Greece in 1927, and became systematic with the establishment of the Cotton Research Institute in 1931. At the very beginning, the responsabilities of the Institute were the research work on the plant, the application of the obtained results, the guidance to the cotton farmers and the control of cotton production. Very soon, in 1932, with the establishment of the Hellenic Cotton Board (HCB), all activities beside research were transferred to the HCB The Institute carried out the research work, with the help of the Hellenic Cotton Board in the establishment of regional trials.

From 1974 until today, the research activities are mainly distributed among these two services. The Institute is mainly responsible for breeding, introduction and evaluation of new varieties, the technical supervision of the preservation of the purity of its own varieties, research on cultivating techniques, lint quality preservation -improvement, etc, of the varieties. The Hellenic Cotton Board is responsible for the research on general aspects of the cultivation of the crop, like irrigation, fertilization, cultivation techniques, defoliation, growth regulation, machine picking, plant protection, ginning, quality of cotton and cotton products, as well as economic aspects, such as farm organization, cooperative group farming, etc... Besides these two services, other Research Institutes and Stations also carry out research on cotton, in cooperation with the previous two. The Agricultural Research Stations of Vardates, Palamas and Aliartos work on cotton breeding and variety evaluation, the Irrigation and Reclamation Institute of Sindos on cotton irrigation, and the plant Protection Institutes of Thessaloniki, Volos and Benakion on plant protection.

I - Production

Varieties : The upland varieties (*G. hirsutum*) are successfully grown in Greece, and these varieties are the following :

The technological and other characteristics of the above varieties are included in Table 1.

Acreage - Production : Acreage and production during the last 20 years are given in Table 2. Cotton lint production from 1969 and then is higher than 100 000 tons each year and the objectives for the immediate future is its stabilization at 150 000-160 tons to cover the domestic consumption.

The last ten years, cotton yields have been improved, if compared with the previous ten years, with an increase of about 100 kg/ha seedcotton,

Variety	% total acreage	Description
4Σ	38.3	Breeding of the Greek Institute of Cotton (10EXSUS)
Zeta	36.5	Two selections of the Greek Institute of Cotton which have been developed from the varieties Acala SJ_2 and SJ_5
Sindos 80	20.0	New breeding of the Greek Institute of Cotton
Scotousa	20.0	Very early variety, breeding of the Institute of Cotton, suitable for the North part of Greece (near the 41° latitude)
Coker	9.7	Old variety from selection of the American Coker 210, drougth resistant
Samos	1.5	Early variety, breeding of the Institute of Cotton
Acala Sindos	0.5	Selection of Acala SJ_1

due to the improvement of the varieties, the production techniques, and also the growers skillfulness.

Quality : The quality of greek cotton is shown in Tables 3 (Grade), 4 (length) and 5 (Micronaire). The introduction of mechanical harvesting and its increase has caused a loss of about half a grade in lint quality. The improvement of the varieties and the cultural techniques have influenced the fiber length the last years, which has gained at least one millimeter in a remarquable percentage of the crop of each year.

The micronaire shows no great changes from year to year, and usually these changes reflect the climatic ang growth conditions.

Growing conditions

Geographical position : cotton is grown in Greece mainly between 35°N and 41°N latitude and only 1 000 ha are grown souther than the 38°N parallel.

Climatic conditions : in Table 6, one can see the main air temperature and the precipitation in different cotton growing regions in Greece. The Greek climate is characterized by high instability, mainly during spring and autumn. This has great influence on cotton, as both seasons are very critical for the crop (planting-harvesting). The spring-autumn instability is the result of the confrontation of two wider climates over the Greek area, the Mediterranean and the continental ones.

Pedological conditions : the plains where cotton is cultivated have mostly alluvian soil. This is suitable for cotton and when the other conditions are favorable the yields are high.

Hydrological conditions : the irrigation water comes out about 46% from river water and 54% from underground water. When rainfall during the previous winter is limited, shortage of irrigating water is usual (like the years 1977, 1978 and 1985).

Size of farm holdings : the average size of each agricultural enterprise in Greece is small, approximately 3.5 ha, with a variation from 2.0 ha to 4.5 ha. Fragmentation of land area is extensive and the main number of plots in each agricultural enterprise is 6.5. There is a trend after 1971 for an increase in the irrigated cotton crop area, as it can be seen in Figure 1. This increase coincides with the increase of cotton enterprises by renting land.

State policy : The Ministry of Agriculture has the responsability of decisions on cotton policy. The

Hellenic Cotton Board first makes the proper suggestions to the Ministry of Agriculture, and extends to the growers with its technical staff plans and the respective assistance.

The Agriculture Bank is almost the sole source of loans and funds. It supplies the farmers and their cooperatives credits, at lower than usual interest, for buying the annual agricultural expenditure for seeds, fertilizers, insecticides, etc. and machinery. There is a close connection between the Agricultural Bank and the Cooperatives. Greek cooperatives extend throughout the country and by machinery to serve the small growers, like cotton pickers, and high-capacity spayers. They also take care of the ginning and the marketing of cotton and seeds, on behalf of the cotton producers.

There are subsidies for buying expensive machinery and also aid the producers through the gins to support the prices of seed cotton when they are low, through EEC.

Production Practices

Land preparation : it starts by the end of the previous crop picking, in case of cotton, *e.g.* in autumn or early winter, or earlier in case of other crops. It begins with the cutting of the stalks and ploughing to cover plant residues and loosen the soil to a depth of about 20 cm. When the soil moisture conditions permit during winter, a loosening of the soil surface and destroy of weeds is applied by chisels. In late winter or early spring, one or twice are used disk or tooth harrows to smooth the soil surface, to improve the soil structure, and to cover fertilizer, pesticides and herbicides. There are sometimes variations in this preparation, according to weather and soil conditions.

Planting : when soil temperature at 5 cm depth is stabilized at 15° C the planting of cotton starts. The aim of all producers is to have an early plantation. So the planting period is roughly from 10th to 30th April. The cotton plantation is considered successful and early when emergence of seedlings has been completed by the 5th of May. Adverse weather conditions may delay planting or destroy stands. Replanting usually delays the plantation, increase cost and may reduce significantly yields. For planting, four row planters are used, equipped usually with fertilizer and pesticide applier. The distance between rows is 1 m. The seed is chemically or mechanically delinted. Twin rows, 15-20 cm apart, gains preference by the producers, as cotton pickers can harvest without problems these plantations, and yield increases, even 25% higher than in single row plantations, as experimentally has been proved.

Plant population after thinning varies from 100 000-200 000 plants/ha according to the variety and other factors, such as earliness, type of soil, etc.

Fertilization : the total irrigated cotton crop is fertilized, as cotton responds to nitrogen and phosphate greatly. According to the region, earliness of planting, type of soil, plant population, availability of water for irrigation, variety, etc., the amounts of fertilizers vary from 100-60-0 N-P-K units per ha to 160-80-0 N-P-K units per ha. Potash is also used in some cases. Foliar fertilization in combination with insecticides is usual, especially in the early stages of plant growth.

