ever, in the light of report of such rats from Asia, the postulate of YOSIDA et al.[5] looks rather premature. Whatever may be the possible mode of their dispersal to Oceania and the New World or Europe, it appears that the presence of such rats in Asia may not be only an outcome of any migration but one of the finalities achieved in the process of karyotype evolution in the main land of its origin.

Note added in the proof: A number of reports on 2n = 38 *R. rattus* from different parts of the world have appeared since the acceptance of this paper[15-19]. Recently YOSIDA and SAGAI[20] have also reported a $2n = 38$ for *R. r. rufescens* trapped in India.

Zusammenfassung. Chromosomen von 12 Männchen und 12 Weibchen von *Rattus rattus wroughtoni* sowie 2 Weibchen von *Rattus rattus* wurden untersucht und es wurden überall 38 Chromosomen gefunden, verursacht durch Robertsonische Verbindung von 4 akrozentischen Paaren von *Rattus rattus* mit 42 Chromosomen.

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Control of Selectivity and Ion Fluxes in Bean Hypocotyls

Among the various processes involved in transport of ions from the xylem sap into shoot tissues, special attention was usually given to the 'filtering' of sodium out of the sap and to the consequent reduction is sodium transport into the upper parts of shoots[1-8]. However, although this phenomenon was widely described, very little is actually known of the mechanisms which control it. From the little information we have, it seems that the mechanisms which generate ion transport in bean hypocotyls are distinct and differ from those which control selectivity[9]. Rubidium, as well as most of the sodium, is transported into hypocotyl slices by means of a non-metabolic process which is unaffected by temperature changes. On the other hand, selective accumulation of sodium is temperature-dependent and is practically abolished under low temperature conditions. In most of the cases reported, the processes governing transport and selectivity were characterized by their responses to environmental conditions. In the following investigation, attempts were made to clarify what effects various plant organs have on ion uptake and ion selectivity by excised bean hypocotyls.

Bean plants (*Phaseolus vulgaris* c.v. Brittle wax) were used in the following experiments. Seeds were soaked in water, germinated, and seedlings were grown and treated as described previously[9]. Roots, cotyledons or buds were

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Effect of excision of various organs on uptake of sodium and rubidium by bean hypocotyl slices

Uptake solution Treatment	1 m*M* NaCl	1 m*M* RbCl	0.5 m*M* Na*Cl + 0.5 m*M* RbCl	0.5 m*M* Rb*Cl + 0.5 m*M* NaCl
a)				
Control	0.055 ± 0.005	0.018 ± 0.004	0.023 ± 0.004	0.008 ± 0.002
Roots excised	0.033 ± 0.004	0.018 ± 0.003	0.017 ± 0.003	0.010 ± 0.002
b)				
Control	0.057 ± 0.005	0.024 ± 0.002	0.023 ± 0.005	0.009 ± 0.003
Cotyledons excized	0.057 ± 0.005	0.016 ± 0.005	0.026 ± 0.003	0.007 ± 0.001
c)				
Control	0.049 ± 0.007	0.027 ± 0.004		
— roots	0.033 ± 0.009	0.024 ± 0.003		
— cotyledons	0.058 ± 0.005	0.019 ± 0.0005		
— buds	0.051 ± 0.007	0.019 ± 0.002		
— cotyledons and buds	0.047 ± 0.004	0.018 ± 0.003		

Data denote non-exchangeable fraction in µmol/g fresh wt. ± SD; 30°C.

removed 24 h prior to the experiment. During this period the remaining plant was left under the same conditions as the controls. ^{22}Na and ^{86}Rb were used for labelling NaCl or RbCl solutions.

Results of 3 representative excision experiments are summarized in the Table. As may be noted excision reduced the final total ion content of the sliced hypocotyls. Removal of roots and removal of cotyledons had also an apparent effect on the selective properties of hypocotyls. Removal of roots 24 h prior to the experiment negatively affected the uptake and final content of ^{22}Na, but did not affect or even slightly accelerated the uptake of ^{86}Rb (Table a)). On the, other hand, a decrease in uptake rates of rubidium was observed in plants from which cotyledons were removed (Table, b)). Excision of buds alone, or excision of buds and cotyledons exerted similar effects on the rates of rubidium uptake (Table, c)).

