Collecting Forage Plants in Turkey

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MOST of the forage crops grown in this country are introductions from Europe and Asia. Only a relatively small number of our native grasses and practically no native legumes are used as cultivated forage plants. In 1948, I had the opportunity to conduct a collecting expedition in Asia Minor for the Division of Plant Exploration and Introduction of the U. S. Department of Agriculture. My assignment was a general one and only a small proportion of the time could be devoted to forage crops either wild or cultivated. The forage collection was, therefore, quite small compared to collections of other types of plants, but several hundred samples were obtained and sent back for evaluation.

The leguminous flora of Asia Minor is especially rich and here are some of the wild native plants which we found and were able to collect.

White clover, red clover, alsike clover, burclover, button-clover, yellow sweetclover, common vetches, hairy vetch, alfalfa, sainfoin, bitter vetch, peavines, milkvetches, crownvetch, white lupine, European blue lupine, tuberous grasspea and, among the grasses, orchardgrass, smooth brome, crested wheatgrass, Harding grass, oatgrass, needlegrasses, ryegrass, velvetgrass, Turkestan and Caucasian bluestem.

The cultivated forage plants were primarily alfalfa, sainfoin, common vetch, hairy vetch, white lupine, and a few others. Grasses are seldom sown in Turkey for forage plants, since in most sections they cannot compete with the more aggressive native legumes. Attempts to establish grass-legume mixtures usually result in rapid domination by the legume. This is even true when grass alone is planted; the native, wild legumes quickly invade the grass seeding and soon dominate the mixture. The caretakers of city parks and gardens frequently attempt the establishment of bluegrass or ryegrass lawns only to find the grass nearly displaced by wild clovers in a short time. This succession follows even under close use or clipping.

The collecting work began in south Turkey along the Mediterranean coast because the season was most advanced there. We then worked the Aegean and Black Sea regions reaching the high mountains of the east in August and early September, which was the only time of year collections could be made there. Later we covered central Anatolia and made a quick trip to Syria and Iraq. The season of 1948 was unfortunately very cold, wet, and late. No seed had matured anywhere along the Mediterranean coast at the time I was there.

The Mediterranean flora is largely annual, but by far the richest in number of species in Asia Minor. Weedrows, roadsides, and waste places of every sort are carpeted with a rich leguminous flora. In one meter quadrat, I counted 15 distinct species of legumes. Not until I reached the Aegean coast in May did the season catch up with me so a few collections could be made. All of the myriad forms of the rich Mediterranean flora had to be passed up. Even then it was not possible to do justice to the forage collection. The collection of seeds of wild plants is so time consuming that we would have

had to neglect the cultivated crop plants in order to obtain a satisfactory sampling of the wild forms. Transportation was always the primary problem throughout the expedition and we were always in a desperate hurry to catch up with our schedule. When we stopped to collect grain or flax or some other crop from a roadside field we usually were able to scoop up a handful of pods or burs of various leguminous weeds which were mature at the time. This mixed collection my interpreter of the moment called a "legume cocktail" and the name stuck throughout the expedition. The legume cocktail is admittedly not the best collection that might be obtained, but was frequently the best we could do if we were to cover the country geographically.

Another source of mixed legumes from this area was the screenings and winnowings of the grain harvest just beginning. The commonest weeds in the grain fields of western Turkey are species of *Vicia* and *Lathyrus*. Frequently the field is covered by a dense growth of wild vetch which winds its viny stems up the wheat or rye stalks. In the process of harvesting with a scythe or the windmill reaper used in Thrace much of the vetch seed is shattered. The pods of the wild vetches "spring" on dehiscence, sending the seeds several feet from the mother plant. Many of the greener pods find their way to the threshing floor and the usual winnowing in the wind leaves a generous admixture of leguminous seeds in the grain. (Fig. 1.)

FIGURE 1. Winnowing barley near Salihli, Turkey. Not only was a barley sample obtained from this pile, but also a generous handful of seeds, pods, and burs of various wild legumes which grew as weeds in the grain field.

