a variety of seeds were ground in distilled water and the resulting slurries centrifuged at $3000\,g$ for 15 min to remove cell debris. Such extracts were mixed with equal volumes of *Tobacco necrosis* virus (TNV) suspensions prepared in $0.06\,M$ phosphate buffer pH 7.0. Inoculations were made immediately onto French bean leaves (*Phaseolus vulgaris* var The Prince) using carborundum as an abrasive. Control plants were inoculated with similar samples of buffered TNV diluted with water.

Activity Quotients were clcaulated for each treatment using the method of Benda[8].

$$\text{Activity quotient} = \frac{\text{Number lesions on treated leaves}}{\text{Number lesions on control leaves}}$$

Each experiment was replicated on at least 2 occasions. Control plants showed between 30 and 40 local lesions per leaf. The Table shows that of the 14 seeds examined 10 reduced the number of local lesions formed on test plants resulting in activity quotients less than unity. Inhibition of lesion number was most marked in the case of *Brassica napus* (Rape.), *Beta vulgaris* (Beet) and *Beta vulgaris* var. *Rapa* (Sugar Beet). Partial reversal of inhibition was brought about by heating the seed extracts to 100 °C for 10 min. No changes in size or rate of lesion development could be detected.

Effects of seed extracts on the local lesion production by *Tobacco necrosis* virus

Seed extract	Activity quotient Unheated extract	Heated extract[a]
Lactuca sativa, L.	2.40	1.10
Lycopersicum esculentum, Mill.	0.33	0.87
Brassica napus, L.	(0)[b]	0.18
Brassica alba, Rabenh.	0.26	0.56
Raphanus sativus, L.	0.80	1.07
Cheiranthus cheiri, L.	0.26	0.40
Papaver orientale, L.	0.60	0.40
Chenopodium amaranticolor, Coste and Reyn.	0.33	0.66
Beta vulgaris, L. (Beet)	0.06	0.41
Beta vulgaris var. *Rapa*, Dumort (Sugar-Beet)	0.11	0.46
Vicia faba, L.	4.00	[c]
Phaseolus aureus, Roxb.	2.00	[c]
Phaseolus vulgaris L. var. 'The Prince'	2.76	2.04
Nicotiana glutinosa L.	0.9	1.0

[a] Such extracts were heated to 100 °C for 10 min. [b] Complete inhibition of lesion formation. [c] Not tested.

Particularly interesting are the results obtained using extracts prepared from *Lactuca sativa* (Lettuce), *Vicia faba* (Broad bean), *Phaseolus vulgaris* (French bean) and from *Phaseolus aureus* (Mung bean). These extracts consistently yielded activity quotients greater than one, suggesting enhancement of virus activity. This enhancement was reduced but not completely eliminated by heating extracts to 100 °C for 10 min. Enhancement or augmentation of virus activity has not previously been described for seed extracts although such a phenomenon has been observed when plant saps were mixed with virus suspensions[8,9].

These preliminary results suggest that some seed extracts contain compounds favourable to virus multiplication – augmenters – as well as inhibitory compounds. It is interesting to note that the seeds of *Lactuca*, *Phaseolus* and *Vicia* known to be frequently involved in virus transmission contain augmenters. The ability of seeds to act as carriers of plant viruses may reflect differences in the concentration or activity of virus augmenters and inhibitors present in seed tissue. Thus virus entering seeds with predominantly augmentative properties would be seed transmitted whereas virus entering seeds with largely inhibitory properties would fail to be transmitted by seed. Further experiments to test this hypothesis and to identify the compounds involved are being undertaken.

Zusammenfassung. An Samen von *Lactuca sativa*, *Vicia faba*, *Phaseolus vulgaris* und *P. aureus* steigerte das Tabaknekrose-Virus Läsionen, hervorgerufen auf den Blättern der *P. vulgaris*. Zehn andere Samenproben widerstanden hingegen der Läsionsbildung.

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The Innervation of the Prothoracic Glands of *Cerura vinula* L. (Lepidoptera)[1]

Preliminary observations have so far not yielded much information on the innervation of the prothoracic glands, because the investigators contradicted one another (Arvy and Gabe[2], Srivastava[3]). Williams[4] and Herman and Gilbert[5] reported innervation of the prothoracic glands on the lepidopterous silkmoth *Hyalophora cecropia* by classical cytological techniques, as did also Scharrer[6] on the cockroach *Leucophaea maderae* in more detailed studies using the electron microscope. Srivastava and Singh[7] found that the prothoracic glands of *Papilio demoleus* are innervated by nerves which form a network of nerve fibres closely surrounding each gland cell.

The prothoracic glands of *Cerura vinula* L. are band-like structures that lie on the large ventral trachea on either side of the oesophagus. By staining the nerves in situ, using the leucomethylene blue nerve staining technique of Zacharuk (cit. Stay and Gelperin[8]), I have found that the glands are not only linked with the prothoracic ganglia and the interganglionic connectives between the prothoracic and the metathoracic ganglia through nerves, but also with the suboesophageal ganglion. The nervous connections with this ganglion are very small and have not been observed to penetrate the gland in methylene-blue preparations (Bückmann[9]).