Weed control : chemical weed control herbicides are applied to almost all cotton crop area. Pre-emergence application of trifluralin (before planting) or prometrin (after planting) is usual.

Mechanical weed control is also necessary and it is applied one to three times. Four-row cultivators, tractor-mounted or towed, are used and besides weed control, they offer soil aeration, destruction of soil crust, reduction of surplus moisture, etc...

Irrigation : Nearly all (93%) cotton is irrigated in Greece. One to seven irrigations are given, and the number of irrigations depends on the climate, the conditions of the plantations, the soil type, etc.

The most usual method of irrigation is by sprinklers (about 85% of cotton area). Irrigation by farrows is also used. The last years the producers prefer to use self-propelled big sprinklers, because of the lack of available labor. Drip irrigation is tested by the Hellenic Cotton Board where irrigation water is not enough for cotton and the soil type is light and sandy.

The high cost of drip irrigation equipment is a negative factor for the use of this system in cotton.

Crop protection : Cutworms, wireworms, thrips, spider mites, whiteflies, jassids, bollworms and pink bollworms are the insect infestations of cotton in Greece. Bollworm is dangerous only some years, like 1967, 1968 and 1983, when it was

severe especially for some regions. Pink wollworm is restricted to the south part of Greece.

At planting time, about 40% of the cotton area are treated with soil insecticides. Control of insects by sprays is applied when it is necessary. There are high traps in cotton plantations for the adult moths of bollworm, and pheronome traps for pink bollworm. Inspection of the plantations by the agronomists of the Hellenic Cotton Board and the growers provides the avoidance of unnecessary sprays and the right time for sprays.

Common sprayers towed by tractors are usually used for the sprays, while the cooperatives are buying high-capacity and high-clearance sprayers for their members.

From diseases, *Verticillium* wilt, *Alternaria sp.* and bacterial blight cause problems in Greece. *Verticillium dahliae* has contamined the last years the soil of many areas in the main cotton producing regions causing severe losses. The problem has been overcome partly by using tolerant varieties (Zeta) and other measures, like crop rotation, denser plant population, etc., which are of less value than the varietal measure. *Alternaria* causes some problems, especially in stressed plantations, usually in August, causing leaf shedding.

Bacterial blight is a problem in years with humid summer and almost every year in some cases.

When spring is wet and cold, there is infection of the seedlings by *Rizoctonia* and *Phythium*. Soil cultivation and late thinning help and reduce losses.

Harvesting : Mechanical harvesting with pickers covers about 60% of total production, and the rest is hand-picked. In Figure 2, is shown the evolution of mechanical harvesting in connection with the total production and the number of pickers, during the period 1965-1983. Mechanical harvesting increased due to scarcity and high cost of labor during cotton harvesting time, although it causes some reduction in average cotton quality, requires addition work with defoliation, it causes some picking losses and also difficulties in the delivering of seedcotton at the gins.

Experience and research on the above problems, gave some solutions for the decrease of their negative influences.

II - Research

Cotton research in Greece is applied and conducted to give mainly answers to the production problems. The major cotton production problems in Greece are the following :

- the relatively short cotton growing season, caused by the low temperatures in spring and the precipitations in the autumn, as described before ;

- the infestation of the plants by *Verticillium* wilt ;

- the maintenance and improvement of cotton productivity and quality ;

- the mechanical cotton picking, as a result of labour shortage at the harvesting period and increasing harvest cost ;

- the increasing cost of cotton production.

A.Research objectives

1. Breeding and varietal evaluation : The main emphasis is on *G. hirsutum* but other species including *G. barbadense* are studied. Too many efforts are made to create Greek cotton varieties and to test foreign varieties that could be introduced into Greece because of important agronomic and technological characteristics.

The breeding methods used are internationally acceptable for cotton, mainly the Pedigree breeding method adapted to the crop and the conditions of Greece. The methods includes the use of selected and tested inbred lines, used for the creation of multi-line varieties that show better adaptability to a a wide range of ecological conditions. Recently, a collaborative program started with the French Institute for Cotton and Exotic Textiles (IRCT) aimed at creating hybrid cotton varieties.

Varieties developed in Greece and introduced varieties are tested in three successive stages :

a. Preliminary, on State Farms,

b. Experimentally, in fields distributed in all cotton producing regions of the country, and

c. Demonstratively, in fields under farmers's conditions.

The breeding and varietal evaluation have given very good results so far. The Greek varieties 2r and 10E, as well as introduced and adapted *Acala* 4-42 and Coker 100W, played a most important role in the expansion of the cotton cultivation in Greece.

The major achievement of the whole breeding program was the development of the variety 4 Zeta released for cultivation in 1966. This variety proved the most important among all varieties tested in Greece, combining high productivity, adaptability, earliness and good lint quality. It was the only variety in cultivation for 15 years. The spread of *Verticillium* and the need for early varieties were the factors which reduced in part the importance of this variety.

In Table 1, the characteristics of the new cotton varieties, resulting from experimentation replicated in time and in the most important regions of cotton cultivation are given. The characteristics are compared to those of variety 4Σ Zeta and include seedcotton and lint yield, earliness, lint percentage and the most important technological characteristics of staple length, Micronaire Index and Pressley Index (results of Cotton Res. Institute).

Varietal adaptability is studied to determine the productive potential of each variety in different environments at the various stages of varietal evaluation. Regression lines of the yields of the varieties on the average yield of the environments are given in Figures 3 and 4. The data are from large scale trials conducted under farmer's conditions.

Lint quality is of major importance in the evaluation of the varieties. Technological characteristics of the fibers and spinning performance in laboratory and industrial scale are studied by both Cotton Res. Institute and Hellenic Cotton Board.

Breeding for *Verticillium* resistance combining earliness and high yield is the main objective in Greece. Several varieties are now available showing a wide range of resistance to *Verticillium*. However, most of them are rather late. The introduction of earliness and the preservation of the degree of resistance of the original material at the same time is of major importance.
The adaptation of the varieties to mechanical picking is another very important factor.

Breeding work is also going on for the development of extra-long staple cotton from G. *Hirsutum*, *G. barbadense* and from crosses between the two species.

2. Physiology-Ecology. Among the research objectives are :

a. The effect of bioecological factors such as temperature and light intensity on the cultivated cotton varieties with special reference to plant growth, fruiting, defoliation, maturity, yield and fiber quality, studied under field and controlled conditions. Growth and fruiting patterns in relation with temperature have been determined for the cultivated varieties (Figure 5).

b. The effect of ecological and cultural factors on the quality of cotton seeds such as precipitation during boll opening, irrigation, fertilization, date of sowing and plant population.

c. The effect of chemical and biological seed dressings on seedling emergence.

d. There is evidence that seed quality is determined by biochemical and enzymatic processes in fatty acid degradation which is the result of abnormal and fluctuating drying of the seeds during the boll opening period. The relation between germination, emergence ability and hydrolytic and oxidative degradation is studied under different humidity conditions.