At the grain bazaars in the towns we visited we sometimes found a hand-operated separator at work. From the screenings we obtained many leguminous seeds. The common cultivated vetches of the area are mostly forms of *V. sativa* and *V. ervilia* and seem hardly distinguishable from the wild forms except that the pods do not spring open so readily.

Only in Turkish Thrace do the forage plants assume something like their proper place in the agricultural system. In contrast to Asia Minor most of the livestock are raised on the farm rather than at the hands of wandering nomads. There is a good diversification of crops and some farmers practice a sort of rotation. Tame pastures are sometimes to be found and the animal manure is used more as fertilizer than as fuel as is the case on the Asiatic side. As a consequence, farming in Thrace is very different from that in Anatolia, and the standard of living seems to be a step higher. The big, gray oxen are used to pull such modern devices as steel plows, grain drills, and windmill type binders—tools almost unknown in central Anatolia. Thrace in June is a lovely country endowed with the slow-moving, graceful, pastoral life of rural Europe two centuries ago. There is an air of simple abundance and rustic well-being. Some of the most pleasant memories I brought out of Turkey were of life in rural Thrace —of giant conical haystacks (Fig. 2) and long lines of great, gray cattle returning to the villages in the Balkan twilight.

FIGURE 2. Putting up hay in Turkish Thrace. Farming here is very different from most of Asia Minor and quaint pastoral scenes such as this are common.

Having covered as best we could the southern and western coasts, we turned our attention to the northern Black Sea region and worked eastward toward the high eastern provinces which we wished to reach in August. The Black Sea coast has a high rainfall, reaching above 140 inches near the Russian frontier. Immediately to the interior of the coastal ranges, the climate changes abruptly to sub-humid and even semi-arid with rainfalls of 10–14 inches being common within a few miles of the high rainfall belt. We found little of interest on the wet side of the mountains, but on the dry slopes we found wild alfalfa, both *Medicago falcata* and *M. sativa*, sainfoin (*Onobrychis viciaefolia*) and Caucasian bluestem (*Andropogon intermedius*).

As we entered the high, eastern country more and more forms were found of potential agricultural interest. The wild alfalfa and sainfoin became abundant; wild sweetclovers were found; forms of orchardgrass (*Dactylis* sp.) became abundant and

we saw for the first time the native smooth brome (*Bromus inermis*) and crested wheatgrass (*Agropyron cristatum*). Tuberous grasspea, *Lathyrus tuberosus* was found occasionally and the local inhabitants gather the small tubers in considerable quantities in the spring for food. Occasional collections of Caucasian bluestem and wild clovers were obtained throughout the eastern provinces.

Between Kars and Erzurum we met a villager who had domesticated his own strain of sainfoin. He had never been to school and could not read or write, but he was a highly intelligent peasant farmer with a natural feeling for plants and growing crops. He had gathered seed from wild *Onobrychis viciaefolia* on the mountainsides near by, grown them in his garden, selected the hay types and increased them. He had an irrigated field of several acres of one of the best strains of sainfoin in the country. He was then contemplating the same procedure for alfalfa. Thus we see an even closer relationship between the wild and domestic forms of the forage legumes of eastern Turkey than in the vetches of the Aegean. The forage crops in eastern Turkey are still not quite domesticated. They are continually being introduced into cultivation, and as often escaping into the wild again. In western Turkey, alfalfa and sainfoin are grown as cultivated crops only, but seed must be obtained from the east. Certain areas have developed a great reputation for the quality of their seed and the superiority of their varieties. Kayseri is noted all over the Near East for its alfalfa seed, while Erzincan is famous for its sainfoin.

Among the other cultivated leguminous forage crops in Turkey are common vetch, hairy vetch, bitter vetch, fenugreek, and sweetclover, although all but the last are also used as a grain. Clovers, although abundant in the wild, are used very little as cultivated crops. Egyptian clover, or berseem (*T. alexandrinum*) is used on a very small scale in the south. Common vetch and hairy vetch are widely used especially in western and central Anatolia. Seed of these are often to be found in the grain bazaars.

