Prenatal Effects Caused by Feeding Sclerotia of *Sclerotinia sclerotiorum* to Pregnant Rats

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Sclerotinia sclerotiorum is a mold attacking a wide variety of plants (WALKER, 1957). Furocoumarins produced in celery invaded by S. sclerotiorum are phototoxic and cause bullous dermatitis in harvesters (BIRMINGHAM et al., 1961) although it has been shown that this hazard exists only with actively metabolising (fresh) celery (WU et al., 1972). Several plant growth regulators have been isolated from culture filtrates of S. sclerotiorum (SUZUKI et al., 1968, SASSA et al., 1968). Nothing is known about the systemic toxicity of this mold although sheep do not appear to be affected by it and have been used to remove infected lettuce crops from the field (BROWN, 1937). Since the hard fungal bodies, the sclerotia, may be present on plants and seeds used as food crops, an investigation has been undertaken to determine whether addition of sclerotia to the diet of pregnant rats results in prenatal effects. Certain grades of sunflower seed may contain 2.5% or more sclerotia (CANADIAN GRAIN GRADING CUIDE 1973).

Materials and Methods

Air-dried sclerotia of S. sclerotiorum removed from sunflower seed were ground (20 mesh) and added to a basal rat diet in prescribed amounts (Table 1). Pairs of primiparous female Wistar rats (Woodlyn Farms, Guelph, Ontario), 175-200 g, were caged overnight with proven sires. Females were designated as in day 1 of pregnancy the morning a vaginal plug or sperm in vaginal smears was observed. Groups of 5-10 pregnant females were assigned to each diet. Records of daily food consumption from day 1-21 of gestation were kept. Caesarean sections were carried out on day 22 of gestation and the following were noted: litter size, number of deciduomas, weight of fetuses and maternal weight gain. Approximately two thirds of the fetuses from each litter were processed for skeleton examination while the remainder was fixed in Bouin's fluid for visceral investigation. Histological examination was made on sagittal sections from six females taken at random from the group fed 8% sclerotia in the diet.

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Results and Discussion

The results are given in Table 1. No significant differences in fetal weight, incidence of deciduoma or litter size were noted between control and test groups. The 15.6% incidence of deciduomas for the 2% diet as compared to 7.8% for the control was regarded as coincidental since diets containing sclerotia in concentrations of greater than 2% had no significant effect.

TABLE 1

Effects of sclerotia of S. sclerotiorum fed to pregnant rats during gestation.

Percent sclerotia in the diet	Mean food consumption (g/day)	Mean fetal weight (g)	Deciduoma x 100 / total implants	Mean litter size	Mean maternal weight gain (g)
0	19.8	4.9	7.8	11.7	66.5
5	18.3	5.1	3.2	12.0	65.2
1	18.4	4.9	3.7	12.7	60.5
2	18.2	4.8	15.6	10.8	59.4
4	17.1	4.8	7.5	12.4	48.8**
8	14.2*	4.2	7.0	12.8	13.2*

*$P < 0.01$ **$P < 0.05$

A sclerotia content of 8% in the diet affected food consumption and maternal weight gain ($P<0.01$) but 4% affected only maternal weight gain ($P<0.05$). Fetal parameters listed in Table 1 were unchanged with 2% and higher levels but the incidence of delayed ossification as characterized by delayed fusion of sternebrae, sternal apposition and missing sternebrae was 11.4, 12.5 and 27.9% for 2, 4 and 8% diets, respectively. Visceral and histological examination of the fetuses did not reveal any distinct changes.

These observations may be due to a low toxicity, a restricted dietary intake or a combination of both. Reducing the dietary intake by 25% during gestation in the rat, CHOW and LEE (1964) noted stunted and anemic progeny. A 28% reduction (8% diet) in food consumption was associated with a slight loss in fetal weight ($P < 0.1$). The delayed ossification at the 2% dietary level was indicative of a slight fetotoxic effect. This dietary level failed to produce any apparent signs of maternal toxicity.

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