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*RESEARCH ARTICLE*

# AN EVALUATION ON THE TEMPERATURE AND PRECIPITATION PREFERENCES OF THE IDA MOUNTAIN (TURKEY) FORESTS

**Berna Hepbilgin**
Geography Department, Çanakkale Onsekiz Mart University Campus Terzioğlu, Çanakkale 17020, Turkey.

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## Abstract

Ida Mountain presents a peculiar geographical structure in terms of the distribution of tree stands, like all the geographical differences on the north and south slopes with its location in the north of Edremit bay and with lying east-west direction roughly.Covering the area of 1823 $km^2$ with its immediate surroundings, Ida Mountain's natural forest section forms approximately 60% of the area. In the natural forest area of Ida Mountain, Pinus brutia, Pinus nigra, Quercus, Abies, Fagus and Castanea are found as pure tree communities, and related varieties formed by the combination of these species in different bulk densities. In the eco-geographic study of forest areas, the two most basic bioclimatic factors are: knowing the temperature and precipitation preferences of tree species and stands. In this study, monthly, seasonal and annual temperature and precipitation preferences of tree stands in Ida Mountain were obtained by modeling the temperature and precipitation data obtained from meteorological stations around Kazdağı. This case study aims to contribute to the future eco-geographical evaluations on the tree stands of Ida Mountain.



## Introduction:-

Ida Mountain (Mt. Ida) is located in the north of the Gulf of Edremit, in the northwest part of Turkey. Due to its lying east-west direction roughly, Mt. Ida is an exclusive topography and an area of high ecological importance. Kaz Mountain is located at the intersection areas of the European-Siberian, Mediterranean and Iranian-Turanian flora regions, and inholds auxin vegetation spread in its valleys and slopes. Euro-Siberian elements consisting 18% of the area are common on the northern and eastern slopes, while Mediterranean elements which consist 24% of the area with vegetation are common on the southern slopes and summits. As for the Iran-Turan elements consist 14% of it (Özel ve Gemici, 2001).

Due to its economic and ecological wealth, Mt. Kaz is an important geographical element that is frequently subject to economic and eco-geographical research. It would be beneficial to present a synthesized view by evaluating the natural potential of Mt. Kaz with a holistic approach and physical geographical studies as well as human and economic geography studies. However, this study is an effort to investigate the natural potential of Mt. Kaz geographically and in a more detailed perspective. With this study, findings regarding the temperature and precipitation preferences of the tree communities forming the Mt. Kaz natural forest area were obtained by Geographic Information System (GIS) modeling approach.

**Corresponding Author:- Berna hepbilgin**
Address:- Geography Department, Çanakkale Onsekiz Mart University Campus Terzioğlu, Çanakkale 17020, Turkey.

One of the prospective contributions of this study is to generate data for the temperature and precipitation preferences of Mt. Kaz tree species by modeling the outside on-site measurements under severe conditions. Another contribution of the study is to better understand the potential of Kaz Mountain's natural forests. In this study, it is also aimed to obtain basic climatological database, based on temperature and precipitation values that can be evaluated for further detailed eco-geographic studies for Mt. Kaz tree communities. The two most important climatological factors that affect and determine the distribution of tree communities in any location are temperature and precipitation. In eco-geographical researches, there was a lack of research regarding the temperature and precipitation preferences of Mt. Kaz tree species, thus, findings that we obtained will provide an opportunity for evaluations. Measuring temperature and precipitation for tree communities in forests, usually in mountainous areas, requires extensive labor and time. Some relevant researches investigating the relationship between forests and climate on mountainous lands made by Bahadır & Emet (2010), paired a total of 10 tree species which are common for the seven regions in Turkey with GIS analyses have put forward substantive tree species that characterize the region's climate. According to the study, from Mediterranean climate red pine (Pinus brutia) and Taurus cedar (Cedrus libani), from terrestrial climate Scotch pine (Pinus sylvestris) and oak (Quercus), from Black Sea climate eastern beech (Fagus orientalis) and alder (Alnus glutinosa) have been obtained as characteristic primary tree species (Bahadır & Emet, 2010).

In another study investigating the relationship between the distribution of forest trees on the Anatolian diagonal and the climate (Usta et al., 2014), researchers carried out a climate analysis that took into account the vegetation period with 25 weather station data between 1000 m and 2000 m elevations in the field. Accordingly, the relationships between the spread of trees and some climatic elements such as mean precipitation, mean temperature, actual evapotranspiration, and drought index during the vegetation period were discussed. Some of the results of this study are as follows:

It has been obtained that the widest spread two tree species are Juniperus and Pinus nigra, where the annual amount of precipitation is between 500-750 mm.In the area with an annual rainfall between 0-500 mm, it was found that the most widely distributed tree species are Juniperus spp. and Quercus spp.In the area where the annual rainfall is more than 750 mm, the most widespread tree species was found as Pinus brutia.

