is to become widespread, attention must be given to the Mn status of the treated plants.

It is of interest to note that another chelating agent applied to soil about coffee bushes greatly increased yields, supposedly by correcting a Mn toxicity.1 De Kock and Mitchell2 have shown that some Fe chelates resulted in decreased contents in plants of the divalent heavy metals Co, Ni, Zn, and Cu.

The Fe chelate of ethylenediamine di-(0-hydroxyphenylacetic acid) (EDDHA) reduced the uptake of various sources of Mn (including chelates) by soybean plants in solution culture. This effect is different from at least some other Fe chelates. The Mn chelate of EDDHA was readily absorbed in the presence of the other Fe sources used. A small yield increase obtained for FeEDDHA over FeSO4 was not obtained for MnEDDHA over MnSO4.—ARTHUR WALLACE, Associate Professor of Subtropical Horticulture, University of California, Los Angeles.

The effects of surface soil fertilization on the yields of most crops have been studied widely and the results are well tabulated. On the other hand, little is known about the effects of this fertilization upon the depth and extent of root penetration and proliferation.

The Jordan soil fertility plots at Pennsylvania State University offer an opportunity of obtaining some information on the effects of 76 years of surface fertilization on root depth of crops in a Hagerstown silt loam. Immediately following the oat harvest in 1956, a minimum of 5 comparable soil cores were taken with the 4-inch Kelley coring machine to depths from 31/2—5 feet from some of these plots of the unlimed tier receiving key fertilizer treatments. (It was necessary to discard data from many cores in order to obtain rather comparable rock-free soil profiles.) A seeding of red clover had been made in the oats and was making good growth at sampling time on most plots. The samples were broken down and the depth of rooting and extent of root proliferation observed.

The depth of root penetration in the cores is shown in the following table:

<table>
<thead>
<tr>
<th>Treatment*</th>
<th>Average of 5 cores</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check</td>
<td>28.4</td>
<td>24—34</td>
</tr>
<tr>
<td>PK</td>
<td>31.8</td>
<td>26—35</td>
</tr>
<tr>
<td>2N(SN)PK</td>
<td>28.2</td>
<td>26—31</td>
</tr>
<tr>
<td>3N(AS)PK</td>
<td>30.0</td>
<td>26—34</td>
</tr>
<tr>
<td>10 T manure</td>
<td>27.0</td>
<td>23—30</td>
</tr>
<tr>
<td>C.V.</td>
<td>12%</td>
<td></td>
</tr>
</tbody>
</table>

* Nitrogen (N) was applied at the rate of 24 pounds per acre as sodium nitrate (SN) or ammonium sulfate (AS). Phosphorus (P) was applied at 47 pounds P2O5 per acre as superphosphate. Potash (K) was applied at 100 pounds K2O per acre as muriate of potash. These amounts were broadcast for the corn and wheat only in a 4-year rotation.

At the time of collection of the samples, the red clover roots had not penetrated to as great a depth as had the oat roots.

The principal observations made are:

1. No marked differences were observed in depth of oat root penetration as a result of 76 years of different surface fertilization under the same management system. The average depths varied from 27.0 to 31.8 inches.

2. There was a trend towards shallower rooting on the manured plots, and somewhat deeper rooting on the plots receiving only phosphate and potash fertilizers.

3. The range of depth of rooting was relatively uniform on most plots irrespective of treatment—the range was 23 to 30 inches on the manured plot to 26 to 35 inches on the PK plot.

4. In the subsoil horizons, the roots tended to follow old root or worm channels or structural planes that have been partially filled with soil higher in organic matter than the surrounding soil.

5. There was considerable reduction in the number of oat or red clover roots in the 6- to 14-inch platy structure zone, but once the roots penetrated this zone, there was more branching of the roots underneath. The roots which penetrated the platy structure zone did so primarily along structural faces or old channels.—W. V. CHANDLER, Soil Scientist, Eastern Soil and Water Management Research Branch, ARS, and Associate Professor of Soil Technology, Pennsylvania State University.

1 Joint contribution from the Eastern Soil and Water Management Research Branch, ARS, USDA in cooperation with the Pennsylvania Agr. Exp. Sta. Published with approval of the Director as Journal Series No. 2198. Received September 20, 1957.

YIELD AND QUALITY OF SPRING WHEAT VARIETIES GROWN AS WINTER ANNUALS UNDER WINTER IRRIGATION3

REPORTS show that spring grains have been grown in the Southwest for several years.2 Wahhab and Hussain4 found that spring wheat can be grown as a winter annual in West Pakistan. Wilson5 reported that Early Baart wheat produced excellent soft wheat flour. Bryan and Pressley6 selected lines of Early Baart wheat that produced flour suitable for bread making when grown under irrigation. However, precise information is lacking relative to the yield and quality of spring wheat grown in the warm, irrigated areas of the Southwest. Since the cotton acreage allotment has necessitated that farmers seek new cash

1 Contribution from the Arizona Agricultural Experiment Station, University of Arizona, Tucson, Arizona. Published with the approval of the Director of the Arizona Agricultural Experiment Station as Journal Article No. 438. Received October 9, 1957.


5 Wilson, M. E. Physical and chemical properties of Arizona early baart wheat correlated with its baking strength. Thesis (M.S.), University of Arizona.