# A research on the botanical composition of Kükürtlü neighborhood (Araklı/Trabzon)

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**Abstract**

The study was carried out to determine the pasture status of Kükürtlü neighborhood in Araklı district of the city Trabzon. The plant samples of the study were collected in 2022. Lup method was used for specifying the vegetation data. A total of 53 taxa belonging to 44 genera and 24 families were identified in the study. Poaceae (6) and Fabaceae (4) are the richest families in the total number of taxa. The other families and taxa numbers are as follows; Apiaceae (1), Asparagaceae (3), Asteraceae (3), Boraginaceae (2), Brassicaceae (3), Caprifoliaceae (1), Caryophyllaceae (2), Ericaceae (1), Euphorbiaceae (1), Geraniaceae (2), Juncaceae (1), Lamiaceae (4), Plantaginaceae (2), Polygalaceae (2), Primulaceae (2), Ranunculus (1), Rosaceae (4), Rubiaceae (2), Scrophulariaceae (1), Orchidaceae (3), Urticaceae (1) and Violaceae (1). The status of the pasture was determined as "Poor" with a pasture quality degree of 2.01.

**Keywords:** Kükürtlü, Trabzon, botanical composition, pasture status.

**Kükürtlü mahallesinin (Araklı/Trabzon) botanik kompozisyonu üzerine bir araştırma**

**Özet**

Çalışma Trabzon ili Araklı ilçesi Kükürtlü mahallesinin mera durumunu belirlemek amacıyla yapılmıştır. Çalışmanın bitki örnekleri 2022 yılında toplanmıştır. Vejetasyon verilerinin belirlenmesinde Lup metodu kullanılmıştır. Toplam, 24 familya ve 44 cinse ait 53 takson tespit edilmiştir. Poaceae (6) ve Fabaceae (4) toplam takson sayısı bakımından en zengin familyalardır. Diğer familyalar ve takson numaraları aşağıdaki gibidir; Apiaceae (1), Asparagaceae (3), Asteraceae (3), Boraginaceae (2), Brassicaceae (3), Caprifoliaceae (1), Caryophyllaceae (2), Ericaceae (1), Euphorbiaceae (1), Geraniaceae (2), Juncaceae (1), Lamiaceae (4), Plantaginaceae (2), Polygalaceae (2), Primulaceae (2), Ranunculus (1), Rosaceae (4), Rubiaceae (2), Scrophulariaceae (1), Orchidaceae (3), Urticaceae (1) ve Violaceae (1) şeklindedir. Mera kalitesi derecesi 2.01 olan meranın durumu "Zayıf" olarak belirlenmiştir.

**Anahtar Kelimeler:** Kükürtlü, Trabzon, botanik kompozisyon, mera durumu.

**Introductıon**

Meadows and pastures are important areas where the feed needs of animals are met, as well as important benefits such as providing biological diversity, being a gene source for cultural plants, and protecting the soil against wind erosion.

Meadows-pasture, which make up 14.6 million hectares of Turkey's land (TÜİK, 2019), have decreased vegetation and yield potential as well as grass quality due to improper use (Gökkuş, 1991). This situation negatively affects the country's livestock and economy. In order to solve this problem, pastures with reduced grass yield and quality should be rehabilitated and made to produce high quality forage with high efficiency. However, in order to be successful in pasture improvement, it is important to know the vegetation structure of the pasture to be improved (Çınar et al., 2019). One of the studies to be done in order to know the vegetation structure well is the botanical composition studies related to the vegetation of that region.

Some floristic (Baykal and Atamov, 2016; Baykal et al., 2018; Baykal, 2019) and botanical composition determination in Rize province close to Trabzon province (Bakoğlu et al., 2019; Çatal et al., 2019; Baykal et al., 2020; Çatal et al., 2020; Bakoğlu et al., 2021) have been conducted, and there is no study to determine the botanical composition of the Kükürtlü neighborhood of Araklı district of Trabzon province. The main purpose of the study is to determine the botanical composition, pasture quality and pasture status of the Kükürtlü neighborhood.

**Materıal and Method**

**Study area:** The study was carried out in the Kükürtlü neighborhood in Araklı district of the province of Trabzon, at an average altitude of 1475 m above sea level (40 41 48.7 N; 39 55 54.4 E) and 33 km from the town, which was previously a plateau and then turned into a neighborhood. The location and photos of the study area are given in Figure 1 and 2. The average temperature and precipitation for long years were determined as 14.8 °C and 828.9 mm (Anonymous, 2022).

