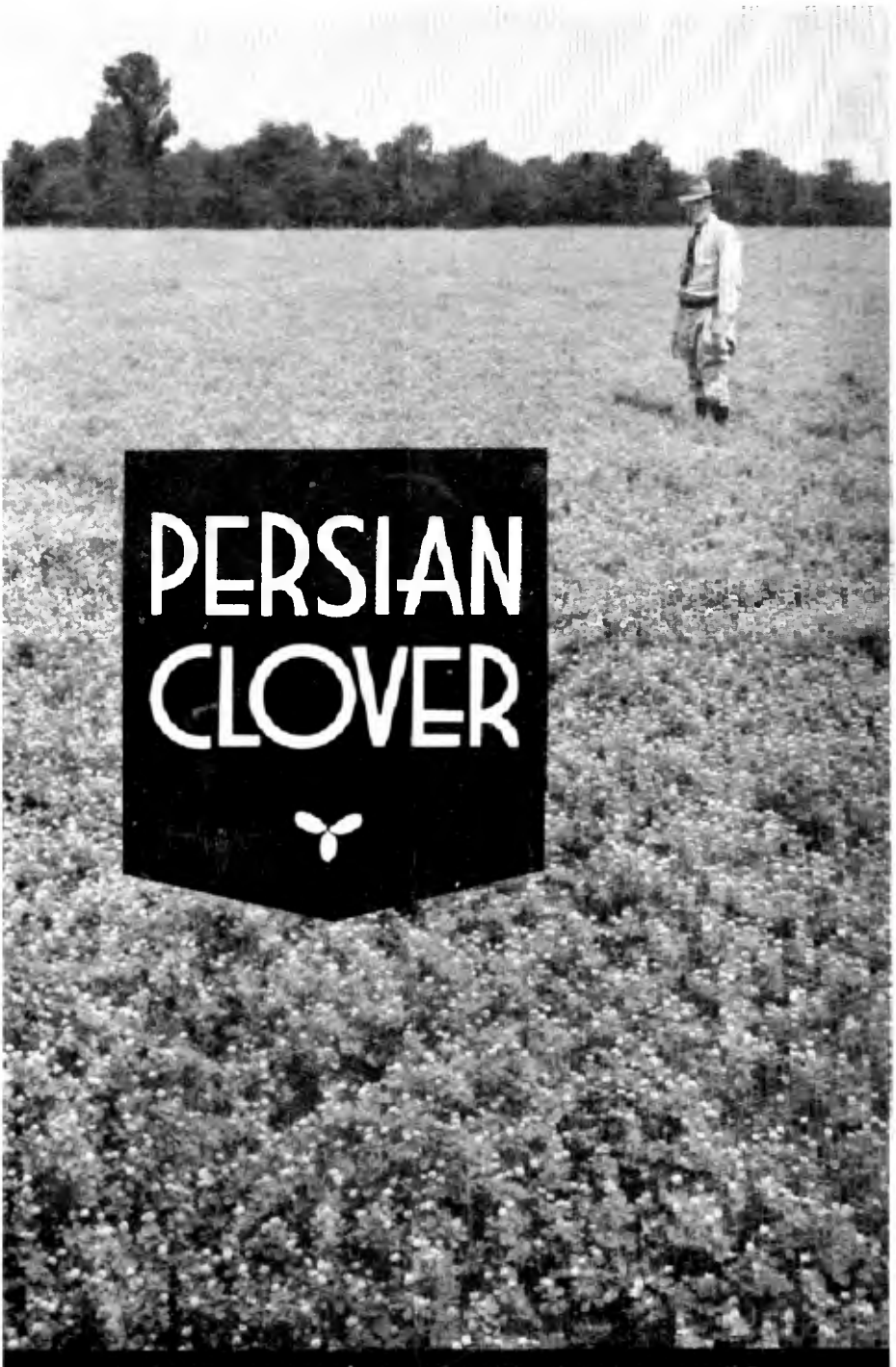

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U.S. DEPARTMENT OF AGRICULTURE

PERSIAN CLOVER

one of the newer true clovers—
A VALUABLE ADDITION to the
legumes adapted to the
SOUTHERN STATES

Advantages:

Extends the grazing season of southern pastures.
Stimulates companion summer grasses.
Pasture and hay have high feed value.
Has high carrying capacity during the spring months.
Produces more feed in late winter and early spring than white and hop clovers.
Is good as a cover or green-manure crop.
Does not require so fertile a soil as white clover.
Produces an abundance of seed that volunteers during the fall.

