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BERMUDA GRASS.

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Bermuda grass, named after the Atlantic islands of that name, is now widely disseminated, especially throughout semi-arid, subtropical regions where winter frosts are not sufficiently severe to kill its roots and stolons. This plant is perennial and spreads by means of its long and many jointed rootstocks or stolons, by its aerial runners and its seed. The small, light seeds, easily transported by winds and flowing water; in admixture with hay, merchandise or other seeds; or in the manure of animals, soon find their way to any region where this grass will grow. In humid climates, such as that of the southern states, the seed produced is not fertile; but in arid climates, as that of Australia or our own Southwest, the seed is fertile and is the chief means by which the grass is spread.

Conditions of growth: Bermuda grass is remarkably hardy to southwestern conditions of climate and soil. It thrives during the hottest part of the year, growing fastest during the usually more humid weather of August. When once established it will live for weeks and months without water; and is one of the most resistant plants to soluble salts in the soil, known. It will live under water for a long time; some well known patches of Bermuda grass near Mecca, California, although submerged in Salton Sea for over two years, were still alive and making new growth from the roots when that body of water finally evaporated to a lower level. It will also come up through a heavy coating of mud under

which it may be buried during irrigation. But Bermuda grass does not thrive in densely shaded places; nor will it endure exposure of its roots and stolons either to frosts or to the direct heat of the summer sun.

Economic value: Bermuda grass makes good pasture for horses, cows and sheep, but gives only a scanty yield of inferior hay. It makes a durable lawn of somewhat harsh texture; and when once established will withstand neglect and hard usage. In some situations it is used to hold banks of ponds and rivers against the action of water, the levees of the lower Mississippi being to some extent thus protected.

As a weed: Bermuda grass is known chiefly, however, as one of the worst weeds of our semi-arid, subtropical Southwest. It is very aggressive and if not kept under control will compete successfully with the irrigated crops. It is probably at its worst along the lower Colorado River, where the long, hot season, the slightly more humid climate, and the rich, irrigated soil greatly favor its growth. It is less aggressive in Salt River Valley; and in Graham County, at 3000 feet altitude, with colder winters and shorter summer seasons, it is controlled with comparative ease.

Methods of control: As with other evils, prevention is cheaper than cure in dealing with Bermuda grass. In cultivated crops the grass may be destroyed by cutting or pulling the plants free from the soil so that they will dry out entirely. If plowed or cultivated under, however, Bermuda only roots more deeply and is then more difficult to destroy. Clean land may be kept clean easily, even under ditches and in the vicinity of fields or roadsides matted with this grass. At Yuma, where this is most difficult, the Station Date Orchard has been kept free from Bermuda grass for six years and accurate account kept of the cost of so doing, with different crops Winter-growing crops, such as onions, cabbages, beets, barley, and wheat, are, of course, little affected by Bermuda grass. Summer row crops requiring cultivation, may be kept clean easily until laid by. To this class belong asparagus, beans, cotton, cantaloupes, peanuts and tomatoes. Such crops, when they shade the ground densely, as sweet potatoes, cantaloupes, and peanuts, are safe from Bermuda grass until harvested. But crops which admit light and air to the soil beneath, as corn, cotton, and particularly watermelons, will develop Bermuda grass between laying by and harvest, to an extent requiring considerable outlay if the land is to be kept clean. Broadcast summer-growing crops which cannot be thoroughly cultivated are the hardest to handle with reference to Bermuda grass. Alfalfa is the chief of these, and Bermuda probably does its main damage in connection with this important crop. Notwithstanding its dense and vigorous growth, alfalfa,

unassisted, will yield gradually to Bermuda grass wherever the latter withstands the winter. The grass, usually brought upon the land by irrigating water, gains foothold at the edges of the field, upon exposed borders and upon bare spots. When the alfalfa is cut the Bermuda increases its lead while the ground remains bare; and in August, when alfalfa grows least, Bermuda grows more vigorously and firmly establishes its grip on the field. Pasturing further encourages the grass to the detriment of alfalfa, so that, oftentimes, three or four years of neglect or mismanagement are sufficient to reduce a thrifty field of alfalfa to an unprofitable condition, at least for hay making purposes. It is true, however, that some of the best crops of alfalfa seed come from fields partly occupied by Bermuda, which, by reducing the alfalfa to a thin stand, secures light and stocky growth for individual plants, favorable to seed production. To prevent the inroads of Bermuda upon alfalfa, all that is necessary is vigilance,—and a sharp, straight shovel. After each cutting of alfalfa, and especially in August and September, the field should be gone over with the shovel and all Bermuda cut and roots turned up to the sun. If consistently followed up, this work well repays its cost; but if neglected, the grass finally will gain such headway that the land can be reclaimed only by putting it in a cultivated crop. The cost at Yuma, with labor at $1.50 to $2.50 a day, was from $2 50 an acre a year on new, clean land, to $9 90 an acre annually, on ground surrounded with Bermuda infested lands and roadways. This corresponds to a reasonable cost of cultivating for other crops of similar value, and is more than repaid by the maintenance of the fields in full productiveness. Cultivated row crops are less costly to keep clean than alfalfa.
At Yuma the results with row crops for two years were as follows:

	AREA	TOTAL COST	COST AN ACRE
1909	5.7 acres	$14.04	$2.46
1910	5.37 acres	22.64	4 21

The cost of keeping a large lateral canal free from Bermuda grass for the same time was: 1909, per 100 feet, $ .90
1910, per 100 feet, $2.04

In this connection, the price of neglect is also interesting. In 1907, eight acres in row crops belonging to a neighbor and kept clean until August, were allowed to take care of themselves while the owner went to the seacoast. On his return, seven weeks later, an expenditure of $85.71, or

$10.71 an acre in wages, was necessary to eradicate the Bermuda which had grown during his absence.

Killing out Bermuda fields: When solidly matted growths of Bermuda grass are to be destroyed, wholesale methods must be employed. Bermuda sod may be killed by turning it dry in the fall with a turning plow, such as the Moline rod plow, thus exposing the roots to killing winter frosts. The following spring the ground may be sown to cultivated crops followed by a winter crop of grain, and in about two years the grass should be under control.

Likewise, in summer, Bermuda sod may be turned dry and the roots exposed for several weeks to the full heat of the sun, with occasional spring tooth harrowing to further expose and disturb the roots and stolons. In November and December the ground may be sown to grain or planted to winter vegetables such as beets and onions. Another summer fallowing may further reduce the Bermuda which should thus, in time, be brought under control.

Following the practice outlined above, we have ceased to dread Bermuda at Yuma, finding it not only possible but practicable to keep it in subjection.

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