**Method**

Plant samples for identifications purposes were collected in June 2022 when the plant vegetation reached the climax phase in the Kükürtlü neighborhood of the Araklı district of Trabzon province. Three plant samples were collected for each taxon, and herbarium materials from the dried samples were prepared by using standard herbarium techniques (Erik et al., 1996). It has been taken under protection at Recep Tayyip Erdogan University Pazar Vocational School. Plant samples were identified with the help of Flora of Turkey and Aegean Islands (Davis, 1965-1985; Davis et al., 1988; Güner et al., 2000). Family, taxon (including Turkish names) and author names are given according to www.bizimbitkiler.org.tr, respectively.

Vegetation characteristics of the pasture were determined using the Lup method (Koç and Çakal, 2004) A total of 100 lup values were measured in a lup line, with a lup line of 20 m in length and a measurement distance of 20 cm between two lups. In determining the botanical composition, the plant taxon falling into each lup was recorded on the measurement scale. Plant specimens that fell into the lup were collected and identified with all their organs.

In determining the botanical composition, 5 main lines were measured, with 10 lup lines on each main line, taking into account the principles stated by Tosun (1968). The plants included in the botanical composition were given scores between -1 and 10, according to the principles stated by Gökkuş et al., (1993) and Bakoğlu (1999) and in Anonymous (2008), depending on whether the plants were evaluated as fodder, then multiplied by their ratios in the botanical composition. Pasture quality degree and status class were found by summing the values of all species (Table 1).
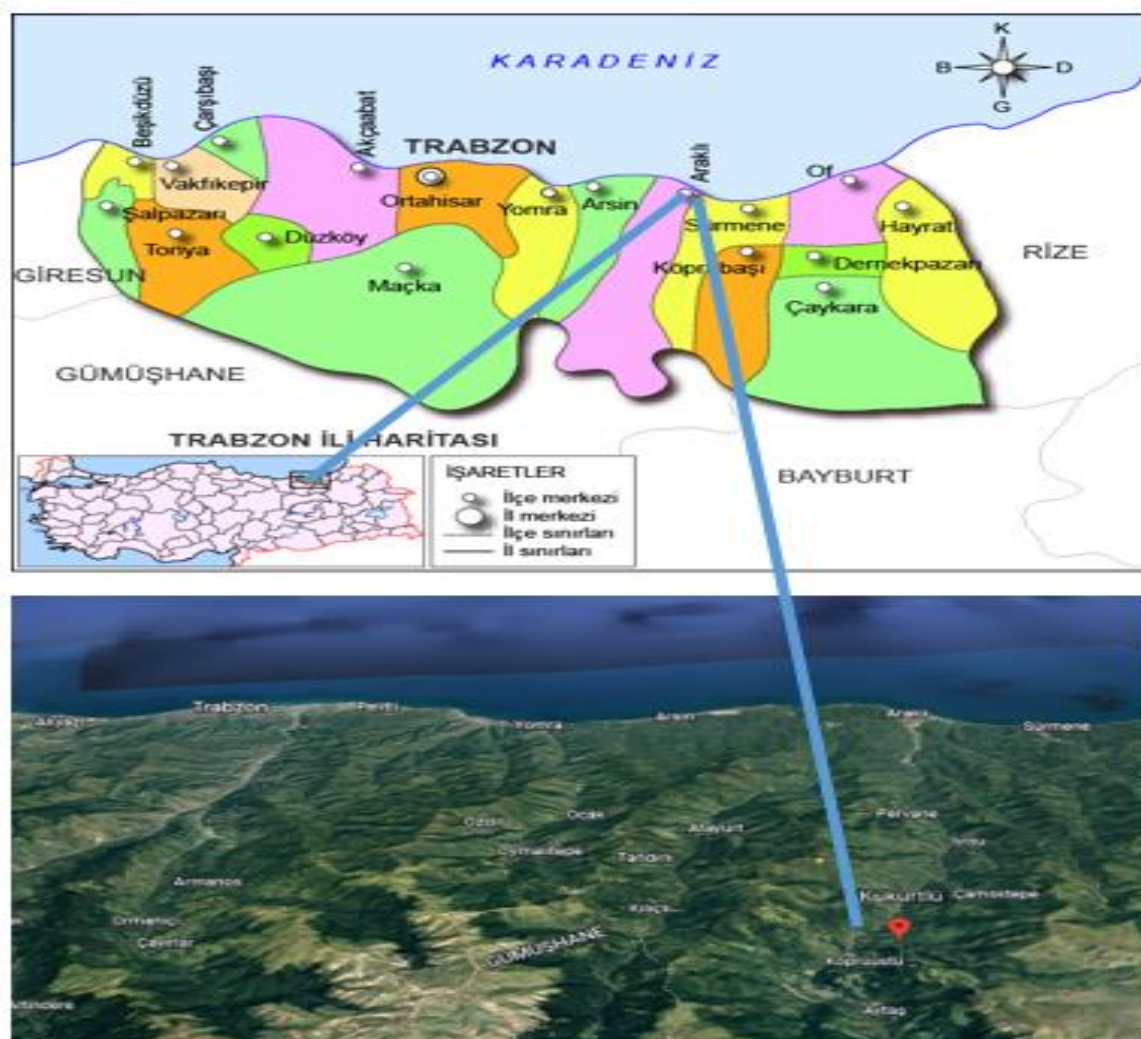
Figure 1. Location of the study area.