Requirements:

Prefers low-lying, heavy, moist soils.
Needs phosphate and frequently potash fertilizers on most soils.
Plants must be inoculated. Double inoculations frequently justified.
Seed in fall on closely clipped or grazed grass turf or on firm seedbed if soil is cultivated.
Start grazing early for most growth.
Continual close grazing reduces quantity of seed for volunteering.

Precautions:

Matures and dies before white clover.
Should be moderately grazed, or early growth of summer grasses will be checked.
Lespedeza is not successful with thick stands of Persian clover.
Danger from bloat is present.
Seed must be harvested at proper stage to prevent heavy losses.
Will not thrive on sandy upland soil.

Washington, D. C. Issued January, 1943

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PERSIAN clover (*Trifolium resupinatum*), a native of southern Asia Minor and the Mediterranean countries and a valuable pasture and hay plant of Persia and Egypt, has found a useful place in the agriculture of the Southern States. Its ability to produce feed in late winter and early spring when the southern grasses are dormant extends the grazing season. The forage is nutritious and is relished by all kinds of livestock and poultry. When grown with grass, Persian clover supplies nitrogen, as do other legumes, thus improving the quality and quantity of the grass. Once it is established with grasses and properly fertilized and managed, reseeding is not necessary as an abundance of seed is produced for volunteer stands. Although primarily a pasture and hay legume, Persian clover is used in some places as a green-manure crop.

In 1928, following the Mississippi flood of 1927, Persian clover began to flourish in a section near Hamburg, La. Since that time it has spread rapidly through the sale of seed and from natural reseeding. Earlier attempts to introduce this clover into the United States on a field scale were unsuccessful.

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Volunteer stand of Persian clover in early May 1940 after a clover seed crop and a corn crop had been harvested from the land in 1939.

Where it grows

Persian clover is best adapted to the low-lying, heavy, moist soils of the Southern States. It has been successfully grown as far north as Tennessee and makes good growth in sections of the coastal region of the Pacific States. It is not recommended for upland sandy soils. In the North, Persian clover is not winter hardy and makes only a short growth when spring-seeded and fails to reproduce. The occasional plants found in the northern humid States are the result of its occurrence as a mixture in Louisiana white clover seed.

How it grows

Persian clover is a true winter annual. The seed germinate in the fall, and the plants grow throughout the winter months in the form of a low rosette. With the advent of spring rapid growth occurs, and many slender upright flower stems develop. Seed is produced in late spring or early summer, after which the plants die. Persian clover grows from 8 inches to 2 feet in height, depending upon the favorableness of growth conditions. When grazed heavily or when the stand is thin, the stems become decumbent, giving the appearance of a low, spreading plant. When it is in the rosette stage the leaves developing from the crown are similar to the leaves of young white clover plants, making identification somewhat difficult. However, the individual leaflets are slightly more tapering at the base than those of white clover.

A Persian clover plant.

Persian clover stems do not creep on the soil surface nor root at the nodes as do white clover stems. The light purple flowers, forming a head somewhat flat in appearance during the early bloom stage, are self-pollinating and self-fertile and are borne in the leaf axils on stems from ½ to 2 inches in length. As the seed matures the calyx around each pod becomes inflated, forming small balloonlike envelopes which break off when mature and readily float on water or may be blown about by the wind, thus bringing about a wide dissemination of the seed. Persian clover seed is predominantly olive green and blackish purple; however, most samples contain some yellow and reddish-brown seed. The seed is difficult to separate from white clover seed, being only slightly larger.

Persian clover can be successfully grown on medium to slightly acid soils. On strongly acid soils 1 to 2 tons per acre of finely ground limestone is recommended. This should be applied in midsummer for best results. All fertilizer applications should be made in the fall shortly before seeding or in the fall of following years just before the volunteer seed is germinating. The fertilizers may be either drilled or broadcast. However, drilling is preferred, as with this method the fertilizer is placed in the soil and concentrated in the drill furrow, making the plant food available over a longer period. In some cases disking the sod before broadcasting has aided stand establishment and increased yields. In rotations the available residual minerals from applications to cultivated crops are sometimes sufficient to produce satisfactory stands and good yields. If they are not sufficient, supplemental quantities should be applied by drilling, preferably, or by broadcasting, immediately before seeding.

Fertilizer requirements

For successful growth Persian clover requires mineral fertilizers. On soils somewhat deficient in minerals, stands can be established but the plants are dwarfed and seed production is meager. It does not require so high a fertility level as white clover but does require a higher one than does hop clover.

