brown. As growth proceeded roots became completely brown, curved and stunted. The growth of lateral roots was severely inhibited beyond 100 mg/l concentrations.

The per cent germination was not significantly affected by dikegulac treatment. After 48 hours of germination a very interesting observation was recorded, the radicles of all dikegulac-treated seedlings became negatively geotropic (Fig. 3). The lower concentrations (25 and 50 mg/l) caused negative plagiogeotropic responses whereas the remaining concentrations caused negative diageotropic responses. The growth of root hairs was also retarded in the same manner.

Dikegulac-sodium works counter to gibberellins and auxins and in some respects it may seem similar in action to morphactins[1]. In recent years evidence has accumulated suggesting that roots are the site of gibberellin (GA) biosynthesis and, at least some, if not all of the root-synthesized GA's are exported to the shoot in xylem sap[3]. The exact locus of GA synthesis in the root of *H. annuus* seedlings appears to be the root apex[6]. Young leaves of *H. annuus* plants are capable of carrying out GA synthesis which may be translocated to the roots via the phloem. The inhibition of primary and lateral roots and root hairs with different concentrations of dikegulac-sodium is possibly due to its effects on GA biosynthesis. The action may cause reduction in GA as well as GA–induced DNA biosynthesis[1], necessary for root growth. GA is known to increase the amount of auxins (mainly of IAA) by inhibiting synthesis of IAA–oxidase[12]. IAA promotes root growth in *H. annuus*[7]. If dikegulac-sodium does not affect IAA level through GA then it may directly reduce IAA level by increasing an amount of IAA–oxidase in roots.

Geotropic growth curvature results from unequal growth rates along the upper and lower sides of the responding organs. Dikegulac-induced negative geotropism and modification in root morphology (mainly swelling and curling) may be attributed to the disruption of auxin transport or the reduction of IAA level in roots. These effects are similar to those of morphactins. Swelling of hypocotyl (Fig. 2) with dikegulac treatment also suggests that this growth regulator must have initiated the production of ethylene in root cells, but this needs confirmation. Ethylene is involved in the supra-optimal auxin inhibition of root growth[11].

At present we have little information about the nature of inhibiting effects of dikegulac-sodium on root growth and its morphology. Experiments are in progress to resolve the precise mechanism of the action of dikegulac-sodium.

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POLYPEPTIDES OF *PARTHENIUM* CHLOROPLASTS OF SDS GELS*

Parthenium hysterophorus Linn., (family: Compositae), is a common weed, spreading throughout the country, posing a serious health hazard to both humans and livestock[1,2]. The efficient photosystems present in the chloroplasts of this weed probably allows it to have uncontrolled luxurious spreading and hence it is worthy of investigating its polypeptides residing within the chloroplasts lamellae and stroma.

Chloroplasts isolated from the young leaves were fractionated into subchloroplastic particles by treating them with digitonin as described earlier[3]. The light dependent photosystem reactions were carried out as described previously[4]. The SDS gel electrophoresis was carried according to Weber and Osborn[5], and the molecular weight of the polypeptides residing in them was determined as described by them. The 10% gels were scanned in a Joyce Loble chromoscan. The carboxylase activities were assayed both radiometrically and spectrometrically[6].

The pigment composition and $a : b$ ratio are given in Table I. The fractions G_{10} and G_{144} correspond to subchloroplast particles predominantly containing PS I and PS II respectively. The light induced electron transport activity with suitable electron donor and acceptor confirmed the separation of the above sub-chloroplastic fractions. The PS I particles exhibited a basal electron transport in presence of methyl red upto 32 μ moles mg^{-1} chl hr^{-1}. The PS II particles reduced FeCN upto 220 μ mole mg^{-1} chl hr^{-1} (Table II). The two separated photosystem particles phosphorylated 33 and 68 μ moles mg^{-1} chl hr^{-1}, in presence of phenozine methosulfate (PMS) and FeCN respectively, while the basal nonphosphorylating electron transport of the whole chloroplast in presence of FeCN was 340 μ mole mg^{-1} chl hr^{-1}.

The chloroplasts after fractionation into soluble and lamellar, were analysed for their proteins before and after treating them with sodium dodecyl sulfate (SDS). The soluble fraction of the chloroplasts contained maximum ribulose 1,5-biphosphate (Ri Bp) carboxylase activity of 3·6 μ mole mg^{-1} chl min^{-1}. The phosphoenolpyruvate (PEP) carboxylase activity was also observed as high as 1·2 μ mole mg^{-1} chl min^{-1}. The other enzymes were not assayed. This soluble protein on SDS treatment revealed, that it was made of several polypeptides, with more prominent peptides at 52·1 and 12·2 KD (Fig. 1), corresponding to the large and small subunits of Ri BP carboxylase respectively[7]. There is a possibility of the subunits PEP carboxylase, being masked within the 12·2 KD of the small subunit of the Ri BP carboxylase, as it is also has similar molecular weight[8].

