Phytochemical Composition of Some *Vicia* L. Genus Species

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Abstract:

Leguminous plant species in lowlands, mountainous forest and arid forestless places of Azerbaijan are cultivated as the most valuable fodder crops in agriculture. They are plants rich in protein, fat, anitrogenous extractive substances etc. Among genera with high fodder value in Fabaceae family (Fabaceae Lindl.) are species of genus *Vicia* L. From 150 species of this genus spread in the world 48 grow in Caucasus and 42 species are found in Azerbaijan, from which one species is cultivated. Taking into account the high fodder value of these species because of their chemical composition the aim was to study their agricultural significance. The species of *Vicia* genus are plants of particular importance in the improvement of natural forage and sown areas. By domestication of this genus species it is possible to obtain hayfield of high productivity and quality, which is considered one of the main aims in agriculture.

Key terms: forest, agriculture, protein, cultivate, hayfield

Introduction:

As it is known, the high content of protein and fat and low content of cellulose in leguminous plants compared to other plants contribute to their high fodder value. In addition, their abundance among herbs on meadows and pastures in lowlands, mountainous forest and arid forestless places increases the coefficient of fodder value. These leguminous plants often grow among cereals and different herbs and comprise certain percentage of this vegetation (Hatamov 2000). But in lowlands and mountainous forest areas leguminous plants microassociations comprising 75-85% of phytocenoses in grass cover of forests are often found. In these microassociations leguminous plants mainly dominate.

Materials and Methods:

During the conducted research species of genus *Vicia* L. have been determined (Flora of Azerbaijan 1954), leguminous plants of Azerbaijan, pasture ecosystems and their preservation, measures for their improvement, their productivity, subdivision on formations and associations have been studied (Prilipko 1970; Hajiyev and Musayev 1996; Hatamov 2000). The literature data and modern technologies have been used in study of the chemical composition of leguminous fodder crops (Larin and Rabotnov 1951).

Results and Discussion:

During the conducted research it has been found that one of such leguminous plants is species of genus *Vicia* L. From these species *Vicia sativa* L., *V.cinerea* MB, *V.villosa* Roth., *V.tetrasperma* Moench., *V.grandiflora* Scop., *V.lutea* L., *V.hybrida* L., *V.ciliatula* Lipsky, *V.hyrcanica* F.et M., *V.variabilis* Frey net Sinf., *V.grosshemii* Ekvtim., *V.variegata* Willd. and others can be specified.

Common vetch (*Vicia sativa* L.) is an annual or biennial plant with the height of 80 sm. It has a tetrahedral scrambling or vertical stem. Stem surface is densely covered with leaves. Leaves terminate in tendrils. It has 3-8 pairs of leaflets. Pink-blue flowers are situated in leaf axils in pairs or solitary. They have pods with 5-10 seeds. Seeds are spherical, their surface is velvety (Flora of Azerbaijan 1954). The plant blooms in May and produces seeds in May-June (Figure 1).

In Azerbaijan it is spread in all areas from plains to mountainous zone. It has been being cultivated in Azerbaijan since ancient times. This plant grows as a weed in vineyards, gardens, at edges of sown areas, raw soil, oats, barley and other crop fields. It is found at the height of 1800 m above the sea level. It is considered a winter plant because under natural conditions seedlings sprout in autumn.
Vicia sativa L. is the best annual forage crop. It is similar to meadow clover and alfalfa on its forage value and protein content. Seeds contain about 30% of crude protein. It is widely used in feeding of poultry. It is threshed and mixed with rough forage and is willingly eaten by livestock. Being eaten separately it tastes bitter. Vicia sativa and oat, Vicia sativa and barley mixtures are readily eaten by sheep. According to the literature data, the amount of hydrocyanic acid in seeds is about 0.027-0.067 %, while in the green mass it may be 10-15 times less. Up to the end of plant development the amount of hydrocyanic acid completely decreases (Larin and Rabotnov 1951). As one of the best forage crops, this plant is cultivated in agriculture, especially in irrigated lowlands. In order to create a powerful forage base in Absheron peninsula it would be better to use Vicia sativa widely. At winter pastures, first of all, lowlands and foothills of mountains are the bulk of forage supply is comprised by ephemeral plants, that is, by annual plants with very short vegetation period. Species of Vicia genus take significant place among these plants.

