

17216. Experimental Lathyrism in the White Rat and Mouse.*

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One of us (L.) has recently reported studies of the production of experimental lathyrism in the white rat.¹ Of the species studied, the most characteristic symptoms resulted from the ingestion of the seeds of *Lathyrus odoratus* (the flowering sweet pea) while the seeds of *Lathyrus sylvestris Wagneri* (flat pea) were most toxic, since death resulted within a few days and after the consumption of as little as 4 g of the legume. The toxic principle was readily extracted with 30% ethanol in every case.

In the present study, we report observations on the seeds of another species of *Lathyrus*, *Lathyrus latifolius* (the perennial or everlasting pea), commonly grown for its flowers in gardens.[†] The finely ground meal was incorporated into the diet of young male white rats (50-60 g) at the 50% level as in previous experiments.¹ Animals fed the *Lathyrus latifolius* meal diet showed signs of marked intoxication and died in from 3 to 8 days after the beginning of the experiment. A typical protocol in condensed form is presented here. A rat of 70.4 g gained 8 g and consumed 20 g of the diet (*i.e.*, 10 g of the legume) in the first 2 days of the experiment. On the 3rd day, 4.3 g were eaten and on the 3 following days, 0.4 to 1.0 g. Violent convulsions, marked reactions to external stimuli such as tapping the cage with a rod, and partial paralysis appeared on the 5th day and death resulted on the 6th day. A similar picture was presented in 6 other rats which received the *latifolius* meal. The symptoms were sim-

ilar in most respects to those already reported in rats fed seeds of *Lathyrus sylvestris Wagneri*. Control rats fed the edible white pea of commerce (*Pisum sativum*, var. *arvense*) ate well, gained steadily and showed no signs of toxicity. It is evident that this species of *Lathyrus* was more toxic for rats than was any of the other species previously studied in this laboratory except *L. sylvestris Wagneri*. Mr. Roland McKee of the United States Department of Agriculture in a private communication received before the experiments with *Lathyrus latifolius* were undertaken, has stated that "I have always considered this species as very closely related to *L. sylvestris*." It is of considerable interest that the toxicity of *latifolius* is so similar to that of *sylvestris Wagneri*.

Marked variations in the susceptibility of domestic or laboratory animals to *Lathyrus* intoxication have been observed.^{2,3} We have studied in young white mice the effects of the consumption of the seeds of *Lathyrus odoratus*, the species of *Lathyrus* with which most typical symptoms of experimental lathyrism in the young white rat were observed. The diet was similar to that used in previous experiments with rats.¹ However, since the protein requirement of the diet of the smaller animal, the white mouse, is greater than that of the rat, the amount of casein was increased from 10 to 15%, the extra casein replacing an equivalent weight of starch. When young male white mice of 12-15 g weight were fed diets containing 50% of *odoratus* meal, they grew well until a weight of approximately 25-30 g was reached. The increments of weight were in every respect similar to those of pair-fed control mates which received diets containing *Pisum sativum*. The gains per 100

* This work has been made possible by a grant from the Board of Governors of the Horace H. Rackham School of Graduate Studies of the University of Michigan.

¹ Lewis, H. B., Fajans, R. S., Esterer, M. B., Chen, C.-W., and Oliphant, M., *J. Nutrition*, 1948, **36**, 537.

[†] Obtained through the cooperation of Rex D. Pearce of Moorestown, N. J.

² Schuchardt, R., *Deut. Arch. klin. Med.*, 1886-87, **40**, 312.

³ Stockman, R., *J. Pharm. Exp. Therap.*, 1929, **37**, 43.

g of food consumed for the first 20 days were essentially the same, 11.8 and 11.0, respectively. Although the diet was maintained over a period of 17 weeks, no symptoms of lathyrism were observed. Since we were using a new lot of *L. odoratus* peas, we felt it necessary to confirm previous observations of the toxicity of this species for rats. Accordingly, we repeated our previous experiments¹ with the new shipment of sweet pea seed. All the rats developed characteristic experimental lathyrism in from 3 to 6 weeks. In view of the failure of young white mice to exhibit any symptoms of lathyrism on diets containing *odoratus*, it is notable that the mice ate from 71 to 86 g (average 77 g) of diet per 100 g of body weight over a typical 4-day period (17th to the 20th day of the experiment). This consumption was twice that of the young white rats under similar conditions (37.5 g), rats which without exception showed signs of acute lathyrism.

Since white mice fed *odoratus* showed no evidence of toxicity, it was of interest to study the effects of diets containing the 2 species of *Lathyrus*, which had proven to be most injurious to rats, *i.e.*, *Lathyrus sylvestris* *Wagneri* and *Lathyrus latifolius*. Three mice received diets containing 50% *latifolius*. None showed the marked irritability, convulsions or paralysis seen in rats fed this diet, but all lost weight rapidly, decreased the food consumption and died in 5, 10 and 12 days, respectively. Two mice, fed diets containing *lati-*

folius extracted with 30% ethanol as previously described¹ maintained their weight, ate the diet well and survived with no signs of toxicity for 18 days, at which time lack of available legume resulted in the termination of the experiment.

Three mice fed diets containing 50% of *L. sylvestris* *Wagneri* seed lost weight rapidly and died in 4, 6, and 7 days, respectively. Increased irritability and convulsions were observed, but these symptoms were, perhaps, slightly less acute than in young white rats.

It is of some interest to note that Schuchardt² in his classical paper on lathyrism states that *Lathyrus sylvestris* and *Lathyrus latifolius* afford "essbare Samen!"

Summary. 1. Young white mice of 12 to 15 g body weight fed diets containing 50% *Lathyrus odoratus* meal grew well and showed no development of experimental lathyrism in 17 weeks, although young white rats which received a similar diet developed experimental lathyrism in from 3 to 6 weeks. 2. Diets containing *Lathyrus latifolius* meal (50%) were toxic for both rats and mice, death occurring in from 3 to 8 days (rats) and 5 to 12 days (mice). The extraction of seed of *Lathyrus latifolius* meal with 30% ethanol removed the toxic principle. Mice fed the extracted meal survived and appeared normal over a period of 18 days. 3. Mice fed *Lathyrus sylvestris* seed died with symptoms of acute toxicity in 4 to 7 days.

Received May 31, 1949. P.S.E.B.M., 1949, **71**.

17217. Glycogen in Rachitic Cartilage and Its Relation to Healing.*

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The presence of glycogen in cartilage was described almost 100 years ago by Charles Rouget.¹ During the intervening years the feeling has grown that glycogen might have some relation to the calcification process.

Marchand² noted the high glycogen content of hypertrophic cartilage cells in the region of lime salt deposition. Hoffmann *et al.*³ observed that "a striking relationship exists between the disappearance of glycogen in car-

* Aided by a grant from Mead Johnson and Company.

¹ Rouget, C., *J. de la Physiol.*, 1859, **2**, 308.

² Marchand, F., *Virch. Arch.*, 1885, **100**, 42.

³ Hoffmann, A., Lehmann, G., and Wertheimer, E., *Pflüger's Archiv.*, 1928, **220**, 183.