3. Fertilization and plant nutrition. Research on fertilization and plant nutrition may give solutions to problems relating to crop productivity and to other growing aspects. The studies cover the rate, the form, the time and method of application for the three basic elements, N, P, K and also the effects of micronutrients on cotton. The results already obtained are in common practice among cotton growers.

In Figure 6, the yields obtained in fertilizer experiments are given. Microelements research proved the need for Mn-application in some areas of Kopais in Central Greece, as it is demonstrated in Figure 7. The objectives of some running programmes are :

- the determination of the proportion in which N, P, K should be given to the plants for a balanced fertilization ;

- the possibility of decreasing the rate of application in some areas ;

- the effect of K application on the increase of cotton yields ;

- the use of foliar application of micronutrients to increase cotton yield. Soil and foliar analysis methods are used;

- the used of biological soil improving products in normal and saline soils.

4. Cultural techniques. Research has already provided solutions to most of the problems concerned in crop cultivation. Among the objectives studied are the following :

a. **Sowing date** : the study of the date of sowing on the yield and quality of seedcotton in relation to the plant population. Early sowing, generally, increases yield and improves earliness. On the other hand, the right plant population for each variety appears to be related to the date of sowing.

b. **Soil preparation for sowing** : several soil preparation techniques including sowing on the flat, on beds and irrigation during autumn were studied. The cultivation of cotton on beds appears to be promising, permitting earlier sowing and plant growth and, therefore, earlier crop and sometimes higher yield. However, the difficulties of preparing and maintaining the beds and particularly of weed control are quite serious.

c. **Row spacing and plant populations.** Several plant populations were tested at different spacings and in single or twin rows. It was found that row spacing and plant population can greatly affect the yield depending also on the variety, date of sowing, cultural techniques and weather conditions. The mechanical picking imposed spacings of 95-100 cm. Optimum plant populations, in this spacing were estimated for the cultivated varieties in single and twin rows. It was also found that, generally, twin rows can give up to 25% higher yield than single rows. The technique is going to be expanded in many areas after the appearance of twin sowing machines in commercial scale.

d. **Irrigation technique** : the optimum time for the beginning and ending of irrigation, the frequency of irrigation, the quantity of water used connected with the environment and the variety cultivated were investigated.

The results obtained favor beginning irrigation a week earlier and ending a week later than the current practice in the country. Il was also found that remarkable differences exist between the new cotton varieties in the time of beginning and ending irrigation and in the total amount of water needed. Various irrigation systems, including drip irrigation, are also compared for technical and economic efficiency.

e. **Use of plant growth regulators and retardants** : several retardants and plant growth regulators were tested including CCC Pix and Gibberellins, to prevent flower and boll shedding. It was found that Pix used early can control excess plant growth and increase the yield. Gibberellins in small doses at the time of the appearance of the first squares increase the number of flowers and boll set and decreases boll shedding.

f. **Defoliants and machine picking** : the effectiveness of several commercial defoliants was studied in relation to environmental conditions during boll maturation. Studies included the method and time of application, fractional application and combination with Ethrel and other chemicals (Figure 8). The effect of machine picking on seedcotton quality was studied in relation to machine efficiency.

5. Plant protection : research is carried out on the control of diseases, insects and other cotton pests and various methods of weed control were tested.

Diseases : *Verticillium* wilt is an important problem of cotton cultivation in Greece and the use of resistant varieties and appropriate cultural techniques has been recommended. The recess of the fungus found in Greece have been determined while the measurement of the *innoculum* density of different regions of the country is being investigated. Several fungicides have been tested to protect seeds from rotting and young plants from damping off. The chemical protection of cotton plants from *Alternaria* has also been studied, although this disease is of limited importance.

Pests : the biology of several insect and other pests of cotton has been studied and the start-point for chemical control has been determined. In addition, several methods of chemical control and various pesticides have been investigated. The pests studied include cotton bollworm (*Heliothis armegira*), bollworm (*Pectinophora gossypiella*), white flies (*Bemisia tabaci*), Jassids, Thrips and mites (*Tetranychus* sp). The principles of integrated pest control are already applied in Greece. A new extended research program for integrated pest control, financed by the EEC, started this year.

Weeds : The effect of several pre-plant and pre-emergence herbicides on the weeds that are usually found in the fields has been studied. Special emphasis was given to herbicides which control perennial or "difficult" weeds, such as *Cynodon dactylon*, *Sorghum haleppense*, *Cyperus* sp. and *Solanum nigrum*. The possibility of combining chemical and mechanical methods in weed control and late season weed control were studied.

6. Technological Research on lint and seed : research is devoted to the control and improvement of the quality of cotton seed and lint during their production, ginning and processing.

Research programs deal with :

a. Study of the genotype X environment interaction on the technological characters, and estimation of the stability of the characters determining fiber quality.

b. The éffect of the environment and cultural techniques on the qualityand the spinning performance of cotton lint of cultivated varieties.

c. The quality control of lint, yarn and cotton textile material produced and the correlation of the lint quality characteristics to the quality characteristics of yarns and textile products.

d. The quality control of cotton seeds and its products in relation to the methods of oil extraction used.

7. Agroeconomic Research : The research on this subject was devoted to the study of the better use of production inputs, the confrontation of the land use problems in cotton cultivation which limit expansion to full mechanization and more economic use of production systems. The technico-economical study of cotton farm structure, either of conventional type or in the form of group farming is very important.

The research approach is based on the use of group farming models for production, ginning and marketing.

It was found that the use by the group of production means can be compared for economic results with those obtained from big size farms. So, group farming system, compared with conventional type of farming :

- decreases manual labor,
- decreases the use of capital per unit area,
- increases the total agricultural income,
- increases the net farm income.

In other words, group farming can lower the production cost and increase the farmer's profit.

B. Application of research conclusions

The research results and conclusions are transferred directly to the farmers by the regional services of the Hellenic Cotton Board which covers all cotton producing areas of the country.

For the final evaluation of the new varieties, a committee with representatives from the HCB, the CRI and the Ministry of Agriculture decides. The committee proposes on the varieties to be released and the research program for next year. The propagation of the cotton varieties is the responsability of the Hellenic Cotton Board. The regional services of the Hellenic Cotton Board are also responsible for the identification of the problems of cotton cultivation.

A number of circulars and scientific papers are issued and informative seminars and conferences are held regularly.

C. Research facilities

The research facilities in Greece may be considered adequate. There are governmental farm in all cotton growing regions of the country (within Research Stations) where several basic experiments are established. A larger number of experiments also are established on private farms

by the regional services of the Hellenic Cotton Board.

Both the Cotton and Industrial Plant Research Institute and the Hellenic Cotton Board have well equipped laboratories to study the technological and spinning characteristics of lint and for chemical analyses of the cotton seed. The Hellenic Cotton Board also has laboratories for quality control of yarns, textiles and chemical processing. The Cotton and Industrial Plant Research Institute has a ginning factory unit for experimental ginning and ginning of the foundation cotton seed. Hellenic Cotton Board also has a computerized growth chamber and a number of plant protection laboratories.