TABLE I

Chlorophyll composition of the sub-chloroplastic fractions obtained after digitonin treatment

Chloroplast suspension containing 5 to 6 mg of chlorophyll was suspended in 5 ml of 0·5% digitonin in 0·05 M PO_4 buffer and stirred for 30 min at 4° C and fractionated by differential centrifugation.

Fraction	Total chl μ g	chl *a*	chl *b*	*a*/*b*
Chloroplasts G_0	4942	2806	2081	1·3
Fraction I G_1 1000 × g pellet	2675	1348	1225	1·1
Fraction II G_{10}, 10,000 × g pellet	354	144	160	0·9
Fraction III, G_{50} 50,000 × g pellet	108	76	23	3·3
Fraction IV G_{144}, 144,000 × g pellet	834	638	152	4·2
Fraction V 144,000 × g supernatant	212	124	41	3·0

TABLE II

Absolute values of various experiments

Experiment	Particles	μ mole mg^{-1} chl × hr
$^{14}CO_2$ fixation	Leaf cells	32·6 to 35·5
Methyl red reduction	PS I particles	26 to 30
FeCN reduction	PS II particles	193 to 210
Hill reaction FeCN reduction	Chloroplasts	360 to 420
Pi esterification with PMS (cyclic)	Chloroplasts	26 to 35
Pi esterification with FeCN (noncyclic)	Chloroplasts	68 to 76

The supernatant of membrane fraction after EDTA treatment revealed the presence of ATPase and several other unkown proteins, when stained with specific activity staining and coomassie brilliant blue respectively. When this fraction was treated with SDS, it had polypeptides ranging from 70 to 2 KD (Fig. 2).

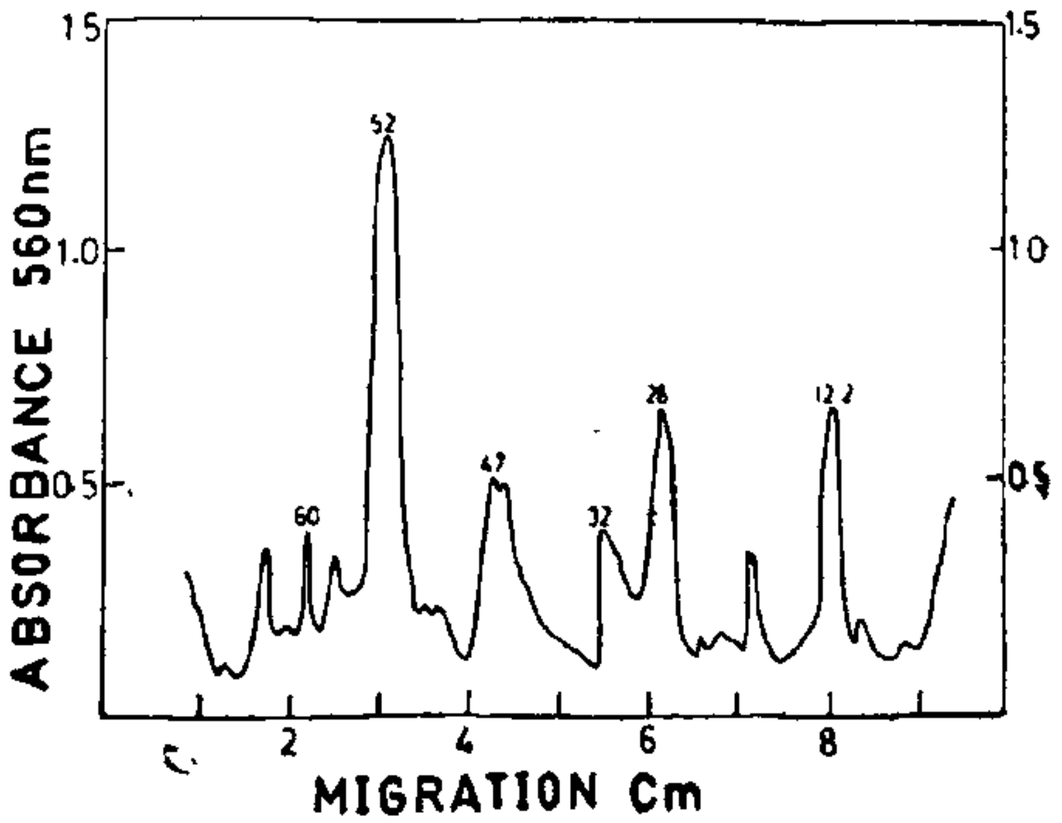

FIG. 1. Electrophoretogram of stroma fractions.