**Table 1:** Pasture Status Scale (De Vries et al., 1951)

| Quality Degree | Pasture Status |
|---|---|
| 8.1 – 10 | Very good |
| 6.1 – 8 | Good |
| 4.1 – 6 | Middle |
| 2.1 – 4 | Poor |
| 0.0 - 2 | Very Poor |

**Results and Discussion**

The plants most preferred by animals are delicious plants in the grasses and legumes families. For this reason, in botanical composition studies, a distinction is made as grasses, legumes and other families. The list of families, scientific and Turkish names of taxa, botanical composition ratio and pasture quality degree of the taxa in the study are given in Table 2, and the distribution of family according to the number of taxa are given in Figure 3.

A total of 53 taxa belonging to 44 genera and 24 families were identified in the study area. The richest taxa in number are Poaceae with 6 taxa, and *Fabaceae* with 4 taxa. The rest of the taxa (43) belong to the other families (Table 2).

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Figure 2: Some images from the study area.

Table 2. Families, taxa name and Turkish name, value numbers, botanical composition ratios and pasture quality degree of plants in Kükürtlü,

| | Family | Taxon | Turkish Name | V.N. | B.C.R | P.Q.D. |
|---|---|---|---|---|---|---|
| | **POACEAE** | | | | | |
| 1 | Poaceae | *Dactylis glomerata* L. | Domuzayrığı | 7 | 1.00 | 0.07 |
| 2 | Poaceae | *Festuca airoides* LAM. | Tülyumağı | 4 | 6.00 | 0.24 |
| 3 | Poaceae | *Poa angustifolia* L. | Darsalkımotu | 5 | 2.00 | 0.10 |
| 4 | Poaceae | *Poa annua* L. | Salkımotu | 5 | 4.00 | 0.20 |
| 5 | Poaceae | *Poa pratensis* L. | Çayırsalkımotu | 7 | 2.00 | 0.14 |
| 6 | Poaceae | *Poa supina* Schrad. | Sulusalkımotu | 6 | 2.00 | 0.12 |
| | | | **Total** | | **17.00** | **0.87** |
| | **FABACEAE** | | | | | |
| 1 | Fabaceae | *Lotus corniculatus* L. var. | Gazalboynuzu | 7 | 1.00 | 0.07 |
| 2 | Fabaceae | *Trifolium medium* L. var. | Köseyonca | 7 | 3.00 | 0.21 |
| 3 | Fabaceae | *Trifolium pratense* L. var. | Çayırüçgülü | 8 | 2.00 | 0.16 |
| 4 | Fabaceae | *Vicia cracca* L. subsp. *cracca* | Kuşfiği | 8 | 1.00 | 0.08 |
| | | | **Total** | | **7.00** | **0.52** |
| | **OTHER FAMILIES** | | | | | |
| 1 | Apiaceae | *Heracleum apiifolium* Boiss. | Telehaş | 1 | 4.00 | 0.04 |
| 2 | Asparagaceae | *\*Muscari aucheri* (Boiss.) Baker | Gökmüşkürüm | 0 | 4.00 | 0.00 |
| 3 | Asparagaceae | *Ornithogalum orthophyllum* Ten. | Bayıryıldızı | 0 | 1.00 | 0.00 |
| 4 | Asparagaceae | *Polygonatum multiflorum* (L.) | Mührüsüleyman | 1 | 2.00 | 0.02 |
| 5 | Asteraceae | *Anthemis cretica* L. subsp. *albida* | Akçabaş | 2 | 2.00 | 0.04 |
| 6 | Asteraceae | *Bellis perennis* L. | Koyungözü | 2 | 5.00 | 0.10 |

