Rapida

. . . a new oat crop for California

C. A. SUNESON · J. T. FEATHER

RAPIDA, A NEW OAT VARIETY, features quicker development than any other normally winter-sown feed grain (barley, oats, wheat or rye). Considered more a "new crop" than a new variety, Rapida came from a double hybridization of a cultivated oat variety with the wild oat, *Avena fatua* L. In the Davis area, it has been planted July 1 and harvested (mature grain) early in September—suggesting the possibility of growing three successive crops in some parts of California.

Rapida should be useful in many special situations: in near-desert areas farmed without irrigation, because of its drought resistance; where double cropping under irrigation will give an alternate crop choice; where a short-term cover crop or a quick pasture is needed; for a salvage crop after flooding; or for habitually late-planting operations. When sown during the summer, Rapida has matured in 70 to 75 days. Under "optimum conditions"—with more time to grow—Sierra or Curt oats have been more productive than Rapida.

The extreme earliness of Rapida oats resulted from a double crossing to selections of wild oats by utilizing an out-crossing technique under development since 1949 to circumvent the usual difficulties in developing oat hybrids. Core features of the out-crossing technique were the use of cultivated types of monosomic oat females (with both a missing chromosome, and partial self-sterility) and direct application of wild oat pollen (without emasculation). In the succeeding generation, the desired hybrids from wild oats comprised about half of the offspring and were readily identifiable.

Rapida is an F_3 generation selection made in 1961. It shows none of the weedy traits typical of wild oat. Its grains are white with an awn on the primary floret of each spikelet. The grains thresh mostly in a manner to be classed as *Avena sativa* L. Height, straw strength, leafiness, shattering, and test weight are all average. Tillering is relatively poor. There is built-in protection from crown and stem rust and BYD virus. There is no seed dormancy.

Low tillering characteristics are associated with the rapid development of the variety and heavier seeding rates are necessary. However, although frost generally damages Rapida less than comparably developed barley or wheat, early winter planting will often result in flowering in the frost period—in which case, seeding rates of less than 40 lbs of seed per acre are recommended. This seeding rate will delay maturity and also will spread the flowering of the tillers on each plant. Quick development of the variety generally helps avoidance of drought and diseases.

Foundation seed of Rapida was produced in 1966 and seed stocks should be generally available following the 1967 harvest.

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WHITEWASH

J. H. FOOTT · D. R. HEINICKE

Whitewash applied to the leaves of Persian walnut trees of the Payne variety showed no injury to the leaf and did not interfere with photosynthesis. There was no significant effect on total yield in the whitewash tests, but the percentage of larger, sound nuts increased. These studies also indicated that temperatures above 90° F were very detrimental to photosynthesis and temperatures of 95° F or above stopped it *completely*.

GROWERS HAVE QUESTIONED the short- and long-time effect of whitewash on walnut leaves and trees. Would such spraying of leaves adversely affect the leaves and trees? Would the shade produced by the whitewash reduce the photosynthesis rate?

This study was conducted at the Summerland Research Station, British Columbia, Canada, in the summer of 1965. Specific aim was to study the effects of whitewash on the net assimilation rate (NAR) of individual leaflets (Persian walnut leaves usually consist of five leaflets). A study was made of the effects of whitewash on the net assimilation rate of the leaflets, as influenced by temperature and by light intensity. Net assimilation rate is a measure of the net carbon dioxide uptake by the leaf during photosynthesis.

Trees under test were of the Payne variety on northern California black walnut rootstock grown in 40-gallon drums. The trees were on 2-year-old rootstocks and had 1-year-old tops. The trees had been shipped from California for the tests. Temperature control was obtained by moving the trees in and out of a green-

FOUND HARMLESS IN

APPLICATIONS ON WALNUT LEAVES

house. Maximum temperatures were in the 85° to 90°F range during the test period, in August.

Continuous readings of the CO_2 content of an air stream passed over the leaf were obtained with improved CO_2 analyses. The air stream passed through a leaf cup which could be attached to a leaflet on a growing tree without injury to it. The leaf cup of light plastic enclosed a given area of leaf surface. The diagram illustrates how leaves on the growing walnut trees were studied, three leaflets being treated, with two serving as checks.

Treating the top surface of the leaflets appeared to improve the NAR over the check, or those with only the lower surfaces or the entire leaf treated.

Only temperatures of 79 degrees or more were studied, because lower summer temperatures were not the concern of this test. Results indicated inhibition of photosynthesis at temperatures greater than 94°F; greatly reduced photosynthesis (as much at ¼ maximum rate) at temperatures from 94° to 90°F; adequate rate of photosynthesis (½ to ¾ maximum) from 89° to 80°F; with the maximum rate of photosynthesis occurring at temperatures from 80° to 70°F. Indications were that maximum rates continue well below the 70°F level, although these lower temperatures were not studied.

The effect of temperature levels showed up clearly when temperature was dropped from the 94°–90°F level to the 86°–84°F level in a 14-minute period. The net assimilation rate increased from 0 at the high temperature to 10.36 mg CO_2 per dm^2/hr at the lower temperature on the same leaflet. This suggests that the walnut tree is able to make good, and probably complete, recovery from the effects of high temperatures.

Light intensity in the range covered (7,000–12,000 ft-candles) had little influence on the net assimilation rate since all intensities were well above the level required for maximum photosynthesis. The shade from the whitewash did not reduce light intensity below the saturation level. The application of whitewash to the upper surface of leaflets proved superior to overall leaf coverage or coverage of lower surface only. This probably was due to reduction of temperature through shading. The bottom treatment may have clogged up stomata or caused a higher leaf temperature by reflecting light which had passed through the leaf.

No harmful effect on the growth or development of the trees occurred from the use of whitewash sprays.

CALIFORNIA AGRICULTURE

Progress Reports of Agricultural Research, published monthly by the University of California Division of Agricultural Sciences.

William W. Paul .... *Manager* Agricultural Publications

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California Agriculture will be sent free upon request addressed to: Editor, *California Agriculture*, 207 University Hall, University of California, Berkeley, California 94720.

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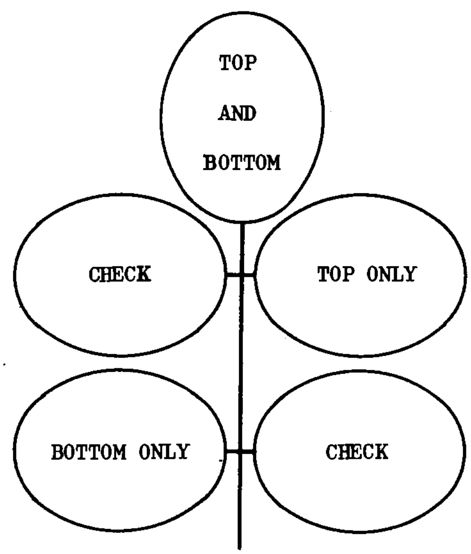
141

WALNUT LEAF TREATMENT PATTERN—TREATMENTS ARRANGED AT RANDOM SO THAT THE SAME POSITION WAS NOT ALWAYS USED FOR THE SAME TREATMENT ON DIFFERENT LEAVES



WHITEWASH EFFECT

Spray treatment	% of NAR [Net Assimilation Rate]	Temperature
Check leaf (none)	100%	84° F
Bottom of leaf	79%	88° F
Top & bottom of leaf ..	96%	86° F
Top of leaf	119%	82° F

TEMPERATURE EFFECT

Net assimilation rate (NAR)	Temperature
0	94° F
¼	94°–90° F
½–¾	89°–80° F
1	80° F to some unknown limit

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