Research work on cotton in Greece

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The research activities on Cotton in Greece were already presented in the first Mediterrenean and Middle East Regional Cotton Research Meeting held in Athens - July, 9-11 1984.

The different stages cotton research passed through in Greece from its very beginning, the services involved in the research programmes, as well as the problems of cotton cultivation for which solutions were found by research work were presented in detail in that meeting.

For the present meeting, we expose a brief summary of those in the meeting of Athens, as well as, some new topics among the research activities introduced recently.

The main research services involved in Cotton Research in Greece are the Cotton and Industrial Plants Research Institute - Sindos - Thessaloniki, and the Research Department of the Hellenic Cotton Board in Athens. The Cotton and Industrial Plants Institute is mainly responsible for breeding, introduction and evaluation of new varieties, technical supervision on the purity preservation of its own varieties, research of cultivation techniques of these varieties, and for the technological study of parameters concerning lint quality. The Research Department of the Hellenic Cotton Board is responsible for the research on general aspects of the cultivation of the crop including irrigation, fertilization, machine picking, plant protection, quality of cotton products and the economical aspects of cotton cultivation. Other services involved on Cotton Research are the Agricultural Research Stations of Vardates, Palama and Aliartos on breeding and variety evaluation, the Irrigation and reclamation Institute - Sindos - on irrigation, and the Plant Protection Institutes of Thessaloniki, Volos and Benakion on plant protection.

The problems of cotton cultivation in the country that had to be faced by research were :

- the increase of productivity and quality of the crop,
- the relatively short growing season,
- the infection of the plants by Verticillium wilt,
- the protection of the crop from insects,
- the introduction and application of mechanical picking,
- the increase of the cultivation cost.

Gossypium hirsutum is the species now in cultivation in the country. Among the other species, G. barbadense seems to be of some interest, especially in the Southern part of the country. Research activities on the crop have been devoted to these two species.

Breeding of new varieties

Productivity, earliness, resistance to *Verticillium* wilt, high lint quality and adaptation to mechanical picking were the main targets of the work. Efforts were made to combine these characters in one variety. As sucking insects became a rather severe problem for the country, the resistance of plants to insects in general was introduced as an objective of the breeding programme.

Variety evaluation

Greek and other varieties from various parts of the world that appeared suitable for cultivation in Greece according to the descriptions, were tested in the main cotton producing areas of the country. The study of the general and specific adaptability of the varieties in the different regions is one of the main objectives of the variety evaluation programme and modern computerized multivariate statistical procedures are now used for this reason.

Productivity earliness resistance to *Verticillium* wilt, and insects, as well as, suitability of mechanical picking and lint quality are the other objectives.

Physiology - Ecology

The effect of bioecological (temperature, light intensity), cultural factors and pretreatment applications to seed on several characteristics including growth, fruiting, defoliation, maturity, seed quality and seed emergence ability were studied.

Fertilization and Plan Nutrition

The rate, time and place of application of the three basic fertilizing elements N, P and K, as well as, of the most important microelements for cotton, were studied.

Cultural techniques

Soil preparation, sowing date, row spacing and plant populations, irrigation technique, use of plant growth regulators and defoliants and machine picking were studied.

Plant protection

From the frequent diseases in Greece, *Verticillium wilt* was studied from the breeding point of view and for the determination of suitable cultural methods to control (rotation, plant population and spacing and K fertilization). The chemical control of *Alternaria* was also studied.

The biology of several insects and the methods for their control by chemicals was studied for Cotton bollworm (*Heliothis armigera*), Pink bollworm (*Pectiniphora gossipiella*), White flies (*Bemisia tabaci*), Jassids, Thrips and Mites (*Tetranychus sp.*). Recently, research on the integrated control began including the study of the most important insect occurring in cotton cultivation.

For the control of weeds, several preplant and pre-emergence herbicides were tested and their effects on the most common weeds were studied. For the control of the more "difficult" weeds as *Cynodon dactylon*, *Sorghum halepense*, *Cyperus sp.* and *Salanum nifrum*, a number of herbicides was tested. The combined use of chemicals and mechanical methods in weed control was also sudied.

Technological research on lint and seed

Subjects of study were the fibre structure of several cotton varieties, the effect of environmental and cultural techniques on the quality and spinning performance of cotton lint, the effect of different picking and ginning methods on fibre quality, the relation existing between lint quality and yard and textile materials produced, the evaluation of subproducts of lint cleaner and the quality of cotton seed for sowing and raw material in oil extracting industry.

The results of the research carried out were, in many cases, sound-making. Greece is cultivating now its own cotton varieties, very well adapted to the conditions of the different regions of the country.

In Table 1 and Figure 1 and 2, experimental data on some of the most important varieties cultivated now in the country are given. Productive, early, resistant to *Verticillium* wilt and well-adapted to mechanical picking varieties are now cultivated in Greece with continuous increase in yield and improvement in lint quality, as shown in Figure 3.

For the use of chemical fertilizers, microelements and the appropriate cultivation techniques, several conclusions were drawn up, as shown in Figure 4a for the use of nitrogen, Figure 4b for fertilizers application, and Figures 8, 9, 10 and 11 for plant spacing.

On plant protection, the most suitable insecticides and herbicides were determined, while for *Verticillium* wilt, it was concluded that plant population and the cultivation in double rows as well as the use of potash fertilizers may have a considerable effect.

The main lint characteristics of the most important Greek cotton varieties were determined as shown in Table 2 (3), as well as, the effect of several factors on lint quality.

Finally, it was found that the production cost of cotton cultivation may be decreased by the common use of the production means.