Table 2 (continued). Families, taxa name and Turkish name, value numbers, botanical composition ratios and pasture quality degree of plants in Kükürtlü,

| 7 | Asteraceae | *Pilosella hoppeana* (Schult.) | Saplıtırnakotu | 0 | 1.00 | 0.00 |
|---|---|---|---|---|---|---|
| 8 | Boraginaceae | *Myosotis alpestris* F.W.Schmidt | Boncukotu | 0 | 3.00 | 0.00 |
| 9 | Boraginaceae | *\*Symphytum sylvaticum Boiss.* | Tomara | 0 | 1.00 | 0.00 |
| 10 | Brassicaceae | *Capsella bursa-pastoris* (L.) | Çobançantası | 2 | 1.00 | 0.02 |
| 11 | Brassicaceae | *Draba hispida* Willd. | Kıllıdolama | 0 | 2.00 | 0.00 |
| 12 | Brassicaceae | *Draba huetii* Boiss. | Çayırdolaması | 0 | 1.00 | 0.00 |
| 13 | Caprifoliaceae | *Valeriana alliariifolia* Adams | Pisot | -1 | 2.00 | -0.02 |
| 14 | Caryophyllaceae | *Arenaria serpyllifolia* L. subsp. | Titrekkumotu | 2 | 1.00 | 0.02 |
| 15 | Caryophyllaceae | *Cerastium purpurascens* Adams | Alacaboynuzotu | 3 | 2.00 | 0.06 |
| 16 | Ericaceae | *Vaccinium myrtillus* L. | Ayıüzümü | 1 | 1.00 | 0.01 |
| 17 | Euphorbiaceae | *Euphorbia amygdaloides* L. | Zerana | -1 | 1.00 | -0.01 |
| 18 | Geraniaceae | *Geranium molle* L. | Yumuşakıtır | 2 | 1.00 | 0.02 |
| 19 | Geraniaceae | *Geranium psilostemon* Ledeb | Zarifıtır | 2 | 1.00 | 0.02 |
| 20 | Juncaceae | *Juncus effusus* L. | Cilotu | 0 | 2.00 | 0.00 |
| 21 | Lamiaceae | *Ajuga reptans* L. | Meryemsaçı | 0 | 1.00 | 0.00 |
| 22 | Lamiaceae | *Salvia verticillata* L. subsp. | Dadırak | 1 | 1.00 | 0.01 |
| 23 | Lamiaceae | *Stachys macrantha* (K.Koch) | Kocasoğulcan | 2 | 2.00 | 0.04 |
| 24 | Lamiaceae | *Thymus longicaulis* C.Presl | Aşkekiği | 2 | 1.00 | 0.02 |
| 25 | Plantaginaceae | *Plantago lanceolata* L. | Damarlıca | 2 | 3.00 | 0.06 |
| 26 | Plantaginaceae | *Veronica gentianoides* Vahl | Kandilçiçeği | 1 | 1.00 | 0.01 |
| 27 | Polygalaceae | *Polygala alpestris* Rchb. | Yaylasütotu | 1 | 1.00 | 0.01 |
| 28 | Polygonaceae | *Rumex alpinus* L. | Şortah | 0 | 1.00 | 0.00 |
| 29 | Primulaceae | *Primula aucalis* (L.)L. acucalis | Çuhaçiçeği | 0 | 1.00 | 0.00 |
| 30 | Primulaceae | *Primula elatior* subsp. *pallasii* | Sarıtutya | 0 | 2.00 | 0.00 |
| 31 | Ranunculus | *Ranunculus repens* L. | Tiktakdana | -1 | 2.00 | -0.02 |
| 32 | Rosaceae | *Alchemilla daghestanica* Juz. | Dağpençesi | 1 | 5.00 | 0.05 |
| 33 | Rosaceae | *Alchemilla sintenisii* Rothm. | Supençesi | 1 | 1.00 | 0.01 |
| 34 | Rosaceae | *Potentilla crantzii* (Crantz) | Beşparmakotu | 0 | 1.00 | 0.00 |
| 35 | Rosaceae | *Sibbaldia parviflora* Willd. var. | Fındıkotu | 1 | 3.00 | 0.03 |
| 36 | Rubiaceae | *Asperula arvensis* L. | Tarlabelumotu | 0 | 5.00 | 0.00 |
| 37 | Rubiaceae | *Galium incanum* Sm. subsp. | Külahiplikçiği | 1 | 1.00 | 0.01 |
| 38 | Scrophulariaceae | *Scrophularia nodosa* L. | Tavuksıracası | 1 | 1.00 | 0.01 |
| 39 | Orchidaceae | *Dactylorhiza euxina* (Nevski) | Lazsalebi | 2 | 1.00 | 0.02 |
| 40 | Orchidaceae | *Dactylorhiza urvilleana* | Balkaymak | 2 | 1.00 | 0.02 |
| 41 | Orchidaceae | *Orchis ustulata* L. | Katranalacası | 0 | 1.00 | 0.00 |
| 42 | Urticaceae | *Urtica dioica* L. subsp. *dioica* | Isırgan | 2 | 1.00 | 0.02 |
| 43 | Violaceae | *Viola sieheana* W.Becker | Çayırmenekşesi | 0 | 1.00 | 0.00 |
| | | | **Total** | | **76.00** | **0.62** |
| | | | **GENERAL TOTAL** | | **100.00** | **2.01** |

