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EFFECT OF GIBBERELLIC ACID SPRAYING ON BANANA FRUIT DEVELOPMENT

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In the recent past, crop yield has been maximized by employing appropriate genetic methods and increasing the agricultural inputs. Further increase in the crop yield may be possible by physiological manoeuvring in terms of application of plant growth regulators at an appropriate time and using effective concentrations. These chemicals, by controlling internal metabolism induce plant to produce more than it would under the best of conditions without them[1,2]. Depending upon the time of application[3,4] and concentration[5], gibberelic acid (GA) is able to produce an astonishing diversity of responses on the majority of crop plants. Schwabe and Goldwin[6] reported increase in yield and size in apple and stone fruits. Similarly, a marked increase in fruit weight of *Cucumis sativa* has been observed by GA application directly to the fruit initials[7]. The present paper deals with the response of intact banana (*Musa paradisiaca*) fruits of different ages to GA application.

Two fruit bunches (35 day and 55 day old from the date of fruit initiation) were selected on two different plants. The pendant of these bunches was removed. The individual bunches were divided into two equal longitudinal halves with the help of a glazed cardboard paper. While one side of the bunch was sprayed on alternate days with GA_3 (10^{-4} M) solution, the other side (control) was sprayed with distilled water. This technique offered the advantage of having fingers of about the same chronological age on the two sides. Tween-20 (0·1% V/V) was used as surfactant. Spraying was repeated thrice. After final spraying, the fingers on the treated side were marked and the separator removed. Forty-five days after the first spraying, the bunches were detached from the plant and data on weight and volume of individual fingers were recorded. Mean of five representative fingers, in each of the three hands, *viz.*, 1st, 3rd and 5th and an overall grand mean of about 50 fingers per treated bunch are presented in Table I and Fig. 1 respectively.

An examination of response to the hormonal spray, given in Fig. 1, clearly indicates the GA-induced improvement of weight and volume per finger in both young and old bunches. While, the increase in weight was more than in volume in the fruits of same age, the younger bunch responded more favourably than the old bunch. It is evident from Table I that the weight of the fingers from the first hand of 35 day old bunch increased most favourably followed by that from third and fifth hands. There was an inverse relationship between weight and age of the fingers in 55 day old bunch. The maximal response to GA observed in the first hand of 35 day old bunch and also in the fifth one of the 55 day old bunch may be attributed to the closeness in their chronological ages. Thus, younger the fruits better was the response to GA treatment both inter- and intra-bunchwise.

Similar to our observations, whrein we have obtained increase in yield, Lockard[8] has earlier reported increase in weight, volume and length of the finger by spraying

TABLE I

Age-dependent response of banana fingers to GA spray; values are means (± S E.) of 5 fingers from each hand under any one treatment

Position of hand	Young bunch (35 day old)			Old bunch (55 day old)		
	Untreated (control)	GA	% over control	Untreated (control)	GA	% over control
			Weight (g) per finger			
First (oldest)	25·6±0·8	41·9±0·9**	63·7	56·8±1·4	63·9±2·1*	12·4
Third (intermediate)	30·8±0·9	42·7±0·7**	38·8	36·4±1·1	45·4±1·9**	24·8
Fifth (youngest)	21·6±0·6	28·0±0·8**	29·7	21·5±0·7	42·8±2·5**	99·1
			Volume (cc) per finger			
First (oldest)	38·1±0·2	53·9±1·9**	41·3	59·8±2·0	62·8±1·2	5·0
Third (intermediate)	46·3±1·9	57·2±1·2**	23·7	47·0±1·2	57·7±4·0**	22·8
Fifth (youngest)	32·8±1·2	46·3±1·2**	41·1	30·8±2·9	50·0±6·5*	62·7