Literature

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Source des tableaux et figures : Hellenic Cotton Board

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	-6,00	38,40	27,20	4,40	7,76
Samos	102	101	9	0,961	0,932	-4,80	39,10	28,10	4,20	7,58
Sindos 80	108	108	9	0,738	0,945	-4,20	41,30	29,30	3,90	7,75
Erato	107	107	9	0,967	0,928	-1,80	41,70	28,20	3,80	7,70
4 Σ	100 (3060) kg / ha 100 (3160)	100 (1260) kg / ha 100 (1330)	9 10	1,058 0,972	0,917 0,865	10 / 10 30 / 9	39,90	28,90	4,10	7,95
Ac. Sindos	105	107	10	1,06	0,98	1,40	40,80	28,40	4,30	8,00
Zeta 2	111	111	10	1,147	0,941	6,80	41,70	28,50	4,80	7,42
Zeta 5	103	95	10	1,081	0,941	3,10	40,70	28,80	4,40	7,49
Lamia	102	98	10	1,015	0,96	2,40	40,70	28,20	4,60	7,48

Table 1: Characteristics of cotton varieties cultivated in Greece

Varieties	Acreage %	Yield kg /1000 m2		Boll weigth	Lint	Length fibrograph 2,50%	Pressley P.I.	Micronaire M.I.
		Seed cotton	Cotton Lint					
4 Σ	36	304	127	5,6	41,6	28,8	7,93	3,94
Sindos 80	18	314	132	5,6	41,7	28,8	7,96	3,95
Zeta 2	38	336	141	7,3	41,6	28,6	7,97	4,66
Zeta 5	5	311	130	6,6	41,4	28,4	8,02	434
Samos	3	316	130,8	6,3	40,8	28,7	7,85	4,24
Acala Sindos	0	320	137	6,7	42,6	28,6	7,99	4,39

Table 2: Yield and fibre characteristics of the Greek cotton varieties

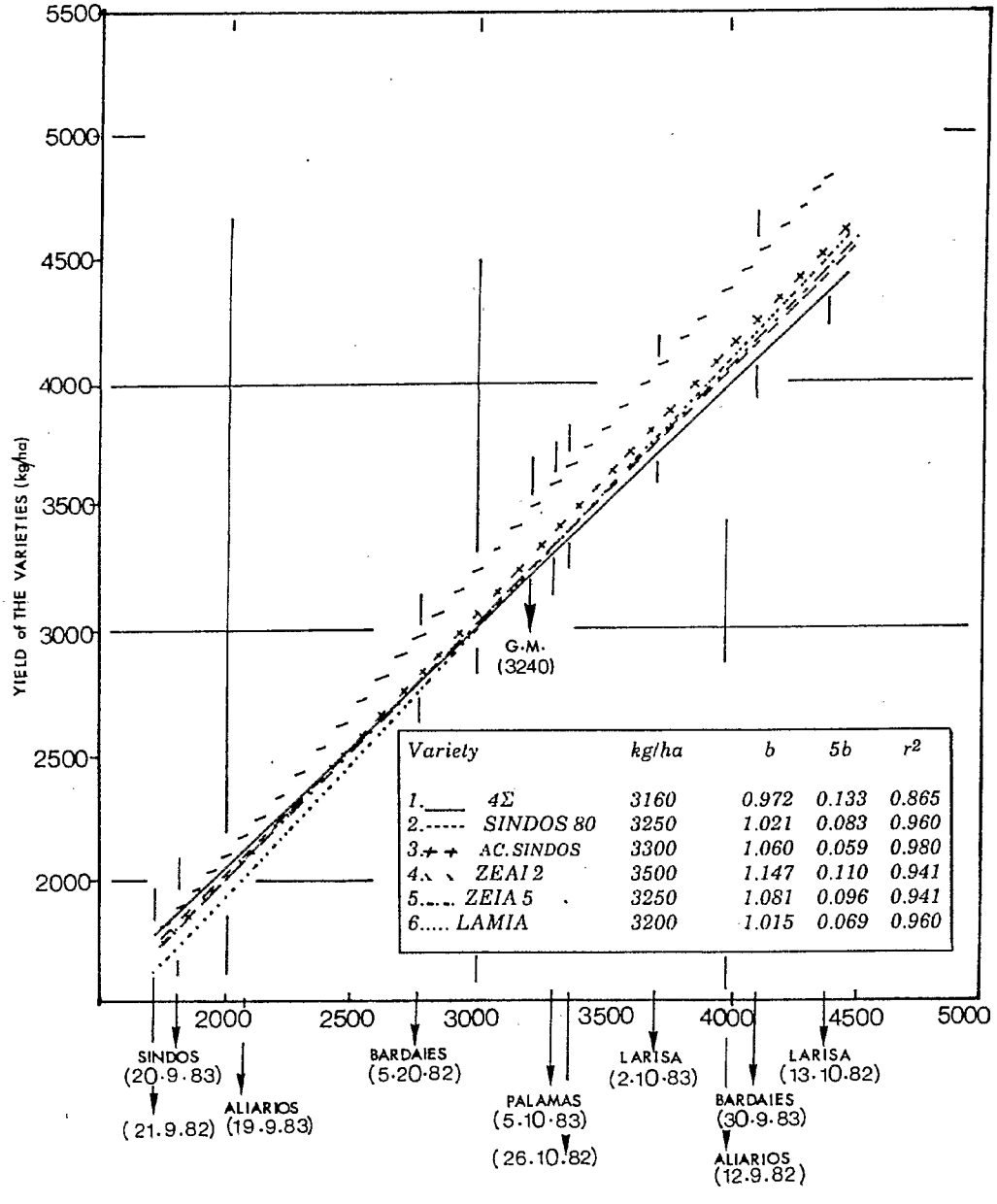


Figure 1 : Regression of the environmental yield on the yield of several varieties tested (experimented in Central and South Greece 1982-83)