For soil analyses and laboratory determinations required for irrigation scheduling, a close collaboration exists with the laboratories of the Institutes of Soil Science (Athens and Thessaloniki). For plant protection, collaboration exists with the laboratories of the Institute for Plant Protection of Thessaloniki and Volos and Benaki Phytopathological Institute in Athens.

Statistical analyses of the experimental data obtained is carried out on microcomputers of the two Services and on the computer of the Ministry of Agriculture.

Researchers have at their disposal the libraries of the two services and libraries of the Universities of Athens and Thessaloniki, the libraries of the Ministry of Agriculture and the National Research Foundation. Researchers on cotton can also make use of the literature banks of International Organizations through the computer of the National Research Foundation.

Finally, research papers prepared by the researchers may be published in Scientific bulletins issued by the two services or in the journal *Agricultural Research* published by the Research Division of the Ministry of Agriculture or in foreign periodicals.

Variety	Average yield % of 4 Σ			Adaptability parameters (1982-83)		Earliness days ± 4 Σ	Lint %	Lint technological character.		
	Seed cotton	Lint	Number of experiments	b	r2			2.5 % Sp. length	Micronaire index	Pressley index
Skotoysa	105	103	9	1.075	0.974	- 6.0	38,40%	27..2	4..4	7..76
Samos	102	101	9	0.961	0.932	- 4.8	39,10%	28..1	4..2	7..58
Sindos 80	108	108	9	0.738	0.945	- 4.2	41,30%	29..3	3..9	7..75
Erato	107	107	9	0.967	0.928	- 1.8	41,70%	28..2	3..8	7..70
4 Σ	100 (3060) kg / ha	100 (1260) kg / ha	9	1.058	0.917	10 / 10	39,90%	28..9	4..1	7..95
	100 (3160)	100 (1330)	10	0.972	0.865	30 / 9				
Ac. Sindos	105	107	10	1.060	0.980	1..4	40,80%	28..4	4..3	8.00
Zeta 2	111	111	10	1.147	0.941	6..8	41,70%	28..5	4..8	7..42
Zeta 5	103	95	10	1.081	0.941	3..1	40,70%	28..8	4..4	7..49
Lamia	102	98	10	1.015	0.960	2..4	40,70%	28..2	4..6	7..48

Table 1: Characteristics of cotton varieties cultivated in Greece

Source des tableaux et des données des figures : Hellenic Cotton Board

Crop of	Irrigated area			Non - irrigated area			Total Area			Lint cotton		
	Area ha	Yield kg / ha	Seedcotton production M. tons	Area ha	Yield kg / ha	Seedcotton production M. tons	Area ha	Yield kg / ha	Seedcotton production M. tons	Production M. tons	Yield kg / ha	Turn out %
1964	110 696	1 516	167 815	29 604	614	18 177	140 300	1 326	186 038	67 800	483	36,44%
1965	108 372	1 739	188 459	27 182	607	16 499	135 554	1 512	204 958	74 600	550	36,40%
1966	116 919	1 942	227 057	23 393	637	14 901	140 312	1 725	242 038	87 900	626	36,32%
1967	120 572	2 085	251 393	16 858	747	12 593	137 430	1 921	264 003	96 100	699	36,40%
1968	126 299	1 593	201 194	12 429	649	8 066	138 728	1 509	209 341	73 460	529	35,09%
1969	130 475	2 259	294 743	15 287	754	11 526	148 762	2 104	312 995	111 700	751	35,69%
1970	118 344	2 499	295 742	13 367	951	12 712	131 710	2 339	308 070	110 100	836	35,74%
1971	120 204	2 667	320 584	9 966	948	9 448	130 170	2 535	329 981	116 324	894	35,25%
1972	154 790	2 486	384 808	12 142	1 035	12 567	166 932	2 381	397 465	139 930	838	35,21%
1973	137 709	2 193	301 996	9 030	883	7 973	146 739	2 113	310 060	106 620	727	34,39%
1974	144 539	2 412	348 628	9 505	842	8 003	154 044	2 315	356 612	126 250	820	35,40%
1975	129 632	2 781	360 507	6 658	1 124	7 484	136 290	2 700	367 983	129 840	953	35,28%
1976	142 091	2 330	331 072	6 559	1 371	8 992	148 650	2 289	340 260	118 370	796	34,79%
1977	173 748	2 553	443 579	9 183	716	6 575	182 931	2 461	450 193	156 070	853	34,67%
1978	162 925	2 750	448 044	5 307	696	3 694	168 232	2 681	451 030	147 000	874	32,59%
1979	131 434	2 393	314 522	4 920	1 174	5 776	136 354	2 349	320 296	105 684	775	33,00%
1980	135 537	2 561	347 110	5 515	1 086	5 989	141 051	2 503	353 051	115 673	820	32,76%
1981	121 902	2 911	354 857	4 364	862	3 762	126 326	2 840	358 766	120 783	956	33,67%
1982	131 406	2 364	310 644	6 133	650	3 986	137 540	2 296	315 792	102 600	746	32,49%
1983	160 161	2 469	395 438	7 838	900	7 054	168 000	2 396	402 528	126 000	750	31,30%
1984	192 000											

Table 2: Cotton area and production in Greece (1964 - 1983)

Grade	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1. White:													
3-4 1/2	72,20%	71,40%	75,90%	74,80%	92,00%	83,70%	79,30%	38,40%	42,20%	71,90%	59,80%	49,20%	64,10%
5-5 1/2	21,30%	22,30%	19,40%	19,70%	7,10%	13,80%	17,40%	44,30%	37,50%	18,80%	30,50%	21,40%	26,40%
6-8	1,60%	2,30%	1,90%	1,90%	0,30%	1,00%	1,10%	4,50%	3,90%	1,60%	2,50%	4,20%	3,50%
2. L. spotted:													
4-7	4,00%	2,70%	2,30%	2,60%	0,40%	1,30%	1,90%	12,00%	14,10%	6,40%	5,80%	14,60%	4,70%
3. Spotted -Tinget-													
L. Gray-Gray	0,90%	1,30%	0,50%	1,00%	0,20%	0,10%	0,30%	0,80%	2,30%	1,30%	1,40%	10,60%	21,30%

Grade	1978	1979	1980	1981	1982
1. White:					
3-4 1/2	43,90%	33,30%	28,80%	47,30%	25,10%
5-5 1/2	39,20%	30,00%	28,90%	35,20%	25,40%
6-8	6,20%	4,50%	2,80%	1,80%	3,70%
2. L. spotted:					
4-7	8,30%	21,50%	26,70%	13,00%	33,90%
3. Spotted -Tinget-					
L. Gray-Gray	2,40%	11,00%	12,80%	3,30%	11,90%

Table 3: Classification of greek cotton, from 1967 - 1982. (in bales percent)