We found both grasses and legumes growing in areas of adverse climate. Rainfall as low as 8 inches, climates where −40°F. is not uncommon in winter, and those with high summer temperatures and summer drouth all supported a variety of grasses and legumes. Attempts to introduce some of these legumes into the Great Plains have not been too successful. Since the extraordinary specificity of leguminous nitrogen-fixing bacteria is now well known, it was suggested that one reason for the poor performance might be the lack of a proper strain of bacteria. Accordingly, when it proved feasible, nodules were collected as well as the seed. Digging for nodules in earth which had not seen rain for 3-4 months proved very difficult at times, and a rather small collection of nodules was ultimately obtained. For the benefit of future exploration work, it will be of interest to determine the value of this type of introduction.

The mountain ranges of southern and western Turkey are badly overgrazed and many are infested with thorny shrubs so well armed that neither goats nor camels can control them. The northern coastal ranges are heavily forested on the wet side and badly overgrazed on the dry side. There is a national law that prohibits goats from grazing in forested areas, but this law was plainly not enforced. The high ranges of the eastern mountains are in much better condition. This is largely due to the fact that most are too far removed from the plains for the nomads to bring their flocks. The livestock population in the eastern mountains is largely resident, and the number of livestock is

therefore limited to the supply of winter feed which can be put up with primitive hand tools. Since a man can cut only a limited amount of hay in a summer with a scythe, he can support only a limited number of animals.

The people of the high eastern provinces live in villages, grow a little grain and put up hay for overwintering the stock. In midsummer the herds may be taken far afield and the villages have a deserted look. The hay and grain straw is usually stacked on the village rooftops. This has several advantages. The fodder is out of reach of livestock, but convenient to feed by merely pitching it off the roof into the street below, and it provides good insulation against the winters, which are severe. (Fig. 3.) Since livestock numbers are limited to winter feed supplies, the introduction of modern power tools would almost certainly result in serious overgrazing of the ranges (Fig. 4).

plains of Anatolia and the denuded mountains of the east there is no other fuel. The manure is usually gathered when fresh, carried to a puddling floor where it is kneaded, puddled and shaped by hand into cakes. When dry the cakes are stacked in ricks for winter fuel. This, of course, is woman's work. In areas where the winters are severe the supplies of manure cakes mean the difference between life and death. So close is this symbiotic relationship between man and beast that it provides one of the best arguments against the mechanization of the farm communities. A tractor could not displace the village herd because it does not provide fuel to warm the houses and cook the food.

On rare occasions in Asia Minor the native leguminous flora is encouraged by good management or irrigation to form excellent pastures. A few irrigated pastures were seen in the Kars region and an exten-