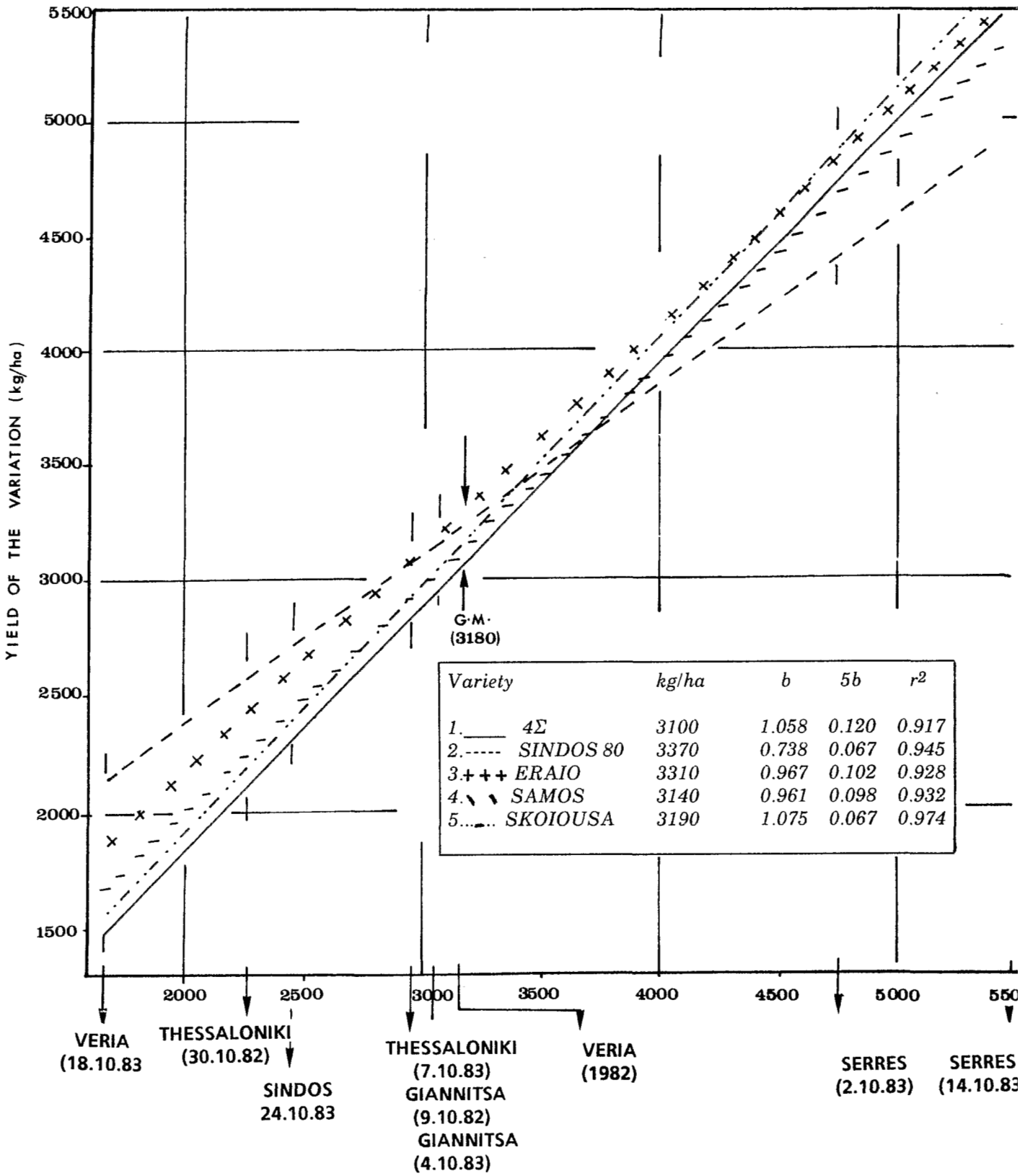


Figure 2 : Regression of the environmental yield on the yield of several varieties tested (experimented in North Greece 1982-83)