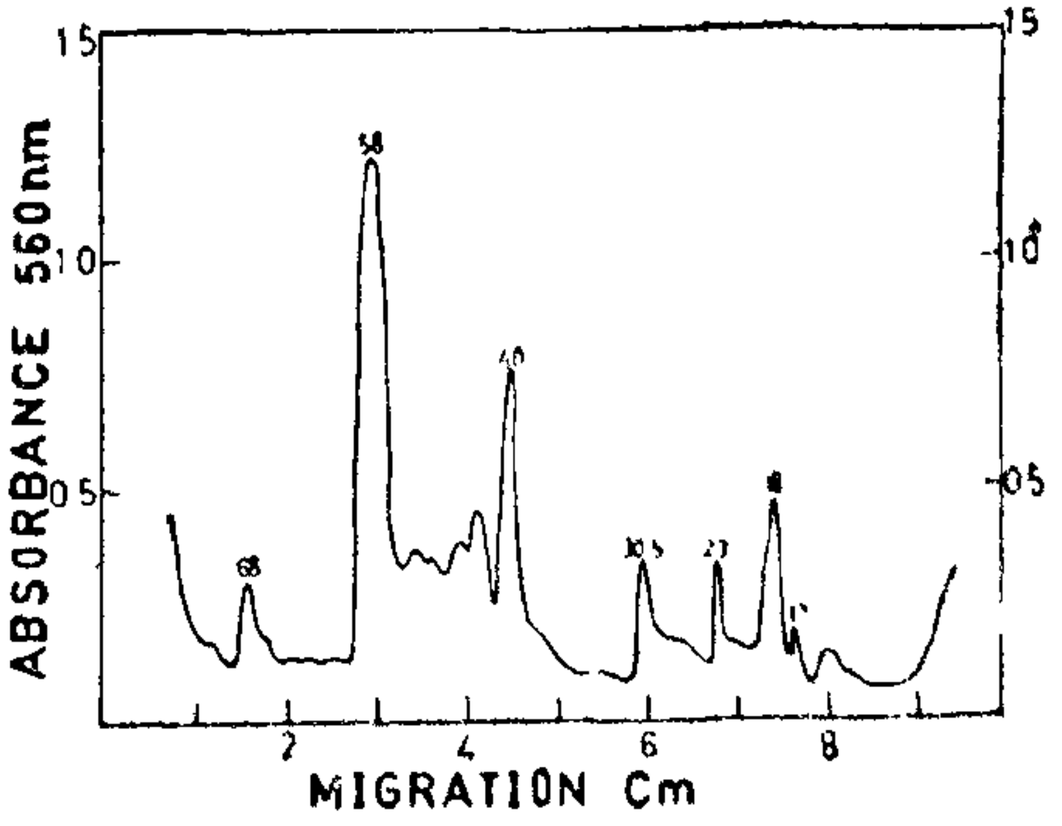

FIG. 2. Coomassie brilliant blue stained gel scanning of EDTA washed membrane supernatant fractions.

The membrane polypeptides of the chloroplasts on SDS polyacrylamide gels are shown in Fig. 3. It