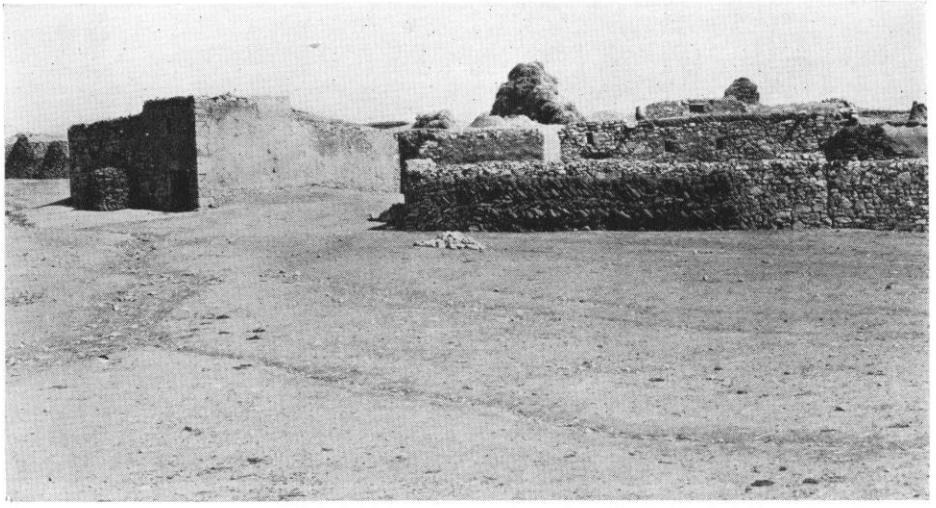

FIGURE 3. Typical village in eastern Turkey with haystacks on the roofs and ricks of cow manure cakes stacked for winter fuel.

The forage plants of the Near East have another extremely vital function. When passed through an animal they are converted to fuel. Through the naked

sion of this practice would be of great benefit to Turkish agriculture. In many of the remote and isolated communities of the eastern provinces the native legumes

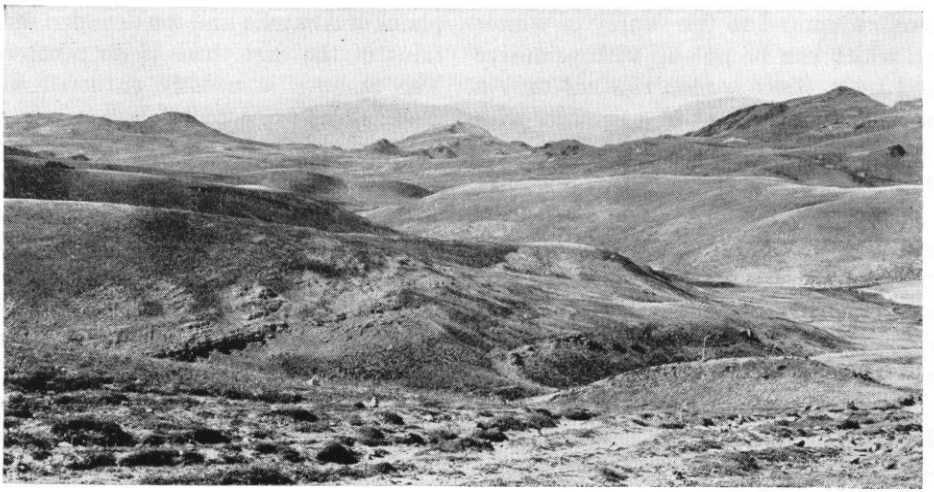

FIGURE 4. The wild, nearly uninhabited mountains of Van and Hakkari provinces provide good summer pasture which is seldom overgrazed. It is too remote for nomads to bring their herds from the lowlands. Livestock numbers are thus limited to those which can be overwintered on the limited amounts of hay which can be harvested by primitive hand tools.