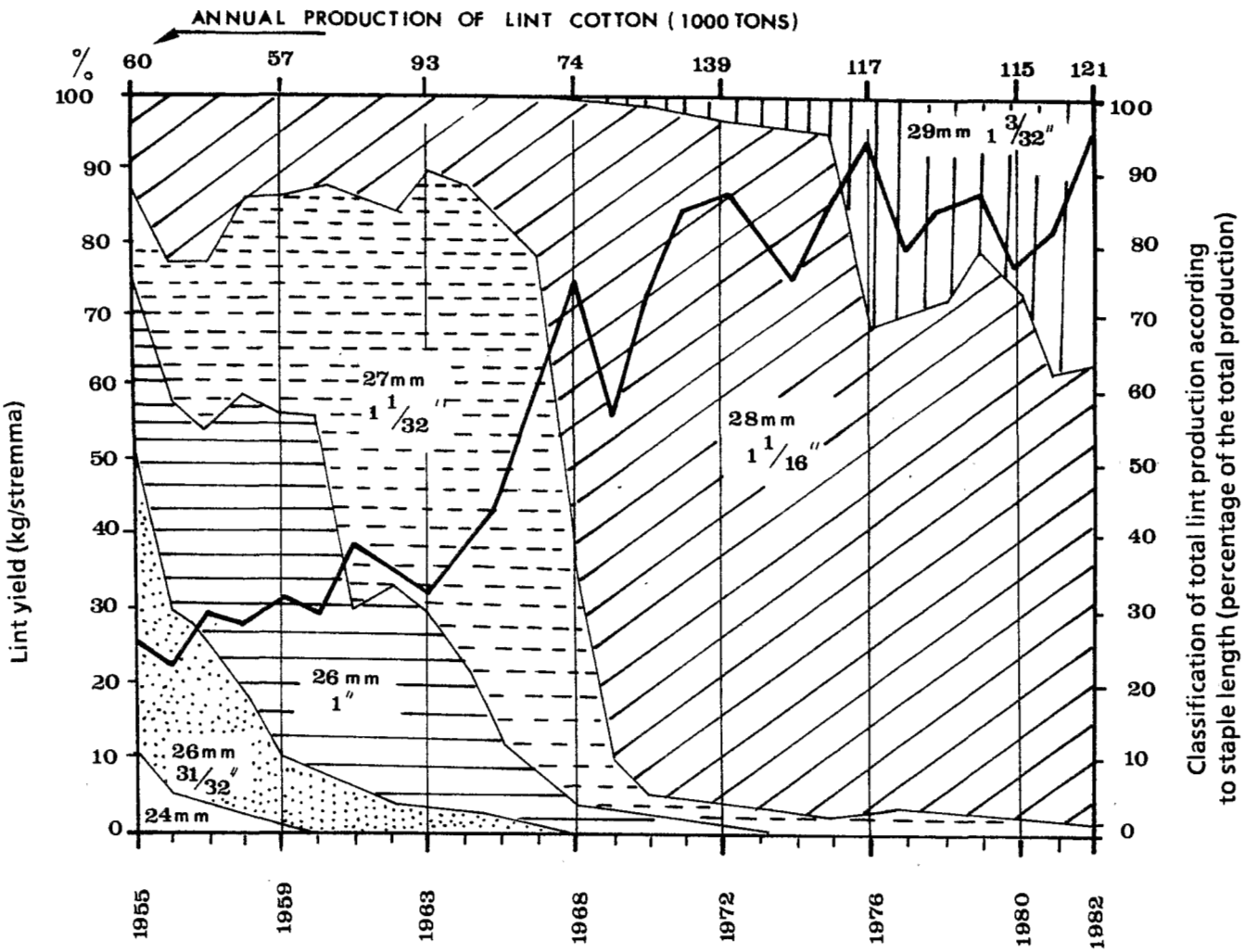


Figure 3 : Improvement of Greek cotton yield and quality