Figure 1. Vicia sativa L.  
Figure 2. Vicia cinerea MB

Hairy vetch (Vicia villosa Roth.) is an annual or biennial plant densely covered with hairs. Its stems are weak, branched and climbing. Leaves consist of 6-10 pairs of leaflets and terminate in three-branched tendrils. The plant blooms and produces seeds in May (Figure 3). In Azerbaijan it is spread in all areas from plains to medium mountainous zone. It is not demanding to soil, grows well in sandy soils rich in lime. It is resistant to cold and drought. This species sometimes develops in vast quantities among autumn cereals. In the form of green grass it is well consumed by livestock, especially by cattle and horses. It is recommended to mow it before the end of the flowering period. When mown late it becomes tough and its forage value decreases. As a valuable forage crop this species has been being cultivated since the end of nineteenth century. Taking into account its durability to

Among annual vetches Vicia cinerea MB is more resistant to drought. Vicia cinerea is an annual plant with the height of 25-30 sm, branched from base. Leaves consist of 6-10 pairs of leaflets and terminate in tendrils. 1-2 flowers are situated in arrow-shaped inflorescence. It blooms in April-May and produces seeds in June-July (Figure 2). It grows in most regions of Azerbaijan, especially in arid places, dry slopes and at corn fields as a weed. Under natural conditions Vicia cinerea does not form pure thickets. It is found in wormwood semideserts and salt-marshes. Its seedlings appear in autumn and the vegetation period ends in early spring.

This plant is recommended to be cultivated because of its forage value. As an annual leguminous plant, Vicia cinerea gives green mass early. As dry grass it is readily eaten by livestock, especially small cattle. After flowering the degree of consumption by livestock decreases. It contains 9.04% of ash, 23.88% of protein, 22.75% of albumin, 4.91% of oil, 15.1% of cellulose and 47.04% anitrogenous extractive substances from the dry weight.
cold and high forage value it is recommended to cultivate it more widely.

Yellow vetch (Vicia lutea L.) is an annual plant with the height of 60-80 sm. Its stem is branched from the lower part or procumbent. Leaves consist of 6-10 pairs of leaflets ending in tendrils. Its pods are pubescent, contain 3-6 seeds and have elongated form. In spite of pubescence, it is a valuable forage crop giving large green mass. It is consumed by all kinds of livestock. Its seeds are good forage for poultry (Figure 4).

![Figure 3. Vicia villosa Roth](image3)
![Figure 4. Vicia lutea L.](image4)

Vicia tetrasperma Moench. is an annual plant with the height of 20-50 sm. Stem is multiple-branched. Leaves terminate in tendrils. The plant blooms in May and produces seeds in June and July.

It is found in most regions of Azerbaijan. This plant is well consumed by all kinds of livestock, especially in dried form. Its seeds also have forage value. It is more advisable to cultivate V. tetrasperma in places near forests (Figure 5).

![Figure 5. Vicia tetrasperma Moench](image5)

Vicia variegata Wiild. is a perennial plant with the height of 20-50 sm. Stem is vertical and densely covered in hairs. Leaves consist of 7-12 pairs of leaflets. These leaflets end in branched or simple tendrils. Flowers are variegated. Pods contain 3-5 seeds. Seeds are spherical and brown with spots. The plant blooms in June and produces seeds in July (Figure 6).

It is spread in high alpine and subalpine zones of Azerbaijan. It grows on meadows, forest glades and edges, sometimes on steppes (Hajiyev and Musayev 1996). In other places it forms small thickets.

It has forage value as a hayfield and a pasture plant. Because of the pubescence at the following stages its consumption decreases. In addition to its forage value, this plant is also cultivated to fortify rocks in slopes. The root system is highly developed. It is advisable to use this plant in order to prevent erosion in slopes.

![Figure 6. Vicia variegata Wiild.](image6)
Vicia grosshemii Ekvtim is a perennial plant with the height of 25-90 sm, covered in hairs, slightly branched. Leaves terminate in branched tendrils. It has 7-10 pairs of leaflets. Flower is purple, pods are elongated, linear. It blooms in June and produces seeds in August.

In Azerbaijan it is spread mainly in high mountainous (subalpine and alpine) zones. It grows among shrubs on subalpine and alpine meadows, at the height of 2800 m above the sea level.

It is well consumed by livestock and has forage value as a hayfield and a pasture plant (Prilipko 1970; Hajiyev 1964).

Vicia variabilis Freyn et Sinf. is a perennial plant with the height of 25-80 sm with steady stem covered in hairs. Stems are multiple-branched. Leaves are lanceolate, sometimes are wide. Pods have many seeds, their surface is smooth. Seeds are black and elongated. The plant blooms in May-June and produces seeds at the same time.

This species is widely spread in all regions of Azerbaijan with the exception of semideserts. It is found in combination with other plants or separately. It produces large amount of hay. This plant is rich in protein, fat and anitrogenous extractive substances. From this point of view, it is a very valuable forage crop and is readily consumed by animals in green and dried form.

Conclusions:

These species of Vicia genus are plants having special significance in the improvement of sown areas in lowlands, mountainous forest and arid forestless places of Azerbaijan. From perennial species of Vicia genus studied at the level of cenopopulation Vicia truncatula Fish., V.sepium L., V.croceae Desf., V.variabilis Freyn et Sinf., V.grosshemii Ekvtim. and others can be cultivated in these zones to produce hayfield with high productivity and quality, which is considered one of the main aims of agriculture.

References

Larin I. and Rabotnov T. 1951. Forage crops of hayfields and pastures of SSSR. Vol.II.