OBSERVATIONS ON THE GROWTH AND WILDLIFE UTILIZATION OF AUTUMN OLIVE (Elaeagnus umbellata) ON THE GEORGE WASHINGTON NATIONAL FOREST, VIRGINIA

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Virginia sportsmen are fortunate in having 1½ million acres of land owned by the United States Forest Service, and 88,000 acres of Game Commission owned lands in the western part of the State. The intensive type of game management applied to these areas provides many opportunities for experimentation.

The climatic conditions found in the western part of Virginia are different from those found in other southeastern states; yet many of our problems are common to all states along the length of the Alleghenies. For example—and this may come as a shock to some people—the dove is regarded as a song bird by quite a few people in the western part of Virginia. Some landowners feel the same way about the quail. The white-tailed deer, considered "king" of our game species just a few years ago, has now become so common that the wild turkey is probably once again the most prized of all game in that section of the state. Not to be overlooked is the ruffed grouse which is the ultimate game species to many hunters in the area. Producing good deer, bear, turkey, grouse, and raccoon hunting under climatic conditions of 30 inch snowfalls and –20 degree temperatures presents quite different management problems than those associated with producing bobwhite quail and dove hunting in bicolor and soybean fields.

Wildlifers are always trying new plant species as potential food and cover plants for wildlife management programs. Nut and seed-bearing plants produce the oils and food necessary for body fat to carry wildlife through a cold winter, yet many fruit producers provide an abundance of food in the fall. If their seeds or fruit remain through the winter, so much the better.

Many different kinds of wildlife food plants have been tried in the mountainous section of Virginia, some of which are: sawtooth oak (*Q. actuissima*), pyrocanthus, several species of bush honeysuckle (*L. tatrica* and *L. protocarpa* variety *maacki*), Japanese barberry, mulberries, several varieties of Asiatic chestnuts, several varieties of thorn apple and crab apple, ginkos, hazel nuts, cherry princepts (*Prinsepia sinensis*), chinquapins, multiflora rose, bicolor (in a number of varieties), autumn olive (*Eleagnus umbellata*), Russian olive, and probably others. The foregoing list does not include many different grasses, legumes, and crops tried for food production, or the many varieties of evergreens used for cover plantings.

The plant to be discussed in this paper is the autumn olive (*Elaeagnus umbellata*). It is not offered as any "manna from heaven" that is an answer to all wildlife food problems. However, those persons who have worked with this plant in the past five or six years in the western part of Virginia feel that it is a wildlife food plant well worth consideration by others.

Autumn olive is not a new plant. It has been around for over a hundred years, having been introduced from Asia (Allen et al. 1959). The plant is discussed thoroughly in United States Department of Agriculture Leaflet No. 458, *Autumn Olive For Wildlife and Other Conservation Uses,* by Philip F. Allen, Biologist, and Wilmer W. Steiner, Plant Materials Technician of the Soil Conservation Service.

The plants in western Virginia at six years of age are approximately 13 feet tall, and when grown in the open, spread out seven feet on either side of the root source. Medium size branches have thorns 1 to 1½ inches long. The plants bloom in late May, missing the late frosts. There is a super-abundance of inconspicuous small flowers with a very sweet aroma. There is a variation in the time of fruit ripening which has been observed from the last week in July

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through the last week of September. Ripe fruits are red, about ¼ inch long, and covered with very small brown scales. The fruit contain a single seed approximately 1/3 the size of the mature fruit. The plants are deciduous with leaves falling around the third week in October. The leaves add to the litter and when mixed with the seeds and dried fruit, make ideal scratching areas under the plants.

Autumn olives have been planted in the mountainous sections at elevations from 1580 to 3880 feet. The plants have grown and produced fruit satisfactorily at all elevations. The plantings have experienced winter temperatures of -20 degrees, summer temperatures of 97 degrees, and snow storms that dumped 30 inches of snow on them without any die-back. Young plants (2-3 years old) suffered severe damages from drifting snow (breaking down of the tops), but recovered in a single growing season. The plants have been able to withstand deer browsing and antler rubbing. In fact, such actions seem to stimulate extra growth the next year. For example, severely antler-whipped, two-year-old plants will produce several six-foot sprouts the next summer, and these sprouts will grow into a satisfactory plant by the time the plant has been in the ground four years.

The variation in time of fruit ripening is an advantage in that wildlife start using the plantings in late summer and continue use into the fall and early winter. It also points out room for plant selection for those who think it would be best to have fruit ripen late in the fall and carry into the winter. The Soil Conservation Service is working on this problem.

All of the fruit has a high sugar content, judging by the fermentation of fruit kept in a closed container overnight. It is thought that some plants have a higher sugar content than others. The taste of the fruit ranges from a very sharp tartness to an almost acceptable flavor. Song birds also prove this point by taking the sweetest fruit first. No observations have been made of any appreciable numbers of fruit remaining on the plants after the third or fourth week in November.