It was found that the two tree species with the widest spread in the semi-arid area obtained according to the drought condition of the vegetation period are Juniperus spp. and Pinus nigra.It was also observed that the two tree species with the widest spread in semi-humid areas are Pinus sylvestris and and Juniperus spp.According to the summer drought survey, it was found that the two most common tree species in arid areas in July, August and September were Juniperus spp. and Pinus nigra (Usta et al., 2014).

In this study, the data from the author's doctoral thesis on 'Effects of Climate Change on Ida Mountain Tree Formation Areas' were used. The study is a continuation of eco-geographic studies for Ida Mountain tree communities, which the author continues after her doctorate.

## Method:-

In this study, monthly average temperature and precipitation values from 1971 to 2000 and eight forest management plans of Mt. Ida including nearby forests obtained by eight meteorological stations (Edremit, Çanakkale, Bozcaada, Gönen, Ayvalık, Balıkesir, Bergama, Burhaniye) around Kazdağı were used. All queries and analysis were performed using MapInfo 2017 Professional program. The results of the findings obtained in the Geographic Information Systems program were edited and graphed in the MS Office environment. The monthly average temperature and precipitation data of the eight meteorological stations mentioned above were modeled for Mt. Ida by working in 10mx10m dimensions with the TIN interpolation method in MapInfo 2017Pro program by applying the basic formulas of temperature-elevation and precipitation-elevation relationship. On the other hand, the pure tree species and the dominant association areas that form the Mt. Ida natural forest area have been separated by querying, and the digital Ida Mt. natural forest area has been obtained by combining each of them areally.

Mt. Ida natural forest area is basically composed of pure spreading tree stands such as Pinus brutia, Pinus nigra, Pinus pinea, Quercus, Fagus, Castanea, Abies, Maques and Other-Leafed Trees, and associations formed by their combination in various proportions. Pure dispersed tree stands and associations have been systematized considering the two most dominant tree species. The Mt. Ida natural forest area consists of Pinus nigra (PniCas, PniOtLe, PniFag, PniQu, PniPbru, PniAbi, PniMa), Pinus brutia (PbruPni, PbruQu, PbruOtLe), Quercus (QuAbi, QuOtLe,

QuFag, QuCas, QuPni, QuPbru), Abies (AbiFag, AbiPni), Fagus (FagCa, FagPni, FagAbi, FagQu) and Castanea dominant association groups (CasFag, CasPni,CasQu) other than the pure spreading tree communities mentioned above. In order to make a simple evaluation, each association is named with the secondary dominant tree species. For example, for Pinus nigra association groups: Pinus nigra-Castanea, Pinus nigra-Pinus brutia, and Pinus nigra-Abies dominant associations.

The digital natural forest area map was overlaid on the generated monthly temperature and precipitation models and the minimum, maximum and average monthly temperature and precipitation values were transferred to the attribute table with MapInfo Datamine Discover-Region inspection analysis.These monthly minimum, maximum and average temperature and precipitation values, which were obtained according to the areas of the tree communities, have been arranged in Excel format as both monthly data and seasonal values from these monthly data and evaluated by the graphics obtained.

**Findings:**

This section describes the table (Table 1) showing annual minimum, maximum and mean/average temperature and precipitation values, graphs showing monthly minimum, maximum and mean temperature and precipitation values, and graphs showing seasonal minimum, maximum and mean temperature and precipitation values.

**Table 1:-** Annual Min. Max and Mean Temperature and Precipitaiton Values of Tree Groups on Kaz Mountain. (Annual data was obtained from Hepbilgin, 2018).

