Oak leaf roller males were caught in all traps including those baited with known sex attractants of other moths, i.e. *cis*-9-tetradecenyl acetate[9] and *cis*-11-tetradecenyl acetate[10]. However, synthetic *cis*-10-tetradecenyl acetate caught 3 to 6 times more oak leaf roller males than either of the known attractants after subtracting the number of males trapped in the blank. The sizable number of males caught in the blank was expected due to the large numbers of males randomly flying in the test areas, and the attraction of males by pheromone producing females which had been caught in the traps.

In summary, *cis*-10-tetradecenyl acetate is a major component of the chemical message which attracts oak leaf roller males to their mates. To our knowledge, this is the first reported identification of this compound in an insect. Large scale synthesis of this attractant will enable extensive field testing and subsequent analysis of its potential as an effective control for the oak leaf roller. Further chemical analyses of the female extracts for additional chemical messengers including sexual excitants are being conducted[11].

Zusammenfassung. Weibchen der Oak Leaf Roller, *Archips semiferanus* Walker, benutzen ein Geschlechtspheromon, um die Männchen der Art zur Paarung zu locken. Ein Lockstoffbestandteil im Pheromon wurde von den Bauchextrakten der Weibchen isoliert und als *cis*-10-Tetradecenyl-Acetat, eine in Insekten bisher unbekannte Verbindung, identifiziert. Fangversuche im Freien mit dem synthetischen Pheromon bestätigten seine Rolle als Lockstoff.

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Hypogravity-Induced Inhibition of CO_2 Production from Amino Acids in Higher Plants

The effect of hypogravity on the growth and physiology of higher plants has been simulated by means of the horizontal rotation of the plant on a clinostat[1]. The appearance of leaf epinasty has been the only criterion utilized for determining when hypogravity has affected the normal physiology of the plant. We have been investigating the effect of simulated hypogravity on the metabolism of certain amino acids in higher plants. L-proline-U-^{14}C was infiltrated by use of a wick[2] into 50-day-old marigold plants (*Tagetes patula*) mounted on vertical and horizontal clinostats rotating at 4 rph (revolutions per h). Normal plants were similarly infiltrated. After 24 h of incubation the various tissues of the plants were extracted with aqueous ethanol and the free amino acid fraction examined by two-dimensional paper chromatography and radioautography. A major radioactive constituent in every case was γ-aminobutyric acid. Since the conversion of proline to glutamate is a well-known route of proline metabolism[3], the presence of an active glutamate decarboxylase was indicated.

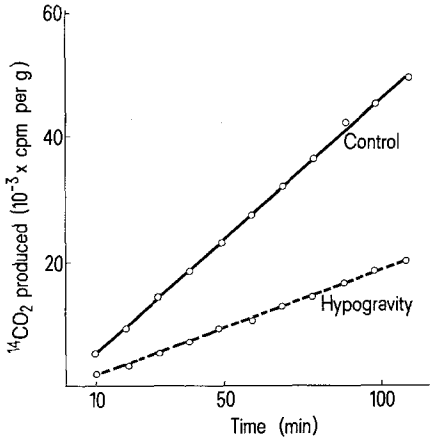

Fig. 1. The production of $^{14}C_2O$ from control plants compared to those rotated on horizontal clinostats after infiltration of 5 µCi of L-glutamic acid-U-^{14}C (specific activity 175 mCi per mmole). 42-day-old plants were rotated on the clinostats for 4 days before infiltration. The results are given on a fresh weight basis.

The in vivo conversion of L-proline-U-^{14}C to $^{14}CO_2$ in normal and hypogravity plants under continuous illumination was then measured and compared with plants similarly treated with L-glutamic-U-^{14}C and others with L-valine-U-^{14}C. Marigold plants (var. Petite Gold), between 30 to 50 days old, were mounted on horizontal clinostats rotating at a speed of 15 rph and left for at least 4 days. Control plants were rotated on vertical clinostats. The labelled amino acid was injected into the stem of the plant at the desired time by means of a syringe. Immediately after the injection the plants were placed in clinostat gas exchange chambers mounted on the clinostats. The chambers were swept with compressed air from a cylinder. The air passing over the plant was bubbled through 5 ml of a 1 *M* solution of hyamine hydroxide so as to trap the released $^{14}CO_2$. The trapping solution was replaced every 10 min with fresh hyamine. Aliquots of the hyamine solutions were mixed in 10 ml Bray's solution[4] and then assayed for radioactivity in a liquid scintillation counter. At the conclusion of the experiment the plants were cut just above the point of label application and weighed.