Fibre length	19 76		19 77		19 78		19 79		19 80		19 81	
	Bales	%	Bales	%	Bales	%	Bales	%	Bales	%	Bales	%
21 - 24	462	0,09%	5	0,00%	22	0,00%	256	0,06%	156	0,03%		0,00%
25	3 479	0,69%	80	0,01%	1	0,00%	315	0,07%	11	0,00%	94	0,02%
26	19 241	3,81%	688	0,11%	1 625	0,28%	13 750	2,97%	2 115	0,42%	410	0,08%
27	49 009	9,71%	9 961	1,56%	7 185	1,22%	36 605	7,90%	48 966	9,63%	11 869	2,19%
28	282 541	56,00%	434 531	68,06%	452 362	77,09%	310 460	66,97%	266 170	52,35%	333 484	61,40%
29	149 284	29,59%	180 540	28,28%	124 263	21,18%	102 191	22,04%	190 865	37,54%	197 223	36,31%
30	524	0,10%	12 601	1,97%	1 374	0,23%	32	0,01%	112	0,02%	13	0,00%
31	13	0,00%		0,00%		0,00%		0,00%		0,00%		0,00%
Total	504 553	100%	638 406	100%	586 832	100%	463 609	100%	508 395	100%	543 093	100%

Fibre length	19 82		19 83	
	Bales	%	Bales	%
21 - 24		0,00%	787	0,13%
25	185	0,04%	2	0,00%
26	10 296	2,25%	17 026	2,91%
27	44 244	9,69%	24 273	4,15%
28	241 614	52,92%	253 688	43,39%
29	160 259	35,10%	288 829	49,41%
30	9	0,00%	8	0,00%
31		0,00%		0,00%
Total	456 607	100%	584 613	100%

Table 4: Fibre length of 1976 - 1983 cotton crops in Greece

Crop	Thessaly	Eastern Greece	Macedonia and Thrace	Other areas	Total Greece
1971	3,60	3,67	3,49	—	3,59
1972	4,00	3,86	3,73	—	3,86
1973	3,86	3,94	3,76	—	3,85
1974	3,90	4,06	3,78	—	3,91
1975	3,78	3,89	3,65	3,80	3,78
1976	3,38	3,47	3,32	3,59	3,44
1977	4,31	4,21	3,80	4,18	4,13
1978	3,44	3,60	3,39	3,80	3,56
1979	3,58	3,80	3,61	3,81	3,70
1980	3,65	3,92	3,57	3,80	3,74
1981	3,37	3,52	3,47	3,79	3,54
1982	3,44	3,53	3,51	3,75	3,56
1983	3,82	4,06	3,87	3,66	3,85

Table 5: Fibre micronaire of 1971 - 1983 cotton crops

Figure 1 : Average acreage of cotton in Greek farms

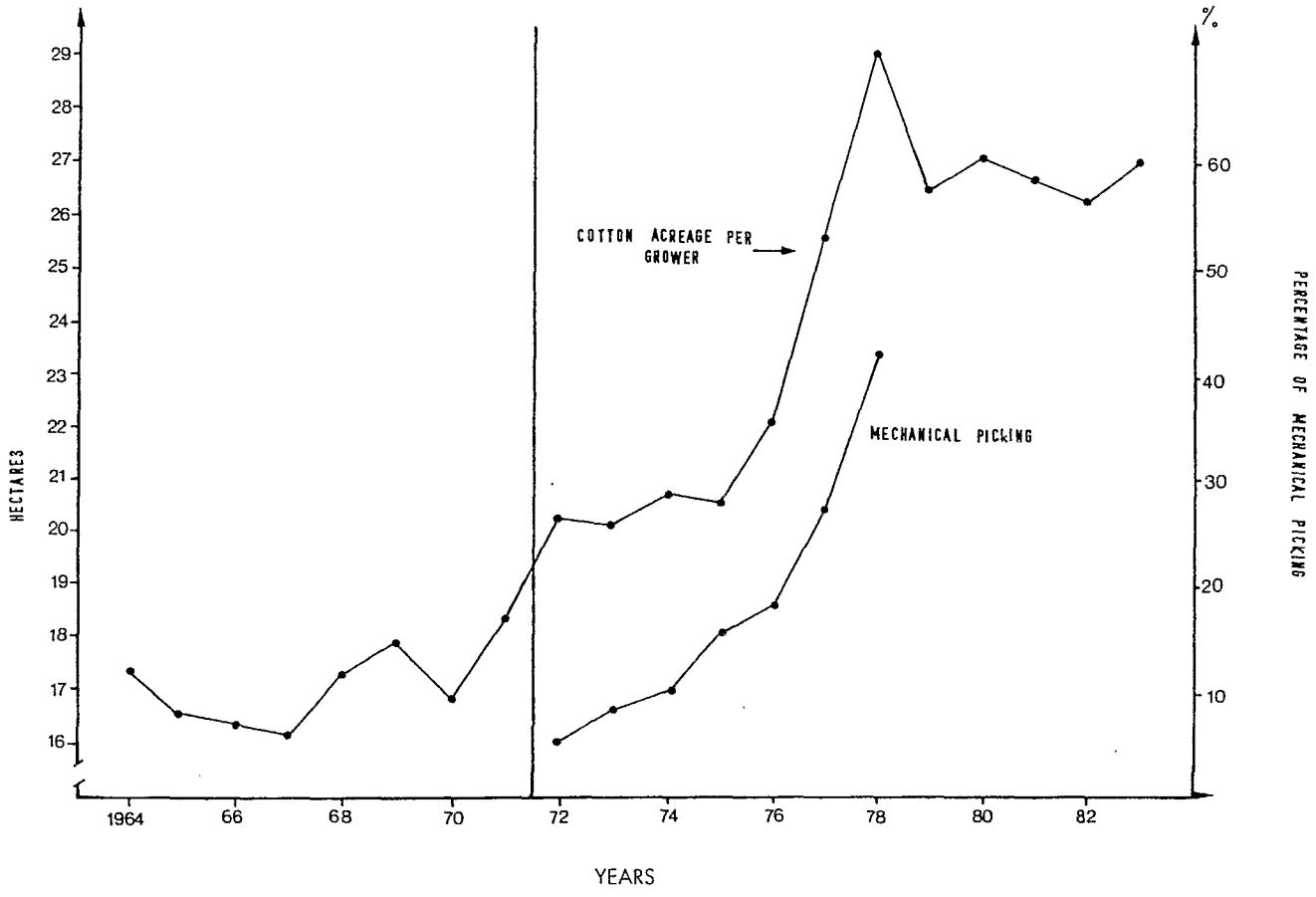


Figure 2 : Mechanical harvesting and hand picking in Greece (1965-1985)