Phosphate deficiencies vary throughout the entire southern region. On the more fertile soils, 200 pounds per acre of 20-percent superphosphate, or its equivalent, applied in the fall at time of seeding has given excellent results. On less fertile soils as much as 500 pounds per acre may be needed to produce similar growth. Following the large initial application, supplemental amounts from 100 to 300 pounds per acre should be applied annually or every second or third year as needed. Potash is sometimes deficient, and where it is needed 100 to 200 pounds per acre of muriate of potash, or its equivalent, is recommended every second or third year.

Persian clover without fertilizer.

An area in the same field where 400 pounds of 20-percent superphosphate was spread in the fall.

Inoculation necessary for good stands and growth

Lack of inoculation is one of the principal reasons for failures to obtain productive stands. When the weather is hot and dry at seeding time, even inoculated seed sometimes fails to produce inoculated plants. Occasionally volunteer plants are uninoculated the second year, even though they were well inoculated the first year. Such occurrences are more frequent when the clover is used as a cover crop and less when it is seeded with grasses.

Seed may be inoculated by using commercial cultures, by using inoculated soil obtained from a field that has grown a productive Persian clover crop the previous year, or by a combination of both methods. With the second method the seed should be slightly dampened and thoroughly mixed with an equal amount of sifted soil and immediately spread in the shade to dry. In using the combination of these methods labor may be saved by mixing the commercial cultures with inoculated soil and applying to the seed. In using commercial cultures the instructions on the container should be followed. As further insurance, inoculated soil or sand to which cultures have been added may be broadcast over the fields after seeding at the rate of 50 to 100 pounds per acre. This should be done immediately preceding or during cloudy rainy weather. It is not necessary to inoculate after Persian clover has been successfully grown in the same field for 2 years. The results from thorough inoculation justify the extra work and expense of using all methods to obtain it.

Preparing the seedbed

Although Persian clover is generally seeded in a grass turf, successful stands have been obtained from seedings made on cultivated soil. One of the main reasons for failure is the occurrence of hot dry weather before the seedling plants have become established. A firm seedbed is essential, and this may be obtained by rolling or dragging. The seed is usually broadcast and may be lightly covered. When seeded on heavy soils between cotton or corn rows, a slight loosening of the surface soil is recommended before seeding. When the clover is seeded on a grass turf, the grass should be either closely grazed or clipped before the seeding is done. While short grass serves as a protection against the rapid drying out of the soil, tall grass prevents the seedlings from obtaining sufficient light and in addition utilizes more of the soil moisture. The best stands are obtained on Bermuda grass and Dallis grass turfs. Although carpet grass is less desirable because of its dense spreading growth, good stands have been obtained with it. Disking a thick carpet grass turf, even to the extent of turning over slices of turf, aids in the establishment of a stand and has the added advantage of placing the fertilizer deeper.

Seeding

Persian clover must be sown in the fall to produce good yields the following spring. When spring-seeded, the plants make a dwarfed growth and die before setting sufficient seed for a satisfactory volunteer crop. The most favorable seeding time is at the beginning of fall rains, which varies from place to place and from season to season. Even in the southern part of the region, seedings should be done by the middle of December for best results. If conditions are favorable for germination and stand establishment 5 to 8 pounds of seed per acre will produce a good stand. With lighter seedings or when dry hot fall weather occurs, the stand the first year is frequently thin. The second year's volunteer stand should be thick, however, if the first year's seeding has been properly managed as Persian clover is a heavy seed producer. Where an individual field varies in fertility and contains both upland and lowland soil a mixture of 2 pounds per acre each of Persian clover, hop clover, and white clover is recommended.

How to use it

Pasture

Persian clover is an excellent grazing plant. It produces a high-quality, nutritious, protein feed from late winter to late spring. It provides grazing from 10 days to 2 weeks earlier than white clover but

Persian clover in late April after being seeded between cotton rows the previous October.

does not last so long in late spring. The greatest and most rapid growth is made during March, April, and early May, at which time it has a high carrying capacity, two cows per acre being not uncommon on bottom lands. The grazing of Persian clover should be started early. Light winter grazing is possible if good stands can be established early in the fall. Heavy grazing is not recommended in late spring, because the rapid removal of most of the top growth when the plants are beginning to bloom kills them before they have a chance to produce seed. However, if they are only lightly grazed during the last 30 days the growth of associated summer grasses may be pronouncedly checked, causing a gap in the grazing period from the time when the clover dies until the grass has recovered from crowding. Moderate grazing is desirable since it shortens this period and the grasses are less adversely affected. Where soil conditions are favorable to white clover and a mixture of Persian and white clover is seeded, continual close grazing favors a rapid increase of white clover and a corresponding decrease of Persian clover. The spreading of animal droppings in a clover pasture is not recommended, as the ungrazed plants growing around the droppings set an abundance of seed valuable for reseeding. The combination of Persian clover and lespedeza is not recommended, because the Persian clover makes its most rapid growth when the lespedeza is starting and thus crowds out the latter. Persian clover should be grazed carefully in order to avoid bloat of cattle and sheep. The danger from bloat may be reduced by early and continued grazing, by having a mixture of grass and clover, and by giving the animals free access to strawstacks or haystacks.