\*:Endemic, V.N.: Number of Value, B.C.R: Botanical Composition Ratios, P.Q.D: Pasture Quality Degree

Botanical composition ratios of Poaceae, Fabaceae, and other families are 17.00%, 7.00%, and 76.00%, respectively. With a pasture quality rate of 2.01, the status of the pasture was determined as "Poor". In our study, the low feed value of the plants in the area may have affected the poor pasture condition of the study area. Among the plants in the botanical composition, *Festuca airoides* (6%) from Poaceae, *Trifolium medium* var. *medium* (3%) from Fabaceae, and *Bellis perennis* (5%), *Alchemilla daghestanica*

(5%), *Asperula arvensis* (5%) from other families constitute the first rank. In addition, 2 endemic taxa *Muscari aucheri* and *Symphytum sylvaticum* are identified in the study area (Table 2).

Number of taxa according to families: Poaceae (6), Fabaceae (4), Apiaceae (1), Asparagaceae (3), Asteraceae (3), Boraginaceae (2), Brassicaceae (3), Caprifoliaceae (1), Caryophyllaceae (2), Ericaceae (1), Euphorbiaceae (1), Geraniaceae (2), Juncaceae (1), Lamiaceae (4), Plantaginaceae (2), Polygalaceae (2), Primulaceae (2), Ranunculus (1), Rosaceae (4), Rubiaceae (2), Scrophulariaceae (1), Orchidaceae (3), Urticaceae (1), Violaceae (1) (Table 2).
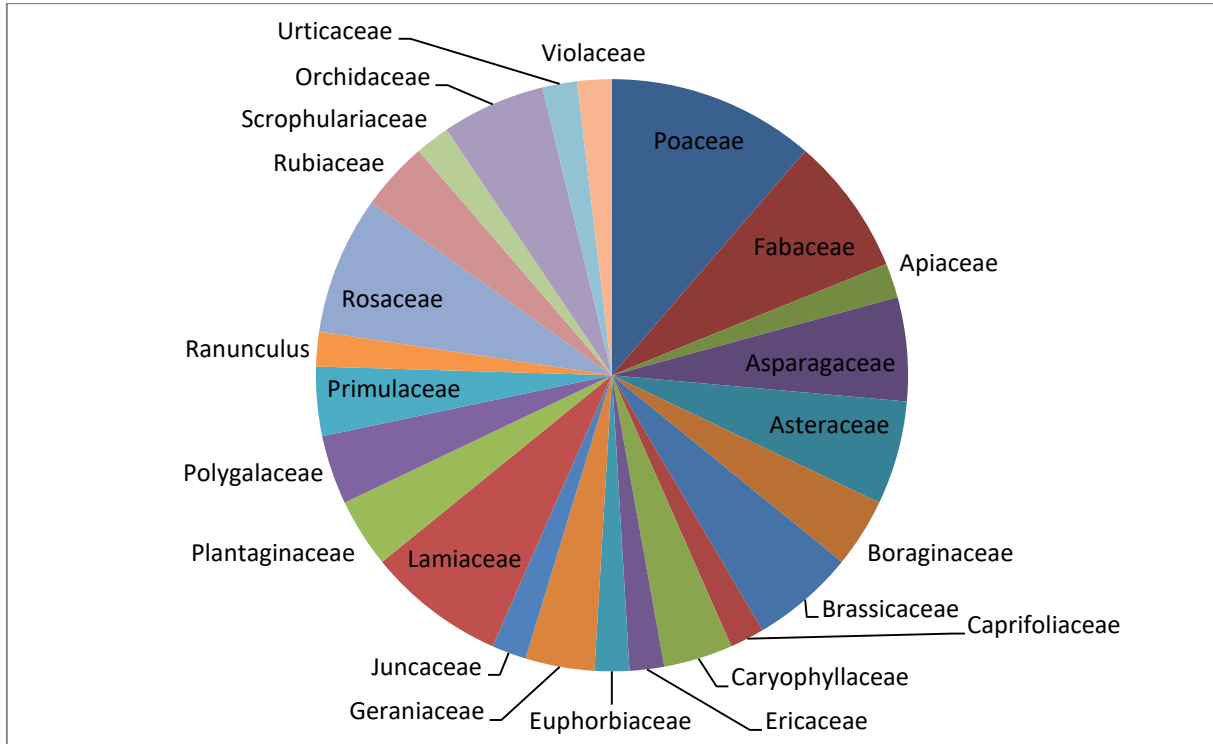


Figure 3. Distribution of family according to the number of taxa

There are some studies in Rize (Bakoğlu et al., 2019; Çatal et al., 2019; Baykal et al. , 2020; Çatal et al., 2020; Bakoğlu et al., 2021) on botanical composition and pasture status which are close to the study area. Bakoğlu et al., (2019) reported the ratio of soil coverage (82.4%), grasses (33.37%), legumes (5.75%), and other families (60.88%,) and poor pasture status with a value of 2.456 within Handüzü plateau; On the other hand Çatal