Autumn olives are growing on a variety of soils in the western part of the state. Some are on a Montevallo silt loam with a pH of 7.0 to 8.0 (as a result of liming four and five years ago) and a white pine site index of 70. Another planting not far distant is on Allen stony fine sandy loam with a pH of 5.0 and a pin oak (*Q. palustris*) site index of 30. Plantings on these sites began to bear fruit the second summer after planting. The oldest autumn olive planting is on a Jefferson-like soil with a better than 50% angular and rounded sandstones, with a pH of 6.5 and a white pine site index of 75. The planting at the highest elevation is on a reddish to purplish soil known as Lehew fine sandy loam and has a pH of 5.0. All the foregoing are exhibiting satisfactory growth and fruiting.

The first plants were obtained through the courtesy of Wilmer W. Steiner, Soil Conservation Service, in the early spring of 1956. The plants were produced at Big Flats, New York. The 400-500 plants were used in five different plantings on the George Washington National Forest as part of the wildlife clearing development work. They were planted in areas of high deer numbers and known grouse and turkey ranges. The plantings were double rows spaced 10 feet apart with plants six feet apart. Since 1956, we have received additional plants from Marshall T. Augustine of the Soil Conservation Service. In addition, several thousand plants have been purchased from commercial nurseries. It is not always possible to plant double rows as described. At present, single rows have been planted on the northern and northwestern edge of wildlife clearings. The edges are selected to give the plants maximum benefit of sunlight. Plants used are 1-0, generally with a single or double stalk of 10 to 15 inches in length above the root collar. On some occasions, plants have produced fruit the second year after planting in the clearings. Most plants will start to bear fruit the third year. By the fourth year the plants are bearing fruit in impressive quantity.

The autumn olive will live and persist under degrees of shade that will kill many other plants. Also, the growth on the poorer soils is not outstanding, but the survival success is very good. Like any food plant, the best plants are produced on better soils. The application of moderate amounts of fertilizer (5-10-

10 or 10-10-10) the first or second year will get the plants to a producing stage at an early date.

Natural revegetation of autumn olive in or around the plantings has not been observed. There are some reports of such reproduction in loose sand soils. One place in Virginia is known to have natural reproduction taking place. In the place referred to, autumn olive is used in a lawn as a hedge between two suburban lots. The lawn is mowed as close to the plants as the mower can get. The collection of leaves and litter found on wildlife clearings is not present under these plants, nor is the fruit used by anything other than song birds.

A portion of one planting on the national forest was inadvertently sprayed by a public utility in its power line maintenance this past spring. The plants were well established, being six years old. Portions of the plants died back, but a complete kill was not obtained. Oak brush sprayed nearby was killed.

"Four 150 foot rows in southern New York yield 2 tons of berries yearly with great regularity. At the Soil Conservation Service Plant Materials Center, Beltsville, Maryland, 24 plants yield more than 900 pounds of berries yearly. Usually 10 pounds of fresh berries yield slightly more than 1 pound of clean seed, or about 22,000 seeds" (Allen et al., 1959). No effort has been made to determine the pounds of fruit produced in Virginia plantings, but the foregoing appears very reasonable.

Song birds, black bear, groundhogs, chipmunks, raccoon, opossum, and wild turkeys have been observed utilizing the plantings in western Virginia. A large planting in the piedmont section of Virginia receives little or no use other than song birds. This fact is not understood, but is mentioned to point out that no claim is made that autumn olives are an answer to all game food problems. In western Virginia the wildlife use starts in early August and continues through early November. A bear fed on the olives for a period of four weeks the fifth year after planting was made. The bear did considerable damage to the tops of the plants, but a year later the plants had outgrown the damage. During the winter of 1961-62, extensive and continuous scratching under the plantings by wild turkeys was observed for the first time. The fall use by turkeys has not been just an occasional passing through. As many as three flocks have been drawn into one 80-acre tract on which there are four autumn olive plantings. This 80-acre tract was frequented by only one flock at infrequent intervals prior to the autumn olives beginning the heavy fruit production.

It is surprising that no obervations have been made of grouse using the plantings. Grouse are frequently flushed in the pines and hardwoods between the wildlife clearings on which the autumn olives are growing. The northern states report grouse and pheasant usage.

Autumn olive is not offered here as an answer to all needs. Its use and growth characteristics, as they have been observed under the topographic and climatic conditions in the western part of Virginia, have been set forth. Those of us that have worked with this plant feel that it shows the most promise of any turkey food plant worked with to date. Those persons who feel they have need of a good growing plant that will produce a dependable abundance of fruit are urged to try autumn olive.

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