* Significantly different from control at $P = 0·05$

** Significantly different from control at $P = 0·01$.

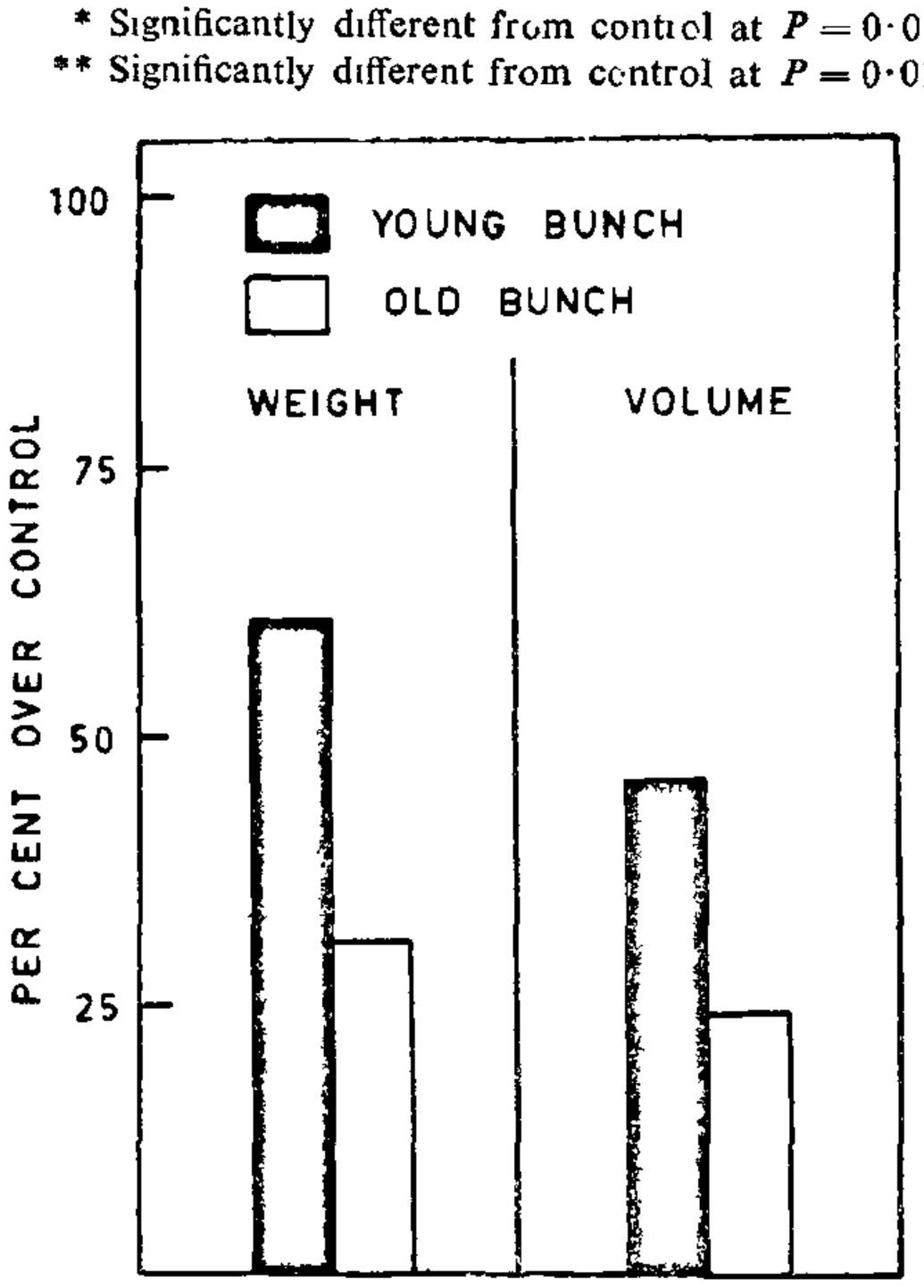

FIG. 1. Age-dependent differential effect of GA sprays on the volume and weight of banana fruits.

of GA either to the banana plants or directly to the fruits. Our findings that younger the tissue better was the response to GA treatments are in conformity with those of others. GA is known to exhibit differential effects when applied at various stages of development. Pal *et al.*[3] observed that GA application was more effective in increasing the fruit diameter when given at terminal phases of citrus fruit development than at initial stages. Treatment with GA at fruit-setting produced bigger berris in Delight Grapes than when applied at flowering stage[4]. Similarly, GA treatment at full bloom was more effective than either at prebloom or postbloom period in apple fruits[9].

Such an effect of GA treatment may either be due to : (*a*) change in endogenous hormonal level[10–12] or (*b*) increase in dry weight and cell number, accompanied with increased synthesis of carbohydrates, proetins and nucleic acids[13]. However, our present work, having been limited to only morphological observations, does not allow us to indulge further in these explanations.

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A NEW SPECIES OF *CYLINDROCARPON*

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DURING the survey of Hyphomycetous fungi of Mount Abu, Rajasthan, the authors came across a whitish fungal growth on a dead twig. The fungus has been identified as a new species of *Cylindrocarpon*. Booth[1] in his revision of the genus *Cylindrocarpon* described 27 species and six varieties. Deighton and Pirozynski[2] described some hyperparasitic species of *Cylindrocarpon*. The present fungus is not hyperparasitic but it comes close to hyperparasitic species *C. macrosporum* (Spez.)[2]. The conidiophores are smaller in size and the conidia are cylindrical with rounded ends. Therefore it is described as a new species.