et al., (2019) indicated, the soil coverage (63.4%) the ratio of grasses (39.35%), legumes (6.61%), and other families (54.04%) in a very weak pasture status with a range of 1.976 in Ovit plateau. Baykal et al., (2020) determined soil coverage rate (70.75%), proportion of grasses (54.98%), legumes (2.88), other families (42.14%) and a weak pasture status with the value of 2.383in Palovit plateau. Çatal et al., (2020) defined the soil coverage (79.15%), the ratio of grasses (21.24%), legumes (13.66), and other families (65.10%) within the weak pasture status with a pasture grade of 2.365 in Trovit plataeu; Bakoğlu et al., (2021) clarified the soil coverage rate (83.40%), ratio of *Poaceae* (13.07%), *Fabaceae* (28.11%) other families 58.82% a weak pasture with the data 2.65.

There are similarities between the results obtained from the study and the findings of other researchers (Bakoğlu et al., 2019; Çatal et al., 2019; Baykal et al., 2020; Çatal et al., 2020; Bakoğlu et al., 2021). The fact that the rate of species from other families that are not preferred by animals is very high, affects this result. The low pasture status in the previous studies carried out with the loop method in the close geography may have been caused by the low value numbers of the species.

**Conclusıon**

As a result, in the study, a total of 53 taxa belonging to 24 families, 6 Poaceae, 4 Fabaceae and 43 plants from other families, were identified. Botanical composition ratios were determined as Poaceae (17.00%), Fabaceae (7.00%) and other families (76.00%). With a pasture quality rating of 2.01, the status of the pasture was determined as "Poor". Efforts should be made to improve the pasture area, which is in a poor condition, with the improvement method.

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