Similar trends, i.e. inhibition of sodium uptake following root excision and inhibition of rubidium uptake following excision of cotyledons, were observed in pure NaCl or RbCl solutions as well as in mixtures.

Excision of cotyledons did not affect the uptake or alter the content of sodium by hypocotyls when solutions of low NaCl concentrations were used. In treatments where high NaCl concentrations were used (> 10 mM) a slightly lower accumulation was observed.

The ratio of uptake at 30 °C to uptake at 0°C was approximately 1.1 for sodium, as well as for rubidium, and was unaffected by excision. The process is thus presumably non-metabolic.

Selective uptake of ions is considered to be one of the very basic characteristics of the living cell, and a constant expenditure of metabolic energy is needed for its preservation. However, very little is known of the specific mechanisms or structures which contribute to this phenomenon. Bean hypocotyls are distinct among plant tissues in exhibiting an apparent preference for uptake of sodium ions, which exceeds by far the uptake of most other monovalent cations. Such selectivity seems to be part of a certain salt-evading mechanism which prevents in various plant species sodium ions from moving from the roots, across the hypocotyls into the upper shoot tissues[1–9]. Explanations of this phenomenon have mostly been attempted at the cellular level, and differences in selectivity were often ascribed to tissue characteristics, as well as to ionic constitution of the medium. However, plants do not constitute only a union of independent tissues, but comprise one inter-correlated system. Thus, the idea that ion uptake by bean hypocotyls is affected by the status of adjacent organs and that removal of one organ may alter selectivity of another one seemed most attractive. Unfortunately, only little is known of the effects of one organ on ion metabolism and behaviour of another one. Excision of plant tops reduced the total capacity of bean hypocotyls to accumulate ions. However, such reduction was not uniform and some ions were affected more than others. A similar phenomenon was described already by WENT[10,11] who suggested that hormones play a major role in the direction of nutrients within the plant body. Data obtained by other investigators also support his assumption. For example, it was shown[12–15] that phosphorus was preferentially moved into regions with a high content of auxin. Decapitation of plants caused, after 5 days, a shift in the normal content of nitrogen, phosphorus and potassium in the internodes, and in the lateral buds below the point of decapitation.

Control of selectivity can also be obtained by certain levels of growth substances moving down or up the plant axis[16–18]. Presence of various regulating substances or different levels of one substance may affect uptake of various ions either by changing the uptake capacity or by altering the retention capacity of the tissues.

Nothing specific on such effects is known at present. It is tempting to assume that changes in sodium content of hypocotyls are due to a lower uptake capacity and are caused by the removal of the source of cytokinins or gibberelins. Removal of buds and cotyledons, which affect rubidium accumulation may result from a disturbed auxin supply. Nevertheless, attempts to induce such changes by substitution of the organs by external sources of growth substances have failed, and the percise identification of the affector remains open. Ecologically, the meaning of such a finding is that disturbances in root growth permits a faster transport of sodium across the hypocotyl into the leaves and causes an earlier tocixity of sodium.

Zusammenfassung. Werden bei Hypokotylen von Bohnenkeimlingen die Wurzeln abgeschnitten, so beeinflusst das die Schnelligkeit der Absorption von Natrium, aber nicht diejenige von Rubidium. Abschneiden der Kotyledonen oder der Knospe beeinflusst die Absorption von Rubidium, nicht aber diejenige von Natrium. Kalzium hatte keinen Einfluss auf solche Unterschiede.

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Wood Quality of Eight *Eucalyptus* Species in Zambia

In its afforestation programme, Zambia introduced more than a dozen *Eucalyptus* species from Australia to test for their survival, adaptability and performance in Zambian environments. Equally important is to investigate their wood qualities such as density and fibre lengths which affect mechanical and utilization properties and suitability of timber for pulp and paper production. Reports on wood quality of *Eucalyptus* species grown in other countries are available (BOYD and KINGSTON[1], DADSWELL et al.[2] and RUDMAN et al.[3]) but little is known about between- and within-tree variation in density and fibre length in Zambia.

Material and methods. 4 trees, 6.5 years old, were sampled in each replication from 8 *Eucalyptus* species