The nerves can readily be seen to extend along the whole length of the gland, accompanied by small tracheoles.

The ultrastructure of the prothoracic glands of *Cerura vinula* L. (HINTZE-PODUFAL[10]) shows that a relatively thin and fibrous basement membrane surrounds the cells and forms deep identations. This basement membrane also surrounds the nerves. The cell membrane of the nerve cells forms deep infoldings which separate areas containing different kinds of axons (Figure 1), and the basement membrane penetrates deeply into this folds.

Some nerves penetrate into the central region and others seem to be confined to the periphery. Their branches split into individual axon groups and near the synaptic regions the basement membrane tapers off rapidly (Figure 3).

The nerves found in the prothoracic glands of *Cerura vinula* are composed of ordinary axons, axons containing neurosecretory granules and glia cells. The glia cells form a network of processes which penetrate between the neurosecretory cells and also surround the nerves (Figure 2). Frequently granula-containing axons lie adjacent to the basement membrane with no glia element between them and the stroma (Figure 2).

One of the significant findings during the ultrastructural study of the prothoracic glands in the larvae of the last instar was the observation of the neurosecretory granules in some axons. These granules resemble those of other neurosecretory cells (for example DE ROBERTIS[11]). They consist of a homogeneous matrix surrounded by a unit

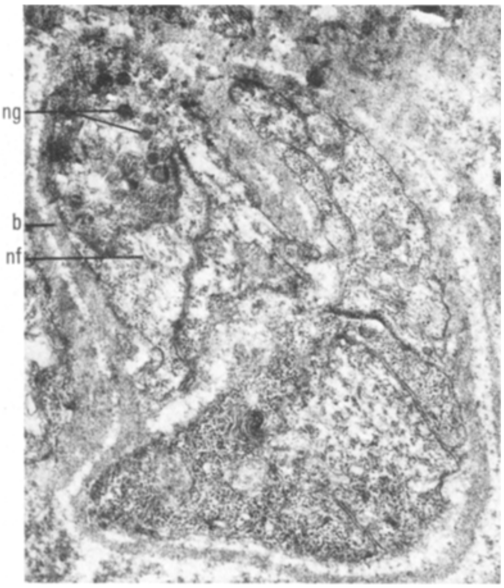

Fig. 1. Neurosecretory axon, showing deep cell membrane infoldings. b, basement membrane; nf, neurofilament; ng, neurosecretory granules.

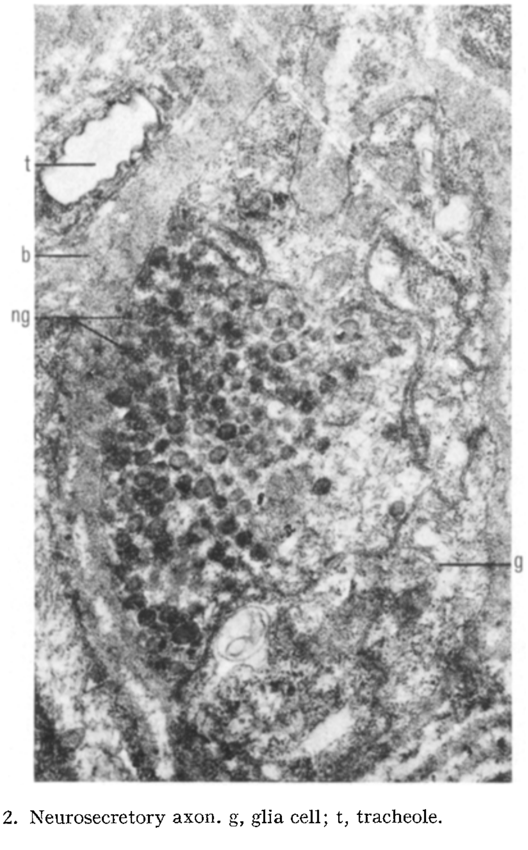

Fig. 2. Neurosecretory axon. g, glia cell; t, tracheole.

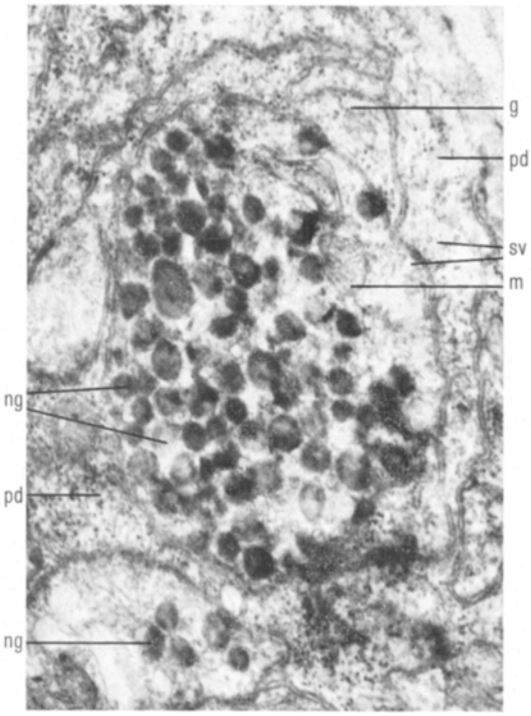

Fig. 3. Neurosecretory axon. m, mitochondrium; pd, prothoracic gland cell; sv, synaptic vesicles.