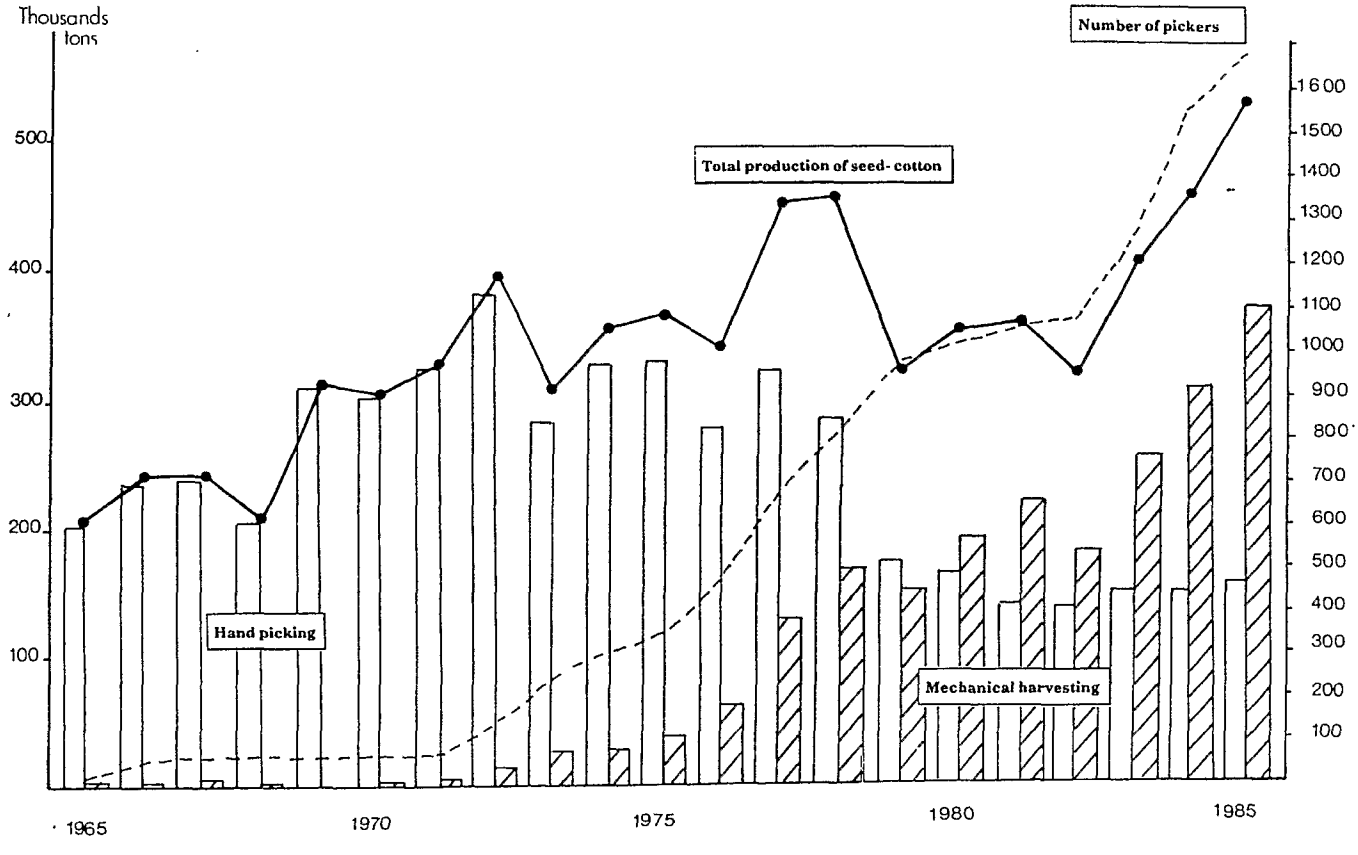
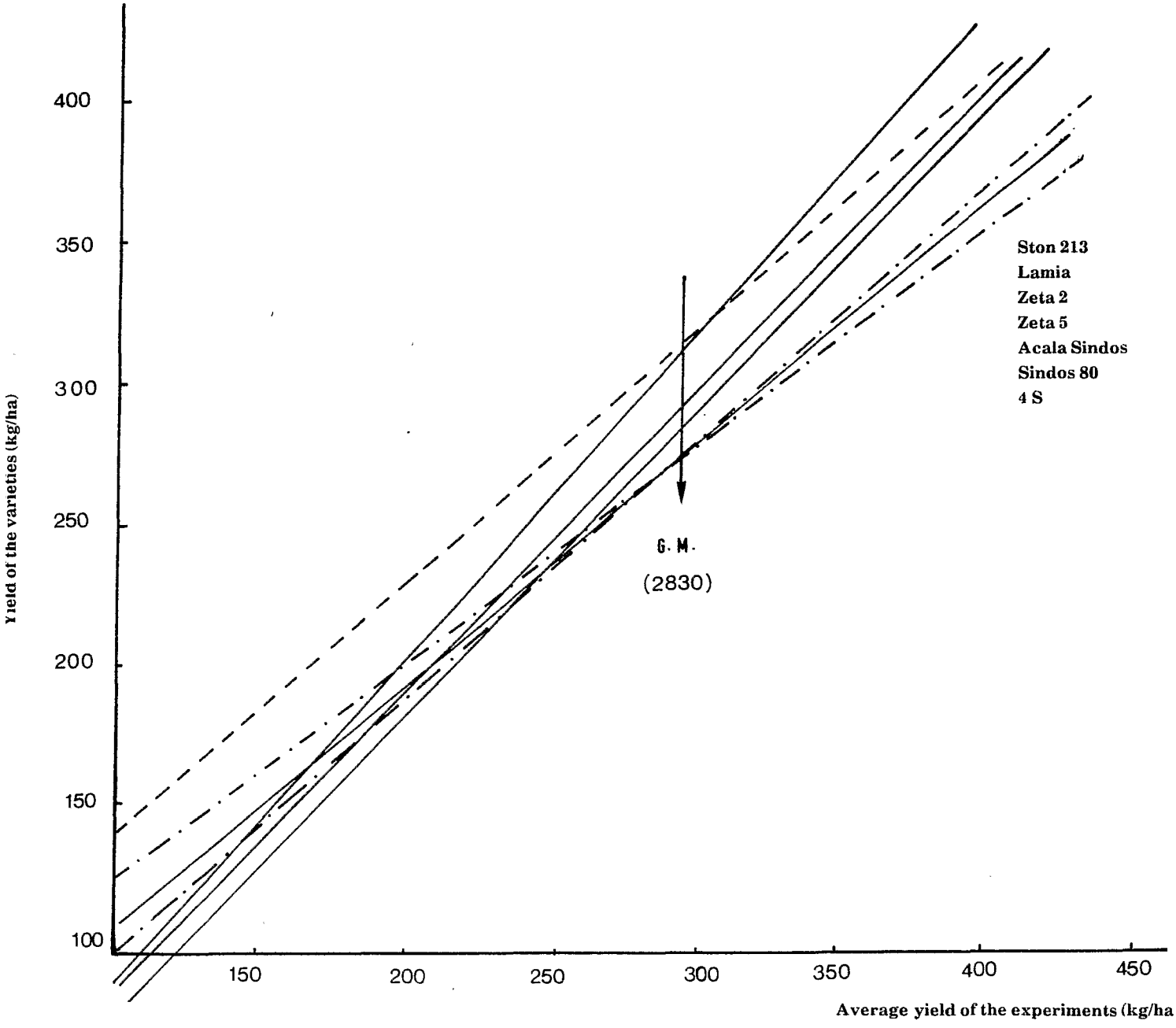