| Population and Assoc. | Annual Temp. Min. | Annual Temp. Max | Annual Temp. Mean | Annual Prec. Min. | Annual Prec. Max. | Annual Prec.Mea |
|---|---|---|---|---|---|---|
| **Type** | **$^0$C** | | | **mm** | | |
| Abi | 8,9 | 13,2 | 10 | 928 | 1414 | 1286 |
| Ppin | 13,9 | 15,4 | 14,5 | 641 | 887 | 814 |
| Pni | 7,4 | 14,7 | 11,7 | 745 | 1588 | 1092 |
| Pbru | 9,7 | 16,3 | 14,1 | 600 | 1316 | 833 |
| Qu | 9,3 | 15,9 | 13,1 | 622 | 1390 | 949 |
| Fag | 8,7 | 13,3 | 9,9 | 922 | 1430 | 1301 |
| Cas | 11,5 | 13 | 12,2 | 955 | 1119 | 1043 |
| Ot-Le | 10,2 | 15,5 | 14,2 | 653 | 1272 | 773 |
| Maquis | 10,7 | 14,8 | 12,8 | 754 | 1227 | 974 |
| Pbru-OtLe | 11,8 | 15,5 | 13,9 | 671 | 1131 | 859 |
| Pbru-Qu | 11 | 15,9 | 13,6 | 657 | 1212 | 888 |
| Pbru-Pni | 11,3 | 14,9 | 13,5 | 753 | 1183 | 889 |
| Pni-Ma | 9,1 | 14,9 | 12,1 | 786 | 1410 | 1058 |
| Pni-Abi | 7,8 | 13,8 | 9,7 | 863 | 1534 | 1323 |
| Pni-Pbru | 10,5 | 14,7 | 13,1 | 745 | 1257 | 938 |
| Pni-Qu | 7,8 | 14,7 | 12,4 | 791 | 1548 | 1025 |
| Pni-Fag | 8,8 | 15,2 | 11 | 730 | 1422 | 1174 |
| Pni-OtLe | 9,6 | 13,5 | 11,7 | 904 | 1333 | 1098 |
| Pni-Cas | 9,2 | 14,2 | 11,8 | 824 | 1375 | 1081 |
| Qu-OtLe | 12,6 | 13,8 | 13,2 | 874 | 996 | 933 |
| Qu-Abi | 10,1 | 13,2 | 11 | 933 | 1284 | 1178 |
| Qu-Fag | 12,5 | 14 | 13,5 | 828 | 1019 | 882 |
| Qu-Cas | 10,9 | 13,7 | 12,8 | 878 | 1191 | 977 |
| Qu-Pni | 9,1 | 14,3 | 12,5 | 819 | 1389 | 1016 |
| Abi-Fag | 8,7 | 10,6 | 9,4 | 1227 | 1426 | 1350 |
| Abi-Pni | 8 | 12 | 9,9 | 1077 | 1518 | 1297 |
| Fag-Cas | 9,2 | 13,6 | 11,9 | 900 | 1379 | 1076 |
| Fag-Pni | 8,8 | 13,6 | 11,1 | 881 | 1422 | 1157 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Fag-Abi | 8,7 | 13,4 | 9,8 | 922 | 1429 | 1313 |
| Cas-Fag | 10,4 | 12,9 | 12,9 | 945 | 1231 | 1055 |
| Cas-Pni | 10,1 | 13,3 | 11,8 | 923 | 1285 | 1087 |
| Cas-Qu | 10,6 | 13,7 | 12,2 | 877 | 1234 | 1039 |
| OtLe-Pni | 9,8 | 12,7 | 11,3 | 982 | 1298 | 1134 |
| Fag-Qu | 10,2 | 13,6 | 11,8 | 889 | 1269 | 1096 |

Abbrev:Abies (Abi); Pinus pinea(Ppin); Pinus nigra (Pni); Pinus bruita (Pbru);Quercus (Qu); Fagus (Fag); Castanea (Cas); Other Leaf Trees (OtLe); Maquies (Ma).Pinus brutia(Ot-Le).Pinus brutia –Quercus:(Pbru-Qu).Pinus brutia – Pinus nigra(Pbru-Pni). Pinus nigra-Maquis(PniMa).Pinus nigra–Abies (Pni-Abi).Pinus nigra-Pinus brutia: (Pni-Pbru).Pinus brutia-Quercus:(Pni-Qu)Pinus nigra-Fagus(PniFag).Pinus nigra-Other Leaf Trees(PniOtLe). (Pinus nigra – Castanea(Pni-Cas).Quercus-Other Leaf Trees:(Qu-OtLe). Quercus – Abies (Qu – Abi). Quercus-Fagus:(Qu-Fag).(Quercus-Castanea(Qu-Cas) Quercus-Pinus nigra(Qu-Pni); Abies-Fagus(Abi-Fag); Abies-Pinus nigra(Abi-Pni);Fagus-Castanea(Fag-Cas);Fagus-Pinus nigra(Fag-Pni),Fagus-Abies(Fag-Abi),Castanea-Fagus(Cas-Fag),Castanea – Pinus nigra (Cas-Pni),Castanea – Quercus: (Cas-Qu); Other Leafed Trees: (OtLe-Pni), Fagus – Quercus(Fag-Qu).