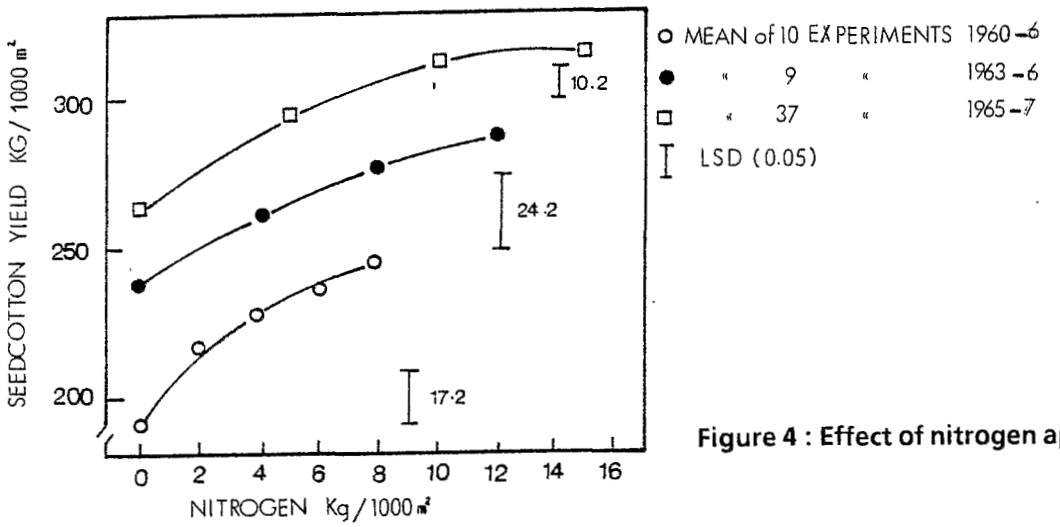
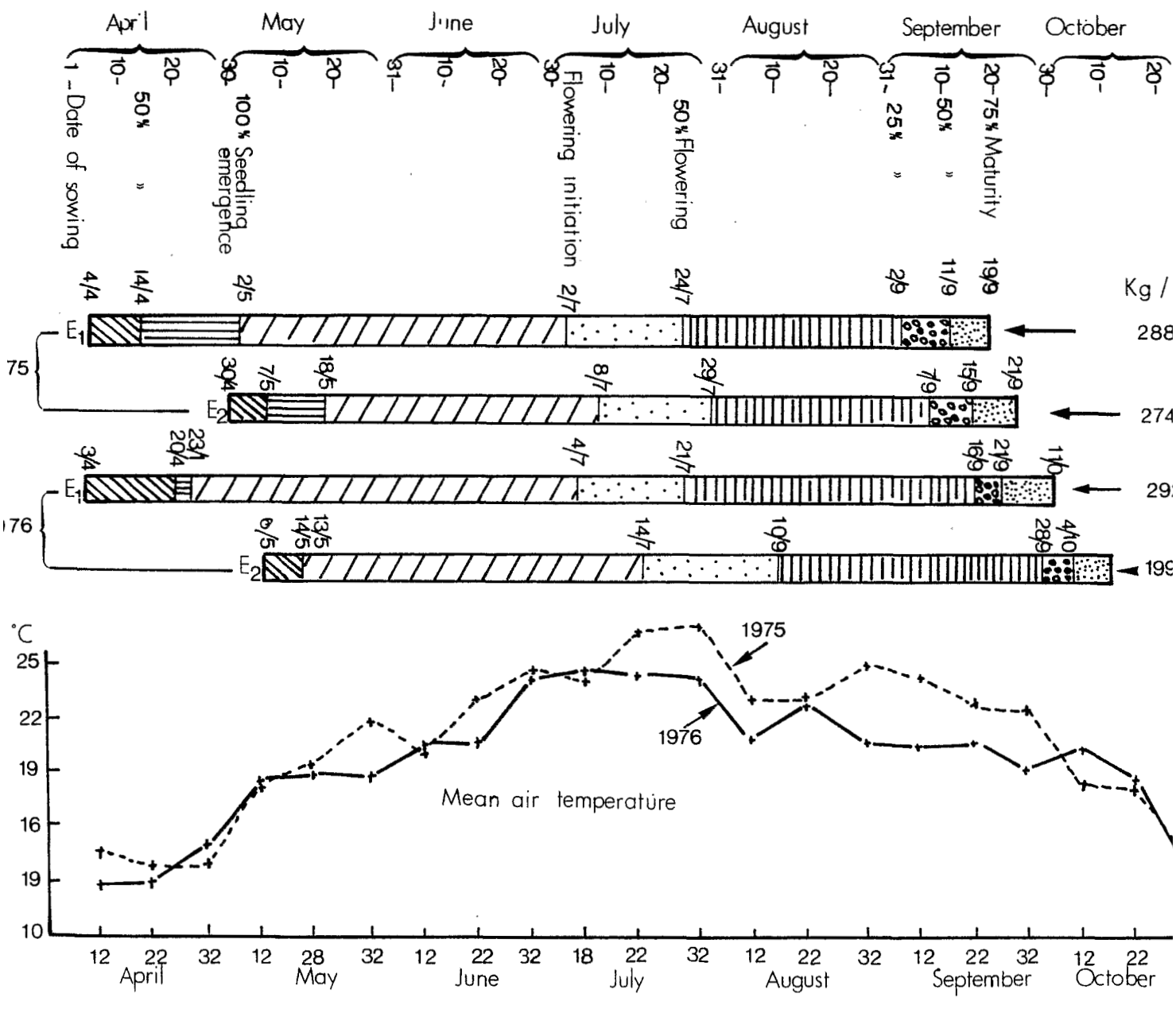