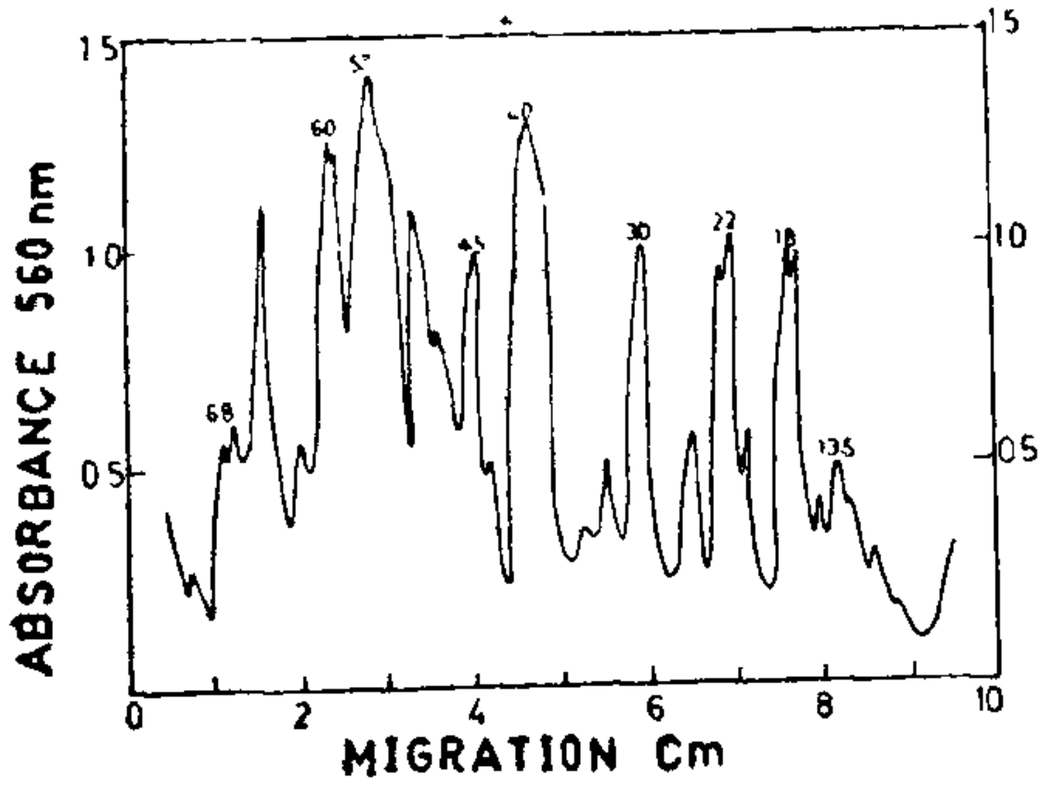

FIG. 3. SDS gel scans of EDTA washed chloroplast membrane fractions.

can be concluded that there are two groups of polypeptides, a higher molecular weight peptide ranging between 60 and 40 KD and another with lower molecular weight between 30 and 20 KD. Group I tends to be enriched with PS I and Group II with PS II systems[9]. For all practical purposes the peptides and enzyme proteins resemble very closely with the spinach chloroplasts[10] and the lamellar and stromal peptides of maize bundle sheath chloroplasts[1]. However, the efficiency of the weed for its uncontrolled spreading is not well understood.

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HISTOCHEMICAL STUDIES ON BOVINE FILARIID, *SETARIA CERVI*

A THOROUGH understanding of the physiological aspects of the host-parasite relationship cannot be realized until a careful study is made on the biochemical nature of the parasite and its host. Most of the work have been done on the effect of the parasite on the host, and very little attention has been paid to the changes in the parasite brought about by the host. In view of this, the present study has been undertaken in rat—*Setaria cervi* system.

Present investigation deals with histochemical localization of protein, glycogen, calcium and alkaline phosphatase in adult *S. cervi* worms before and after transplantation in white rats. Live worms, collected from the peritoneal cavity of freshly slaughtered buffaloes were implanted *via* laparotomy into 30 laboratory bred white rats, almost of the same age group and weight[1]. Microfilaria-positive rats were sacrificed at weekly intervals in batches of 5. Live and degenerate worms, recovered from different locations, were fixed in different fixatives as required in the particular methods. Simultaneously, fresh worms, collected from buffaloes, were also fixed and these served as controls. Mercury-bromophenol blue method was used for protein localization, carmine stain method for glycogen, calcium red method for calcium as described by Pearse[2]. Alkaline phosphatase was localized by the method of Gomori[3].

No appreciable change in protein concentration was noted in the transplanted worms as compared with the controls which showed a relatively high concentration of glycogen in musculature, ovary, uterus and microfilaria (Fig. 1) as compared to those of transplanted worms. However, it was found localized in the cuticle and lateral cords of the transplanted worms (Fig. 2), while it was not traceable in the control. A high concentration of calcium in control group was found in the cuticular region, developing embryos and microfilariae (Fig. 3). However, body walls, lateral lines, boundary walls of uterus, uterine duct and vagina were devoid of calcium. Calcium concentration was found to have relatively increased in the transplanted worms undergoing the process of calcification in the tissue (Fig. 4). Dark brown precipitate was taken as indicative of alkaline phosphatase activity. In control, very strong alkaline phosphatase activity was noted in subcuticular region, upper part of the musculature, developing embryos and microfilariae (Fig. 5). Alkaline phosphatase relatively decreased in transplanted worms (Fig. 6).

Stress causes many reactions, including alteration in the biochemical constituents of blood and tissues, and the corresponding alteration in the biochemistry of the parasite. Reports on the histochemical localization of biochemical constitutents are scanty