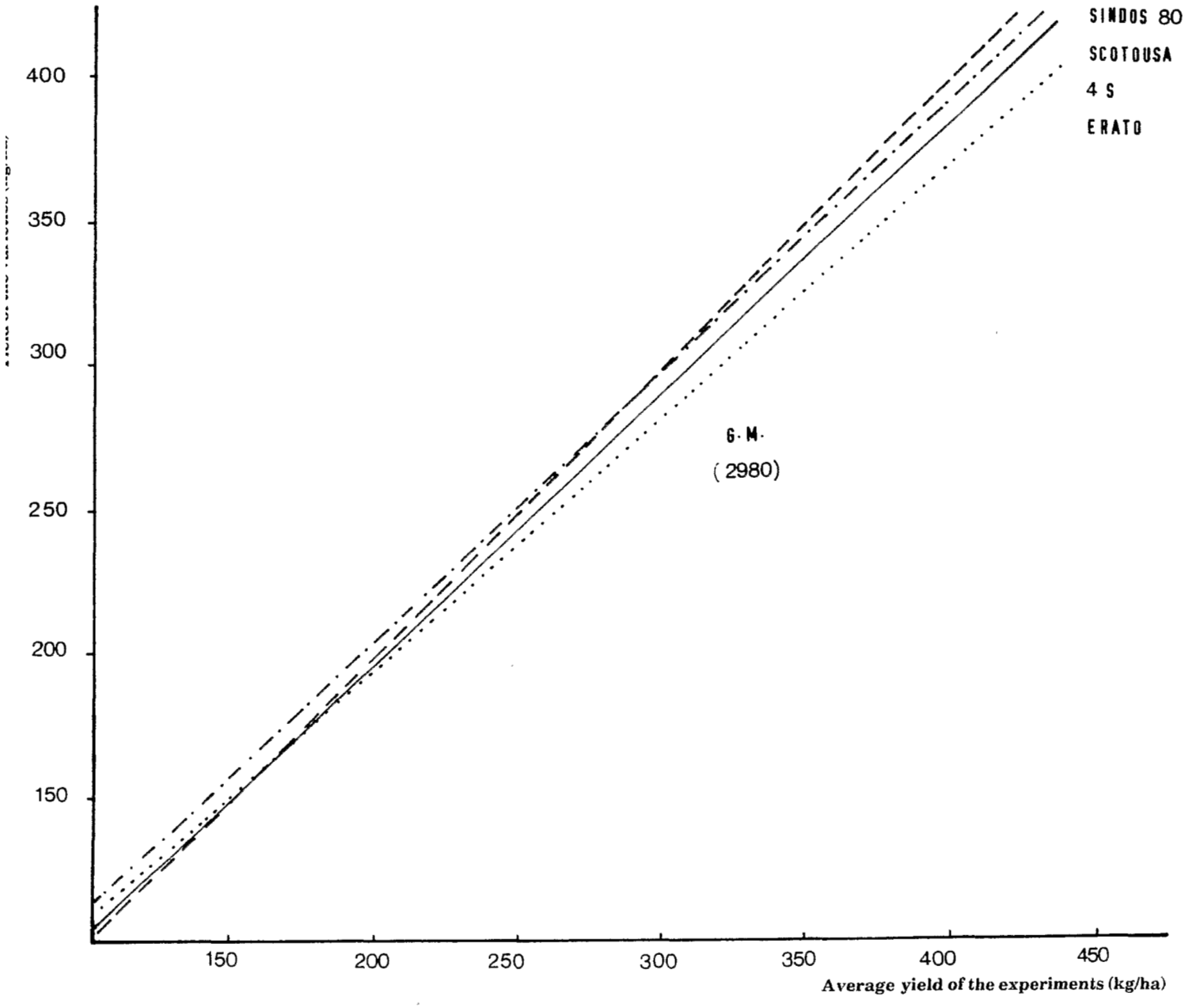