The results of Figures 1 and 2 demonstrate very clearly that $^{14}CO_2$ production is much higher in the control plants than in those subjected to hypogravity. Since

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the same result was obtained with valine as the infiltrated amino acid, the phenomenon is apparently not unique to the glutamic acid family of amino acids. The effect of hypogravity seems to be greater in the case of glutamic acid than the other amino acids tested both in magnitude and in the linear output immediately after treatment. It was not necessary to subject the plants to hypogravity for any length of time in order to produce the effect. If normal plants were infiltrated with labelled glutamate and placed on horizontal clinostats, a decrease in $^{14}CO_2$ evolution was noticed at the first period of measurement 10 min later. The total time required for the injection and mounting on the clinostat to the first measurement required 30 min. Under our conditions this appears to be ample time for the substrate to permeate the symplast. Considering the short time involved and the anticipated dilution of the infiltrated amino acid by the endogenous pool, the amount and rapidity of breakdown is considerable.

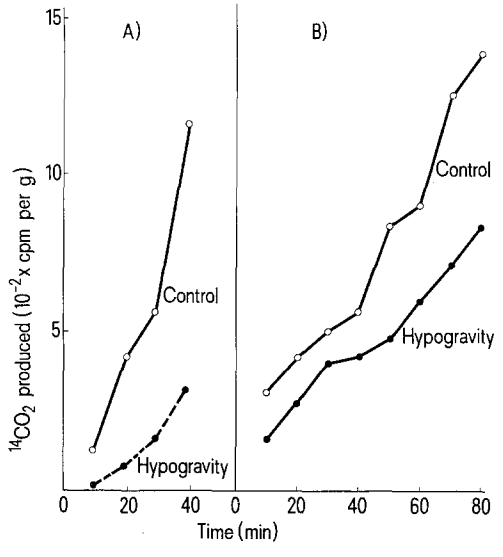

Fig. 2. Comparison of $^{14}CO_2$ produced from control and hypogravity plants after infiltrating (A) 5 µCi L-proline-U-^{14}U (specific activity 198 mCi per mmole) and (B) 4 µCi L-valine-U-^{14}C (specific activity 218 mCi per mmole). The results are expressed on a fresh weight basis.

These results indicate that decarboxylating systems are sensitive to hypogravity effects and might offer a good index for future studies on the effects of hypogravity on cellular metabolism. The results could be due to effects on the enzymes themselves or the physical processes involved in the transfer and release of the gas. The production of ethylene, also a gas, in tomato plants was markedly enhanced by hypogravity[5], in contrast to our results with $^{14}CO_2$. This suggests the possibility that the enzymes involved in the metabolism of glutamic acid or their regulation under hypogravity conditions may be modified from that in the normal plant. Based on certain theoretical considerations, AUDUS[6] has calculated that if only a slight displacement of particles is required for gravity perception, then mitochondria can move through a distance of their own diameter in 6 min. Such movement or lack of movement could transform the internal cellular environment rapidly enough to obtain the results presented in this report.

Zusammenfassung. L-Glutamat-U-^{14}C, L-Prolin-U-^{14}C und L-Valin-U-^{14}C wurden in Ringelblumen (*Tagetes patula*) injiziert, die sich in einer Gasaustauschkammer befanden, und auf senkrechte und waagrechte Klinostaten montiert. Menge und Bildungsgeschwindigkeit des entstehenden $^{14}CO_2$ waren stets geringer in den schwerkraftkompensierten als in den unter normalen Bedingungen gehaltenen Pflanzen.

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Chromosomes of the African Ground Squirrel, *Xerus rutilus* (Rodentia: Sciuridae)

African ground squirrels of the genera or subgenera *Atlantoxerus*, *Euxerus*, *Geosciurus*, and *Xerus* are generally agreed to constitute a distinct group, of at least tribal rank, within the subfamily Sciurinae[1–4]. However, their relationships to other ground squirrels (*Spermophilus*) of the tribe Marmotini, and to the long-toed ground squirrel (*Spermophilopsis leptodactylus*) of Middle Asia, are not clearly understood. The present report describes the Giemsa-band patterns of the chromosomes of *Xerus rutilus*, compares them with the chromosomes of *Spermophilopsis* and *Spermophilus*, and evaluates the relationships between these genera.

Materials and methods. Seven specimens of *Xerus rutilus* (Cretzschmar) (2♂♂, 5♀♀) were collected at Lake Baringo, north of Nakuru, Kenya, Africa. Chromosomes were analyzed from cell suspensions of femoral bone marrow[5]. Skin biopsies grown in tissue culture by Dr. T. C. HSU, M. D. Anderson Hospital, Houston, Texas, were utilized for analysis of Giemsa banding patterns by the method of SEABRIGHT[6].

Results. *Xerus rutilus* had a $2n = 38$ and karyotype composed of 14 metacentrics, 20 submetacentrics, 2 acrocentrics with prominent satellites, a medium-sized submetacentric X and a minute biarmed Y chromosome (Figure 1). The karyotype of *X. rutilus* is indistinguishable from that reported for *Spermophilopsis leptodactylus*[7,8]. A schematic representation of G-bands from *X. rutilus* is depicted in Figure 2. Comparison of these G-bands with

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