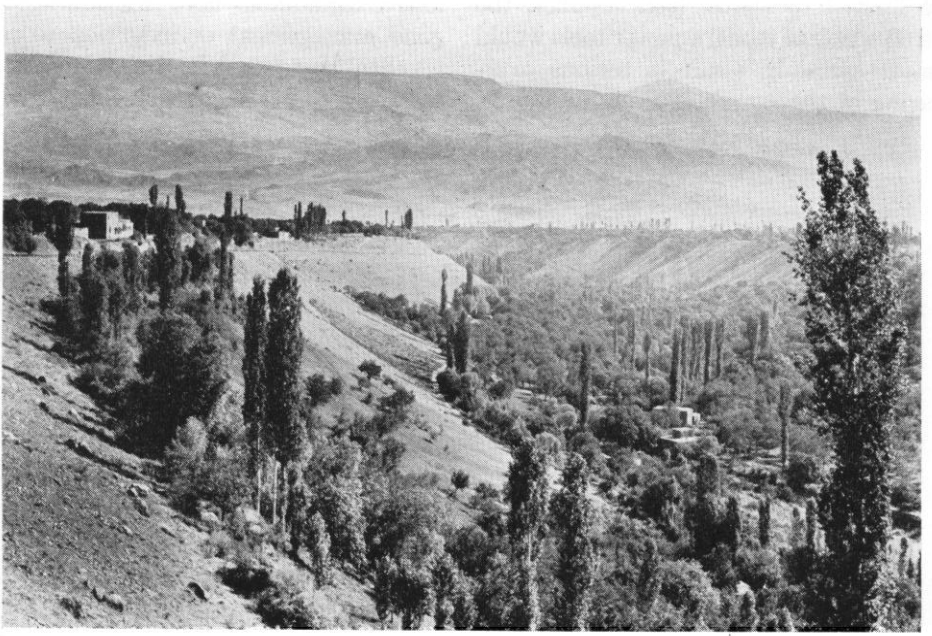

FIGURE 5. The oasis of Kağizman near Mt. Ararat on the Russian border is typical of many remote and isolated communities in the sparsely settled eastern provinces.

are used as a cover crop in the village orchards. The community of Kağizman is interesting in this respect and somewhat typical of many isolated settlements in the wild, sparsely settled mountain areas. It is a small oasis near Mt. Ararat on the Russian frontier. Unlike the usually crowded conditions of typical Turkish villages, the houses of Kağizman are well separated and surrounded by mud-brick

walls which enclose a space sometimes two or three acres in size. These walled-in plots are usually devoted to fruit trees, many of which are very large and very old although still bearing. The native legumes, encouraged by ample irrigation water, form a superb cover crop of mixed alfalfa, sainfoin, tuberous grasspea and clovers. The excess forage may be cut for hay or used for calf or chicken pasture. The house owner usually owns in addition a small irrigated piece of land near the town and possibly grain fields and pasture still farther from town. The arrangement resembles many a small Mormon settlement in our West, and the Lombardy poplars and irrigation ditches along the sides of the streets add to the illusion. There is an air of abundance and well-being despite the extreme isolation of this tiny oasis (Fig. 5).

The night I spent in Kağizman was one of those experiences which so amply reward the plant explorer in his lonely and sometimes difficult travels into the remote sections of the world. That evening the village fathers came to invite me to a party being given for one of the officials. We sat at a long table in a walled garden, ate and drank bounteously. Three musicians played the strange and lovely music of the nomadic Turks, now mournful, plaintive, melancholy, now vigorous, carefree and wild. The best dancers in Kağizman portrayed their art. Sitting at the table in congenial company, hearing a folk music as old as the people who drove their flocks from central Asia to the mountains and valleys of Asia Minor, watching the giant shadows leaping on the mud wall, I felt myself lost in an ageless, timeless land. In any year of the last 6,000 one could have heard this music, seen these intricate and graceful dances, seen virile men at play as the campfire threw eerie shadows on mud-brick walls. The little hand drum set a hypnotic beat. A dancer leaped to the center of the circle a knife in each hand and performed an amazing duel with himself which should have cut him to ribbons. The keen, wicked blades gleamed and flickered in the firelight and someone sang a battle song of some mysterious and forgotten century.

One cannot but be impressed by the conservatism and tenacity of human habits and customs. These children of Noah whose history has seen continuous migrations in search of pasture, in search of peace or in conquest from the heart of Asia and back again, who have camped so many centuries at the foot of Mt. Ararat still live their ways as of old and preserve a folk music as enchanting, as mysterious, and as melancholy as their heritage. How often I stopped in some mountain valley and listened to a village farmer working his fields. The slow moving yoke of oxen, the crooked stick used for a plow were but tokens of history which held him in tyranny, but his voice floating free and wild, quavering in long, haunting minor notes, seemed to chant the story of a proud and independent people.

BRIEFS

"Mathematics may be defined as the subject in which we never know what we are talking about nor whether what we are saying is true."

Bertrand Russell

"Speech making is the art of making deep noises from the chest sound like important messages from the brain."

Kay Ingram