Figure 3 : Regression of the experimental yield on the yield of tested varieties (Experimentation of Central Greece - 1981-83)



Varieties	Kg/ha	b	r2
Ston 213	3010	1.187	0.895
Lamia	3110	0.861	0.662
Zeta 2	2940	1.161	0.838
Zeta 5	2790	1.140	0.734
Akala Sindos	2690	0.934	0.803
Sindos 80	2700	0.883	0.709
4 S	2690	0.766	0.695

Figure 4 : Regression of the experimental yields on the yield of tested varieties



Varieties	Kg/ha	b	r2
Sindos 80	3110	1.32	0.943
Scotousa	3200	0.946	0.925
4 S	2870	0.969	0.937
Erato	2720	0.919	0.953

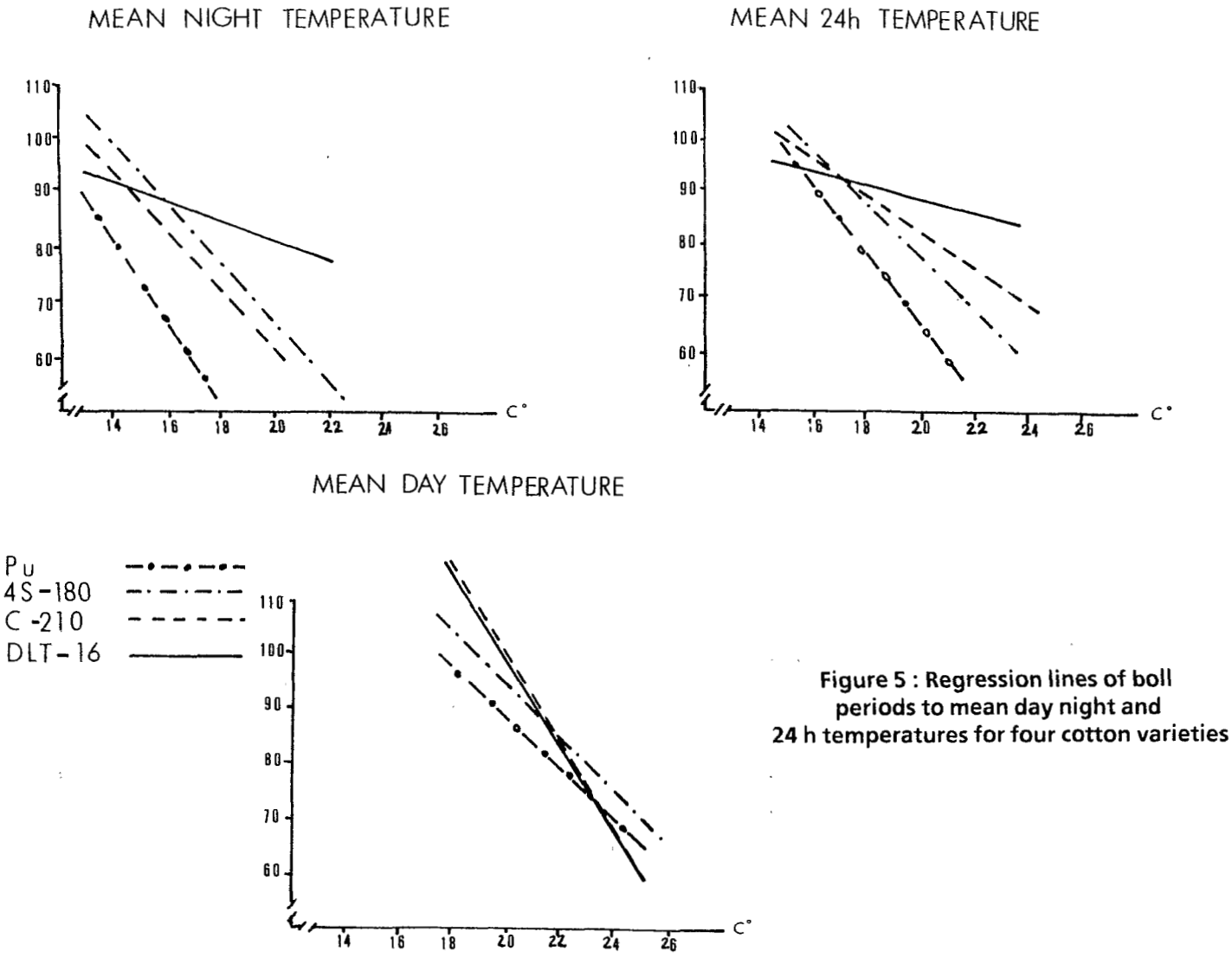


Figure 5 : Regression lines of boll periods to mean day night and 24 h temperatures for four cotton varieties

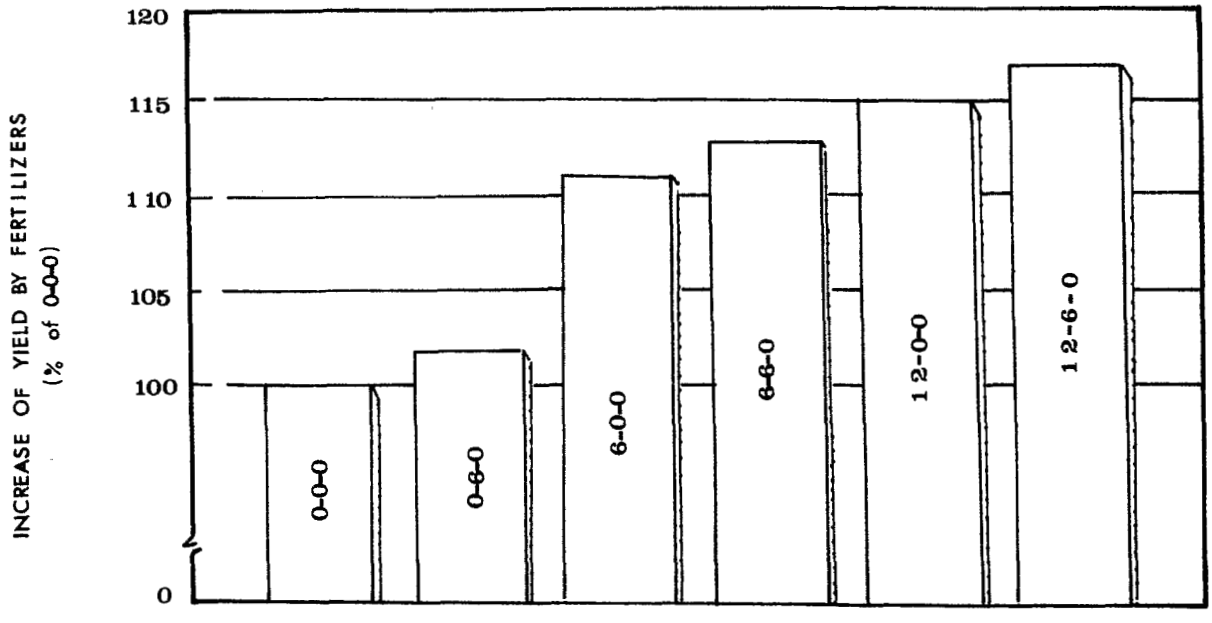
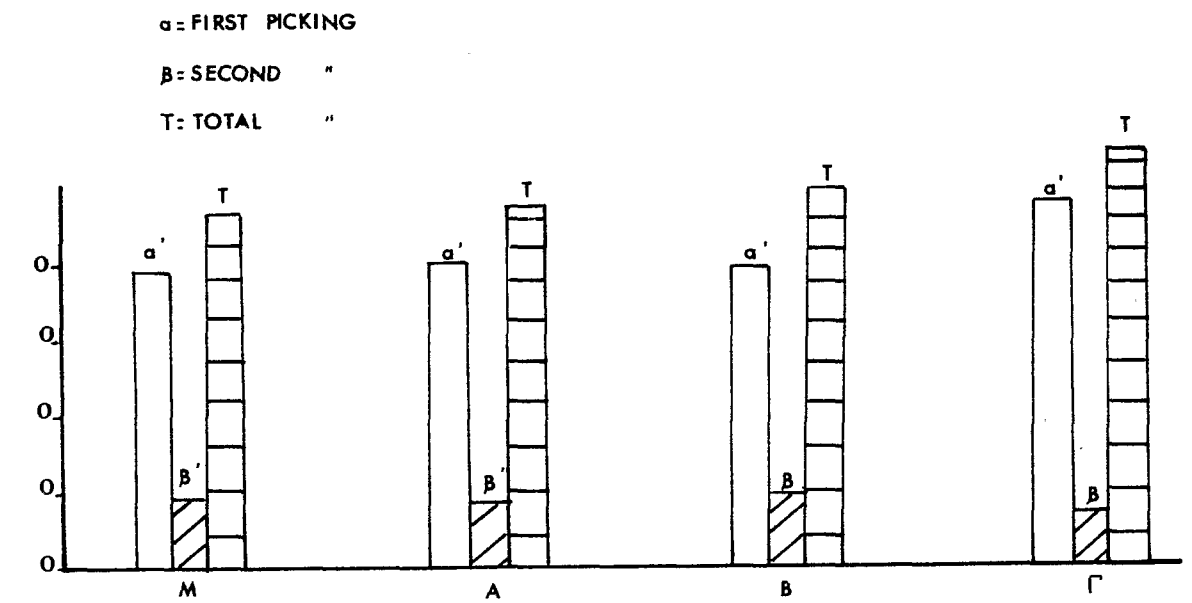


Figure 6 : Effects of fertilizer application on the cotton yield (mean of experiments 1963 - 1971



M = Control
A = Defoliant in one spray
B = Defoliant in two sprays
Γ = ETHEPHON + defoliant in one spray