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membrane and one may classify them into 2 types: electron-dense particles and electron-transparent ones, both types with a diameter of 700–1900 Å (Figures 1–3). The first type seems to predominate. Occasionally neurofilaments occur in the nerves (Figure 1) and the neurosecretory axons make intimate contact with the gland cells at the synaptic regions (Figure 3). The presynaptic part is distinguished by the presence of an accumulation of small vesicles and a few similar vesicles may be found near the synapse in the postsynaptic cytoplasm. Perhaps this facilitates the control of the activity of the glands by means of neurohormonal and neural transmitter substances.

The facts that the prothoracic glands of *Cerura vinula* L. are innervated by nerves that contain neurosecretory granules and show synaptic contacts with the gland cells, makes a direct hormone delivery to the gland cells highly probable.

Zusammenfassung. Die Prothoraxdrüsen von *Cerura vinula* L. werden von Nerven innerviert, deren Axone neurosekretorische Grana enthalten und ausserdem in synaptischer Verbindung mit den Drüsenzellen stehen. Diese beiden Tatsachen sprechen für eine *direkte* Aktivierung der Prothoraxdrüsen durch Neurohormone.

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Three Probable Cases of Parthenogenesis in Lizards (Agamidae, Chamaeleontidae, Gekkonidae)

Neither parthenogenesis nor triploidy has previously been reported in the infraorder Iguania, comprising the families Iguanidae, Agamidae, and Chamaeleontidae. During a study of agamid karyotypes certain butterfly lizards, *Leiolepis belliana* Gray, possibly from northern Malaysia, were found to be apparently triploid parthenogenones while others from Thailand were diploid and bisexual. Literature surveys revealed two other previously unsuspected cases of lizard parthenogenesis; one in the Chamaeleontidae and the other, which probably involves triploidy as well, in the Gekkonidae.

The *Leiolepis* examined were imported from animal dealers in Bangkok (Thailand) and Singapore by Richard R. Ross. The Singapore dealer told Dr. Ross that his *Leiolepis* came from near the Malaysia-Thailand border. These will subsequently be called the 'Singapore' *Leiolepis*. The 'Bangkok' specimens probably came from Tak province in northern Thailand, according to the dealer who supplied them.

Karyotypes were made from testis, spleen, or bone marrow by air- or flame-drying hypotonically pretreated, 3:1 methanol-acetic acid fixed cell suspensions[1–3]. The lizards were injected with Velban or colchicine to arrest mitoses 2–8 h before preparation. Slides were stained with 1% or 2% aceto-orcein. The 'Singapore' *Leiolepis* were in poor condition when karyotyped and provided about 20 mitotic figures each, while many figures were examined from each 'Bangkok' specimen.

The 5 'Bangkok' *Leiolepis* karyotyped (2 ♂♂, 3 ♀♀) all had the probably primitive 36 chromosome pattern typical of many lizards (Figures 1, a and 2), including at least some members of each of the 3 iguanian families (Iguanidae[4–8], Agamidae[4,8], Chamaeleontidae[4,9,10]). Each of the 13 'Singapore' females examined had karyotypes of about 54 chromosomes (Figure 1, b) readily interpreted as triploid. 18 macrochromosomes were present in all cells examined from each 'Singapore' specimen, and at least some cells in most had the expected 36 microchromosomes, although these were difficult to count because of their large number and small size. Usually 1 chromosome of the largest trio (I in Figure 1, b) in most of the triploid figures is differentiated by very conspicuous secondary constriction, which may be the nucleolus organizer (*n* in Figure 1). This differentiation is probably a developmental phenomenon, reported for some mammals[11], but it might result from a clonal chromosomal polymorphism. There were no indications of sex chromosomal heteromorphism in any of the karyotypes.

Constant triploidy almost always requires parthenogenetic reproduction[12] and is usually taken as presumptive evidence for it. In support of this conclusion, all 33 'Singapore' *Leiolepis* obtained were female. The probability of randomly collecting 33 females and no males from a bisexual population is about 1 in 10^{10}, assuming an equal ratio and random distribution of the sexes.

Although no theory requires parthenogenesis to have a hybrid origin[12,13], most lineages of parthenogenetic vertebrates are thought to have originated as interspecific hybrids, with triploid clones deriving from backcrosses between diploid parthenogenones and males of related bisexual species (see Maslin[14] and Schultz[15] for references). One possible exception to the hybrid origin scheme is the parthenogenesis of certain Amazonian populations of *Cnemidophorus lemniscatus*, where there

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