significantly, without altering the a/b ratio and is in conformity with previously reported observations. The possibility of decrease in chlorophyll contents during water stress, according to Meyer et al., could be not only due to inhibition of chlorophyll synthesis but also to accelerated disintegration of chlorophyll already present. The inhibition of chlorophyll synthesis may be due either to the blocking of protochlorophyll forming mechanism or to protein loss. A significant lowering of the pigments a and b, and apparently total pigment, was also observed in the distal leaflets of the wilted plants compared to the respective proximal ones of the wilted plants. The present study thus shows that water stress results in considerable decrease in the leaf chlorophyll, particularly from the distal leaflets of groundnut plants.

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Dept. of Botany, A. Jayarami Reddy.
S.V. University College, I. M. Rao.
Tirupati, October 23, 1968.

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RESISTANCE OF RHIZOBIA TO ANTIBIOTICS

In certain areas antibiotic production in the soil appears to be a major factor in legume establishment. This would also mean that certain antibiotics, if produced in situ by soil micro-organisms, will be inimical to the establishment and biological activity of Rhizobium. Reports on the reaction of rhizobia toward antimicrobial agents are few.

The present note reports the relative sensitivity of five rhizobial species to four antibiotics. R. meliloti *(Medicago sativa)*, *R. leguminosarum* *(Pisum sativum)*, *R. phaseoli* *(Phaseolus mungo)*, *R. japonicum* *(Glycine max* and *R. sp. (cowpea group) (Phaseolus aureus)* among rhizobial species and graded concentrations of sodium penicillin G (Squibb), streptomycin sulphate (Merck, Sharp and Dohme), chloramphenicol (Park-Davis) and terramycin (Pfizer) among antibiotics were used. Resistance or sensitivity was determined by double-layer plate count method at each concentration level in yeast extract-mannitol agar medium.

Table I shows that while *R. meliloti* was fairly resistant to high levels of penicillin (LD > 100 µg./ml.), *R. phaseoli* was sensitive above 5 µg. drug/ml. Concentrations above 25 µg./ml. were lethal to *R. leguminosarum* and *R. sp.* and above 10 µg./ml. to *R. japonicum*. Streptomycin was lethal to *R. leguminosarum* and *R. phaseoli* at concentrations above 0·1 µ./ ml., whereas the LD for *R. japonicum* and *R. sp.* was found to be above 0·5 µg./ml. and for *R. meliloti* above 5 µg./ml. (Table I).

*R. leguminosarum* and *R. phaseoli* were highly resistant to chloramphenicol (2000 µg./ ml.). However, the drug was lethal to *R. phaseoli* at concentrations above 25 µg./ml. *R. japonicum* and *R. sp.* were, however, resistant up to 250 µg. drug/ml. (Table I).

While *R. japonicum* and *R. sp.* were resistant up to 10 µg. terramycin/ml. (34·5% survival), concentrations above 0·05 µg. were lethal to *R. phaseoli*, above 0·2 µg. to *R. meliloti* and above 0·5 µg. to *R. leguminosarum* (Table I).

### Table I

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th><em>R. meliloti</em></th>
<th><em>R. leguminosarum</em></th>
<th><em>R. phaseoli</em></th>
<th><em>R. japonicum</em></th>
<th><em>R. sp.</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin</td>
<td>&gt; 100</td>
<td>&gt; 25</td>
<td>&gt; 5</td>
<td>&gt; 10</td>
<td>&gt; 25</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>&gt; 5</td>
<td>&gt; 0·1</td>
<td>&gt; 0·1</td>
<td>&gt; 0·5</td>
<td>&gt; 0·5</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>&gt; 2000</td>
<td>&gt; 2000</td>
<td>&gt; 25</td>
<td>&gt; 250</td>
<td>&gt; 250</td>
</tr>
<tr>
<td>Terramycin</td>
<td>&gt; 0·2</td>
<td>&gt; 0·5</td>
<td>&gt; 0·05</td>
<td>&gt; 10</td>
<td>&gt; 10</td>
</tr>
</tbody>
</table>
Although the application of antibiotics in relation to the classification of micro-organisms has been indicated, it will be rather unsafe to use this criterion in the case of Rhizobium.

We are grateful to Dr. W. V. B. Sundara Rao for his interest and to Dr. R. B. Rewari for the Rhizobium cultures. One of us (C. L.) is grateful to the Director, Indian Agricultural Research Institute, for awarding a Fellowship during the tenure of this work.

Division of Microbiology, C. L. Chopra.
G. S. Venkataraman.
I.A.R.I., New Delhi-12.
October 23, 1968.

2 Davis, R. J., /. Bact., 1962, 84, 187.

A NOTE ON DRECHSLERA ROT OF TOMATO

During September–December 1965, the authors observed a severe storage rot of tomato fruits in the local vegetable market. Consistent isolations from the diseased fruits invariably yielded Drechslera australiensis (Bgn.) Subram. and Jain, which was confirmed from Commonwealth Mycological Institute, Kew, England. The culture has been deposited at C.M.I., Kew, as No. 13182 and in the Botany Department, University of Allahabad. It was found to be pathogenic as it fully satisfied Koch’s postulates. No species of this genus has so far been reported on fruits of Lycopersicon esculentum Mill from any part of the world, hence it appears to be a new host for the above organism.

Symptoms.—In the beginning small chasangular black seedling lesions are produced by the pathogen. They are circular and water soaked. Subsequently they enlarge from the point of infection, become darker and develop black-coloured spore masses of the fungus. The junction between the diseased and healthy tissue remains clearly defined (Fig. 1). The size of the spots in older fruits increases and the decay penetrates deeply into the flesh. Only injured fruits can be infected by the organism as uninjured fruits failed to develop any symptoms.

The fungus grows well on Asthana and Hawker’s Medium ‘A’ at 25°C ± 1°C. In culture the mycelial colony is white but becomes grey at maturity. Hyphae are septate, 2–6 μ, conidiphores are straight or curved, septate; conidia are mostly 4-celled (3-septate), light grey in colour and measure 8–75 × 5–3–7 μ.

Extensive cross-inoculations were carried out and it was observed that the organism could infect the fruits of guava (Psidium guajava L.), brinjal (Solanum melongena L.), mango (Mangifera indica L.), apple (Pyrus malus L.), banana (Musa paradisiaca L.), chilli (Capsicum annum L.), bean (Dolichos lablab L.), pea (Pisum sativum L.) and radish (Raphanus sativus L.). It, however, failed to infect orange (Citrus aurantium L.), emblic myrobalan (Phyllanthus emblica L.), carambola (Averrhoa carabola L.) and tubers of potato (Solanum tuberosum L.). Suitable control were maintained in all the cases.

We are grateful to Dr. M. B. Ellis of C.M.I., Kew, England, for the help in final identification of the fungus and to the Ministry of Education for the award of a Scholarship to one of us (I. J. K.).