Hay

Properly cured Persian clover hay is relished by all kinds of livestock and has a high nutritive value, as is indicated by the analyses in table 1.

TABLE 1.—*Analyses of stems, leaves, and heads of Persian clover hay harvested in full-bloom stage in Louisiana*

Part of plant	Proportion of entire plant	Composition (moisture-free basis)						
		Ash	Crude protein	Ether extract	Crude fiber	Nitrogen-free extract	Calcium	Phosphorus
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Leaves	34	10.6	23.1	2.2	19.4	44.7	2.06	0.38
Heads	13	8.2	23.2	2.4	24.2	42.0	1.30	.58
Stems	53	10.7	10.3	1.3	39.8	37.9	1.41	.22
Whole hay [1]	----------	10.3	16.3	1.8	30.8	40.8	1.62	.32

[1] Percentages of ash, crude protein, ether extract, crude fiber, nitrogen free extract, calcium, and phosphorus are calculated for the whole hay from the percentages for the constituent parts given in this table.

Yields average from 1 to 2 tons per acre, depending upon the rate of fertilizing, method of handling, and seasonal rainfall. Persian clover should be cut for hay when the plants are in from one-fourth to full bloom. The largest yield is obtained in the full-bloom stage, but the quality is higher when the hay is cut earlier. Although it has a high moisture content, it is not so difficult to cure as coarser stemmed legumes, such as cowpeas and soybeans. After being mowed, it should be allowed to wilt in the swath and then windrowed for final curing. If cut when in full bloom, a stage producing the most hay, it will not produce seed for reseeding. Grade analyses of Persian clover hay harvested at the full-bloom stage, made by the Grain Feed and Seed Branch, Agricultural Marketing Administration, United States Department of Agriculture, indicate that the equivalent of U. S. No. 1 clover hay can be obtained if the hay is properly cured.

Green manure or cover crop

On heavy, low-lying soils of the Southern States the use of Persian clover as a green-manure crop is increasing with satisfactory results. When used for this purpose, it is frequently lightly grazed during the late winter and early spring months. If it is allowed to approach maturity before being turned under, yields of as much as 30,000 pounds per acre of green material have been obtained, and sufficient seed is placed in the soil for volunteer stands for 2 years. In following this practice, corn or sorghum is planted later than normal during the year that the clover is being left to replenish the seed for volunteer stands. When Persian clover is harvested for seed and is followed by a summer-growing cultivated crop, sufficient seed shatters to insure a thick stand in the fall. The value of the clover for soil improvement is not materially decreased where only the straw is turned under.

Seed production

Persian clover is a prolific seed producer. Under ideal conditions yields of 600 pounds of seed per acre have been harvested and a sufficient quantity of shattered seed left to produce a thick volunteer stand the following fall. Yields from 150 to 300 pounds per acre, however, are more common. The flowers are self-fertile and self-pollinating, which favors seed setting even under unfavorable weather conditions. Honeybees work Persian clover flowers for nectar and pollen, and are undoubtedly of help in increasing seed production. It is frequently difficult to save the seed because of shattering. The mature inflated seed capsules break off easily from the heads, and a heavy rain when seed is mature may mean a complete loss.

The use of Persian clover for both grazing and seed production is possible. For such use the clover should be closely grazed until approximately 4 weeks before it normally blossoms, at which time the

Islands of Persian and white clover produce seed for natural reseeding when close grazing is practiced.

animals should be removed. This practice reduces heavy vegetative growth and the prevalence of weeds and favors abundant uniform blossoming. This method is preferable to harvesting the entire growth, as an additional return is obtained from the crop and the amount of straw to be handled is reduced.

The crop should be cut when the greatest percentage of the seed capsules have turned a light-brown color. Cutting is generally done by equipping the mower with lifter guards. In thick stands, and particularly when the crop is lodged and entangled, the use of a heavy short weed bar without guards has proved effective. Although the crop can be cured in the swath, curing in the windrow is recommended. In windrowing the best practice is to roll the heads to the inside of the windrow, since this reduces shattering. The crop can be threshed either by grain separators equipped with hulling attachments or by combines used as stationary machines or with attachments to pick up the crop from the windrow. The use of a combine direct is not recommended. The lightness of the inflated seed capsules and the losses from shattered seed should encourage trials with suction machines now appearing on the market.

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