Cylindrocarpon abuense sp. nov. Chouhan and Panwar

Coloniae effusae, albe. Mycelium superficiale, ex hyalinis, septatis, 1–2 μm crassis hyphis compositum. Conidiophora (phialides) ex hyphis lateraliter orientia, simplicia, recta vel flexa, hyalina 13·5–32·5 μm longa, 2–3 μm lata, una cum septum basale. Cellulae conidiogenae, monophialidicae, terminalae. Conidia apud, apicem tenueparieta, cylindrica, cum rotundatis extremis 1–3 septata, 8–20 × 2–3·5 μm (Fig. 1).

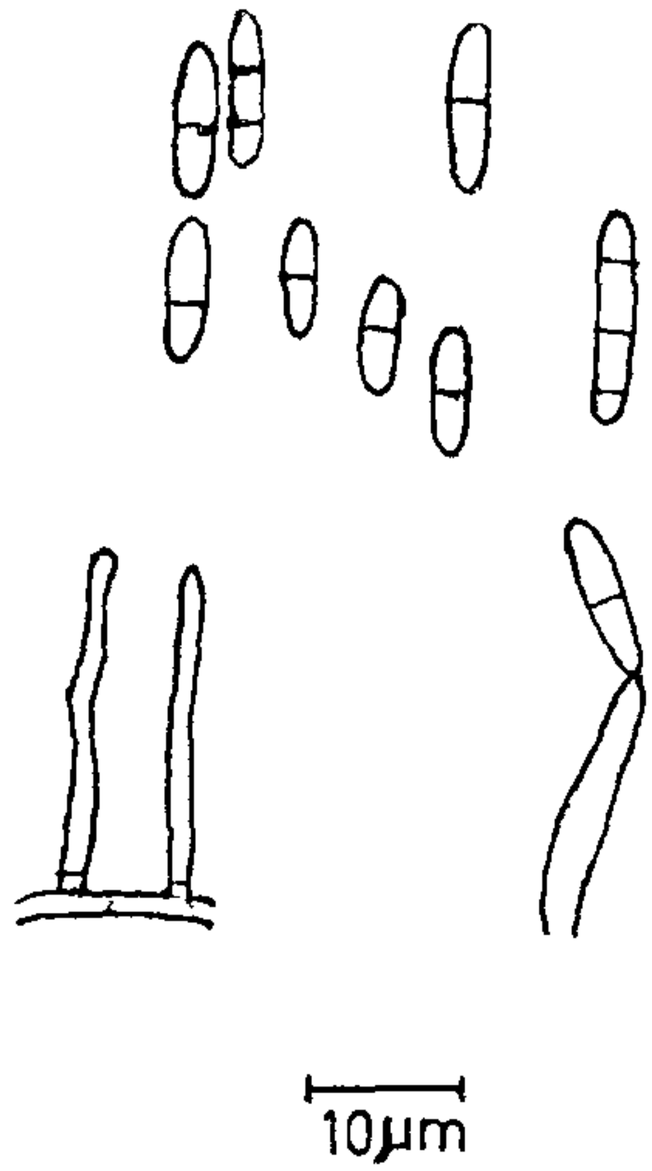

FIG. 1

Typus lectus in lingo emortuo in loco Mount Abu die October 1975 J. S. Chouhan et K. S. Panwar et positus, C.M.I., Kew, Herb, I.M.I. 199265 (a) typus et Botany Department, University of Jodhpur, Coll. J.U.M.L. 605 (a).

Colonies effuse, whitish. Mycelium superficial, composed of hyaline, septate, 1–2 μm thick hyphae. Conidiophores (phialides) arising from the hyphae, laterally, simple, straight or flexuous, hyaline, 13·5–32·5 μm long, 2–3 μm wide, with a basal septum. Conidiogenous cells monophialidic, terminal. Conidia formed at the tips of the conidiophores in slimy heads, hyaline, smooth, thin walled, cylindric with rounded ends, 1 to 3 septate, 8–20 × 2–3·5 μm.

Collected on dead twig from Mount Abu by J. S. Chouhan and K. S. Panwar in October 1975 and deposited in C.M.I., Kew, Herb. I.M.I. 199265 (a) and Botany Department, University of Jodhpur, Jodhpur, Coll. J.U.M.L. 605 (a).

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