Figure 4 : Effect of nitrogen application on the cotton yield

Figure 5 : The different stages of cotton plant growth and development as affected by date of sowing under the climatic conditions of 1975 and 1976



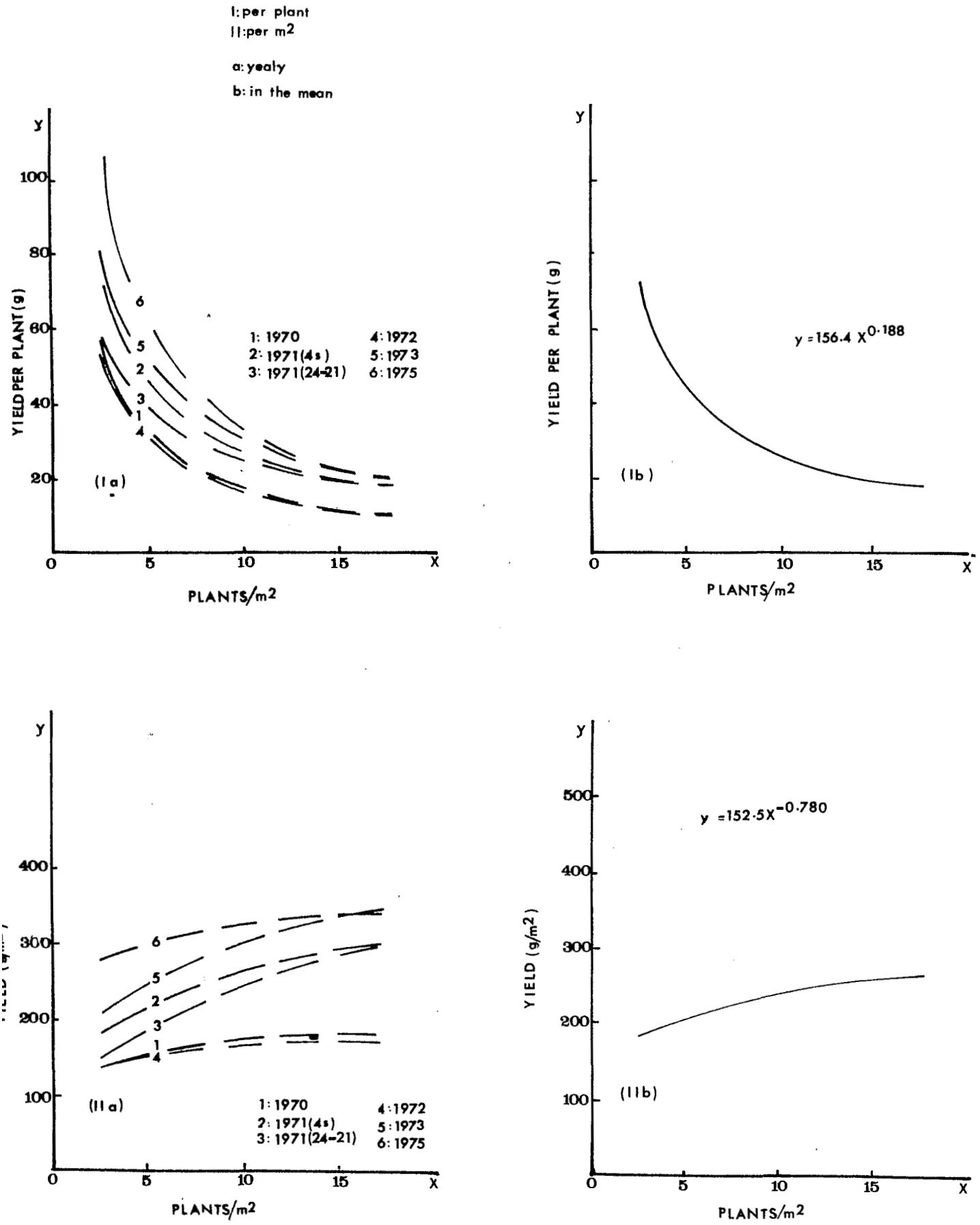


Figure 6 : Effect of plant population on yield

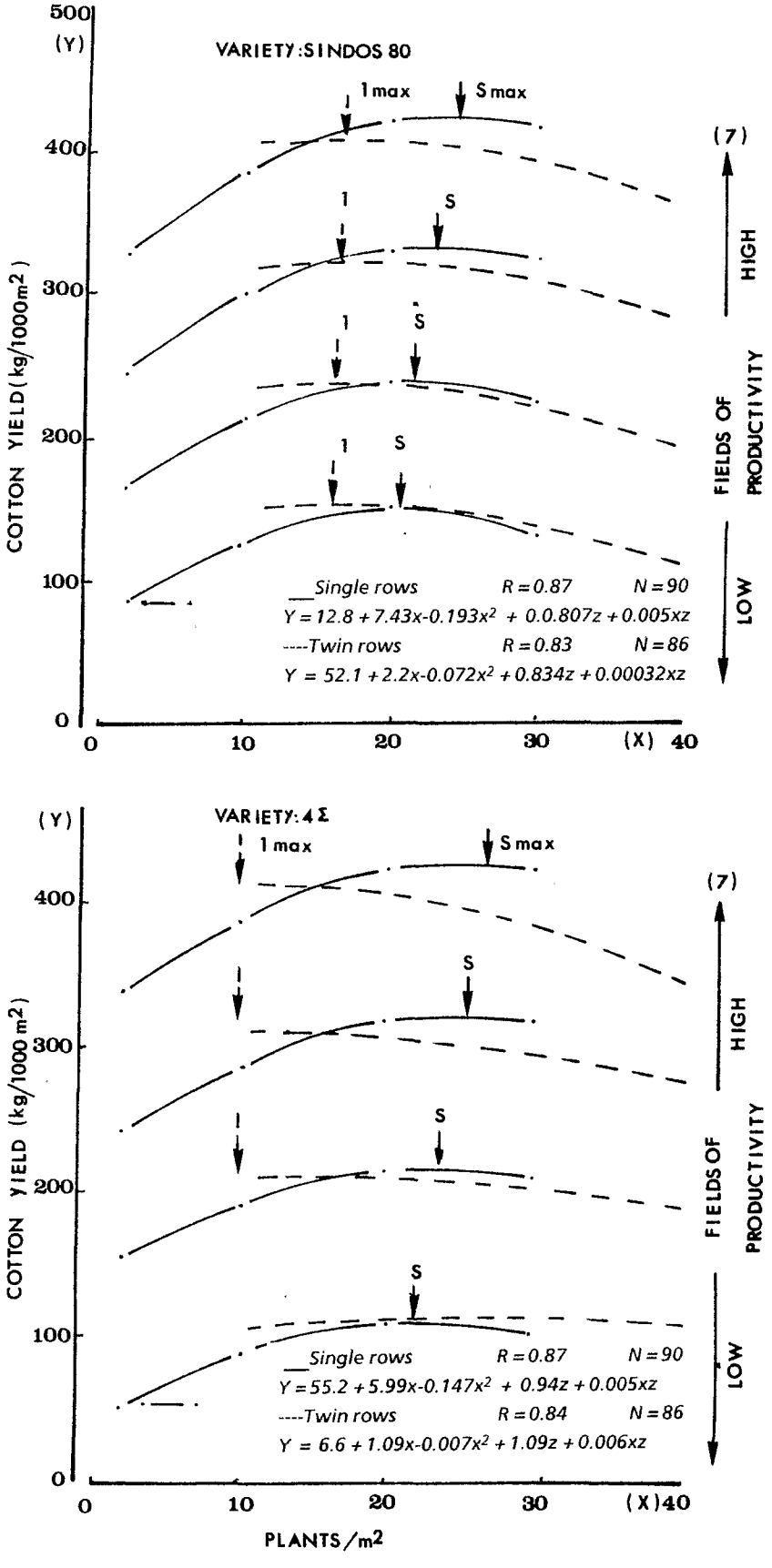


Figure 7 : Effects of plant population on the yield of cotton (single and twin rows)

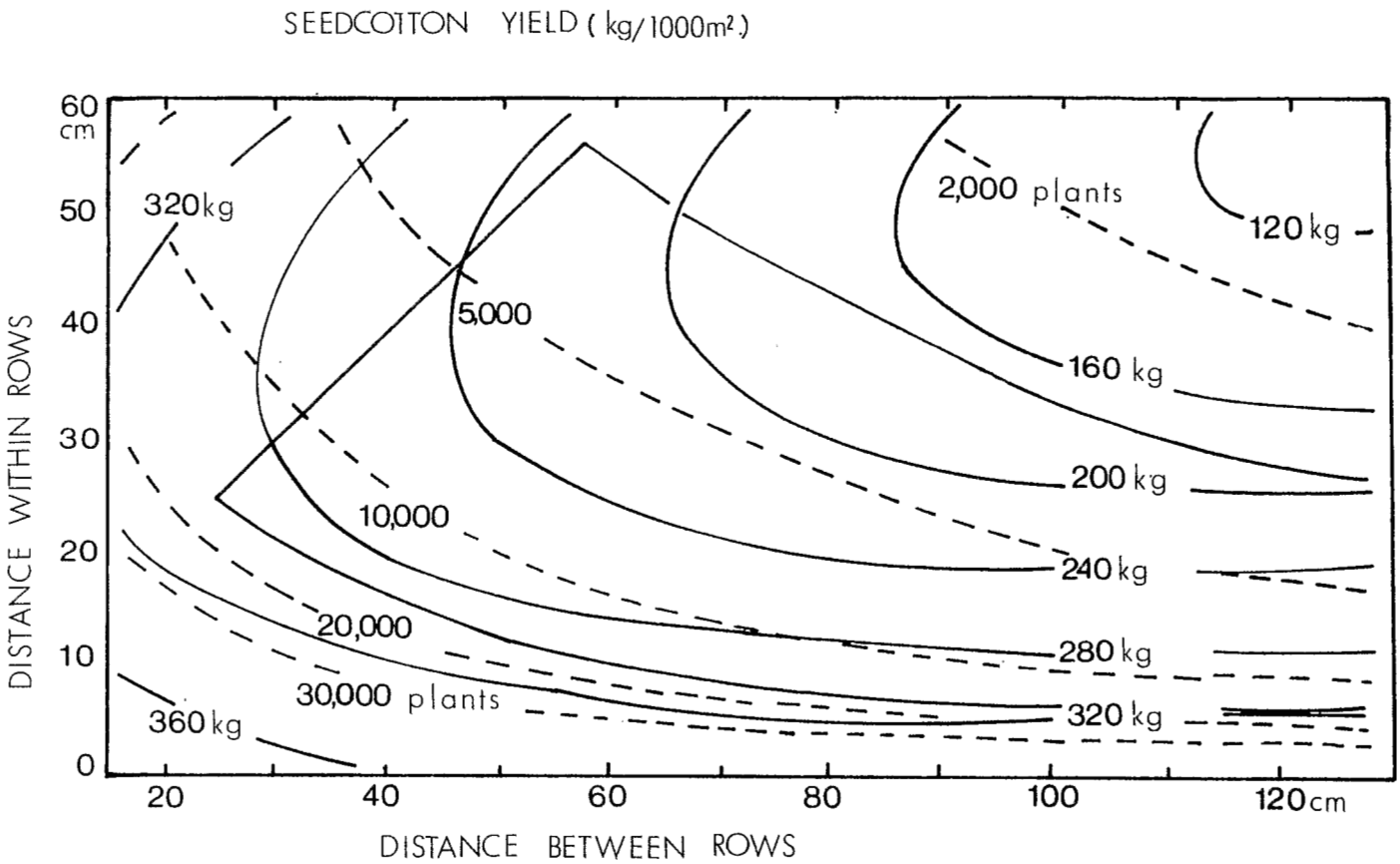
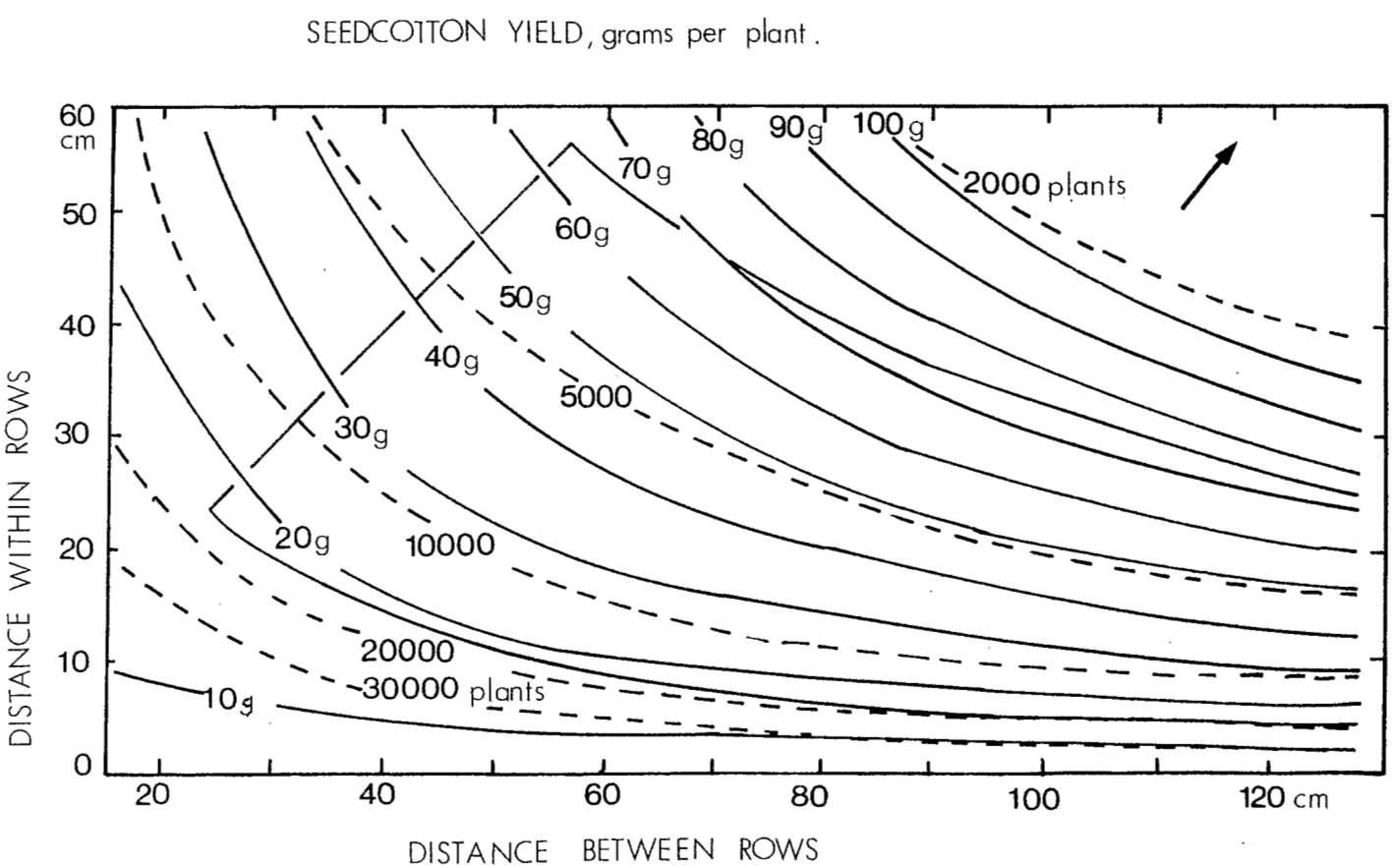


Figure 8 : Effect of spacing on seedcotton yield per unit area

Figure 9 : Effects of spacing on seedcoton yield per plant



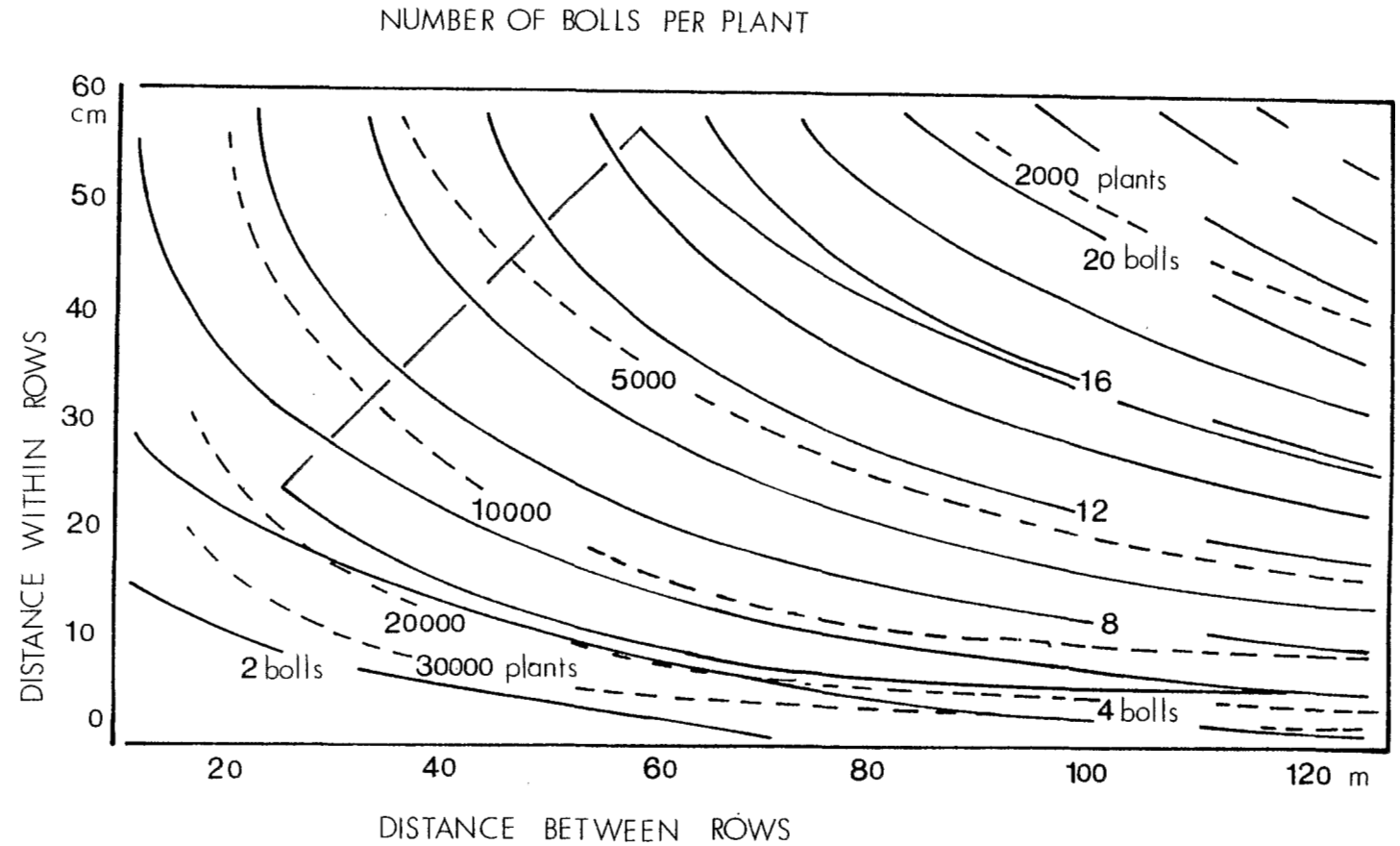


Figure 10 : Effect of spacing on the number of bolls per plant

Figure 11 : Effect on spacing on mean boll weight