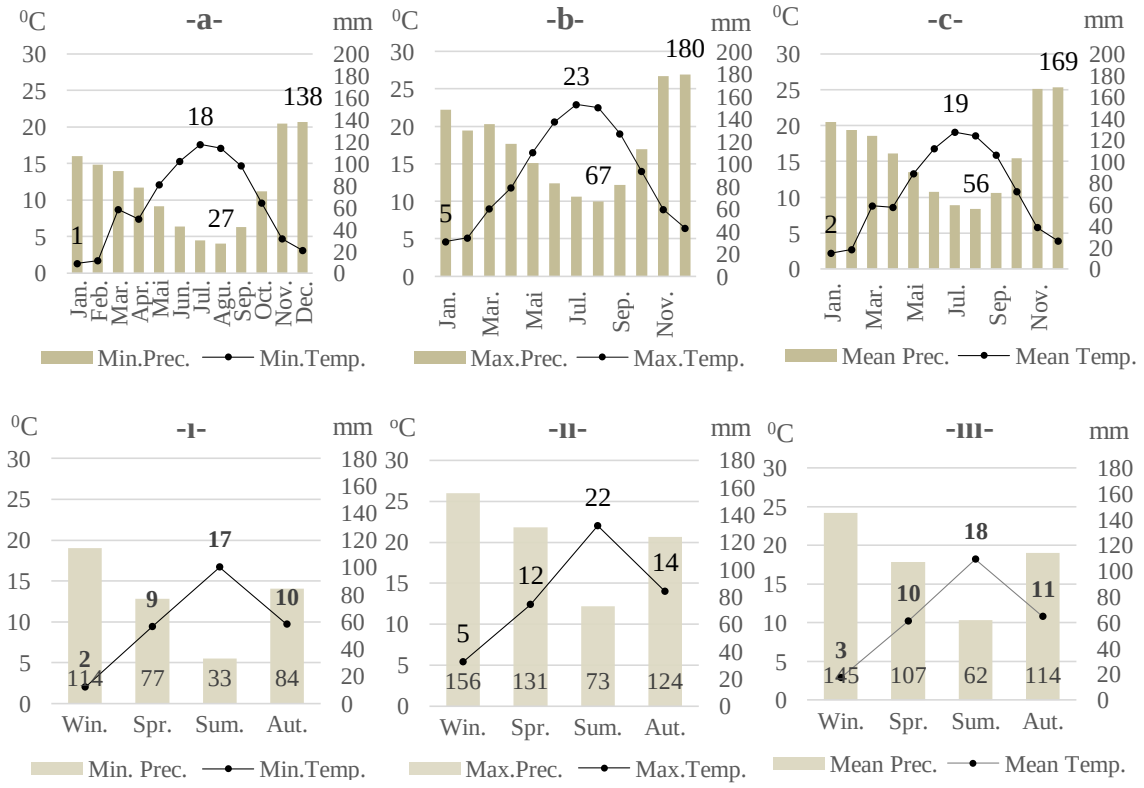


**Fig 1:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Abies**Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Abies (Abi) (G) forests are located on the northern slope of Mt. Kaz, between 499 and 1394 meters elevations, while in a very small area on the south slope, between 1155 and 1406 meters elevation (Hepbilgin and Koç, 2019b). Almost all of the pure Abies forests in the Mt. Kaz natural forest area are located on the northern slope with a total area of approximately 2 $km^2$, and 75% of which located on lands facing north-northwest side (Hepbilgin, 2019c). 92% of pure Abies forests are located between 1000 and 1500 meters on the northern slope of Mt. Kaz whereas 90% of pure Abies forests are located between 1250 and 1500 meters of altitude on the southern slope of Kaz Mountain (Hepbilgin and Koç, 2019b).

Annual average minimum, maximum and average temperature and precipitation values in Mt. Kaz pure Abies forests were obtained as 8.9$^0$C, 13.2$^0$C, 10$^0$C, 928 mm, 1414mm and 1286 mm (Table 1).

It is observed that the monthly average minimum temperatures in Mt. Kaz pure Abies areas range from 1$^0$C (in January) to 18$^0$C (in July), and the monthly average minimum precipitation ranges from 27 mm (in August) to 138 mm (in December) (Fig 1a). It is observed that the average monthly maximum temperatures range from 5$^0$C (in January) to 23$^0$C (in July) and the average monthly maximum precipitationsrange from 67 mm (in August) to 180 mm (in December) (Fig 1b). Average monthly temperatures range from 2$^0$C (in January) to 19$^0$C (in July), and precipitations range from 56 mm (in August) to 169 mm (December) in Mt. Kaz pure Abies stands (Fig 1c).

Seasonal minimum mean temperatures in Mt. Kaz pure Abies areas are 2$^0$C in winter and 17$^0$C in summer; the average minimum precipitation is observed to be between 33 mm (in summer) and 114 mm (in winter). In addition, the average minimum temperature and precipitation in spring and autumn are around 9$^0$C and 80 mm (Fig 1i). The average maximum winter and summer mean temperatureand precipitation values are 5$^0$C to 22$^0$C; and between 73 mm - 156 mm, respectively.The average maximum temperature and precipitation in spring and autumn are around 13$^0$C and 128 mm (Fig 1ıı). While seasonal average temperatures are 3$^0$C (in winter) and 18$^0$C (in summer) respectively, seasonal average precipitation values range between 62 mm in summer and 145 mm in winter. In addition, the average temperature and precipitation in spring and autumn are around 10$^0$C and 110 mm, respectively (Fig 1ıı).

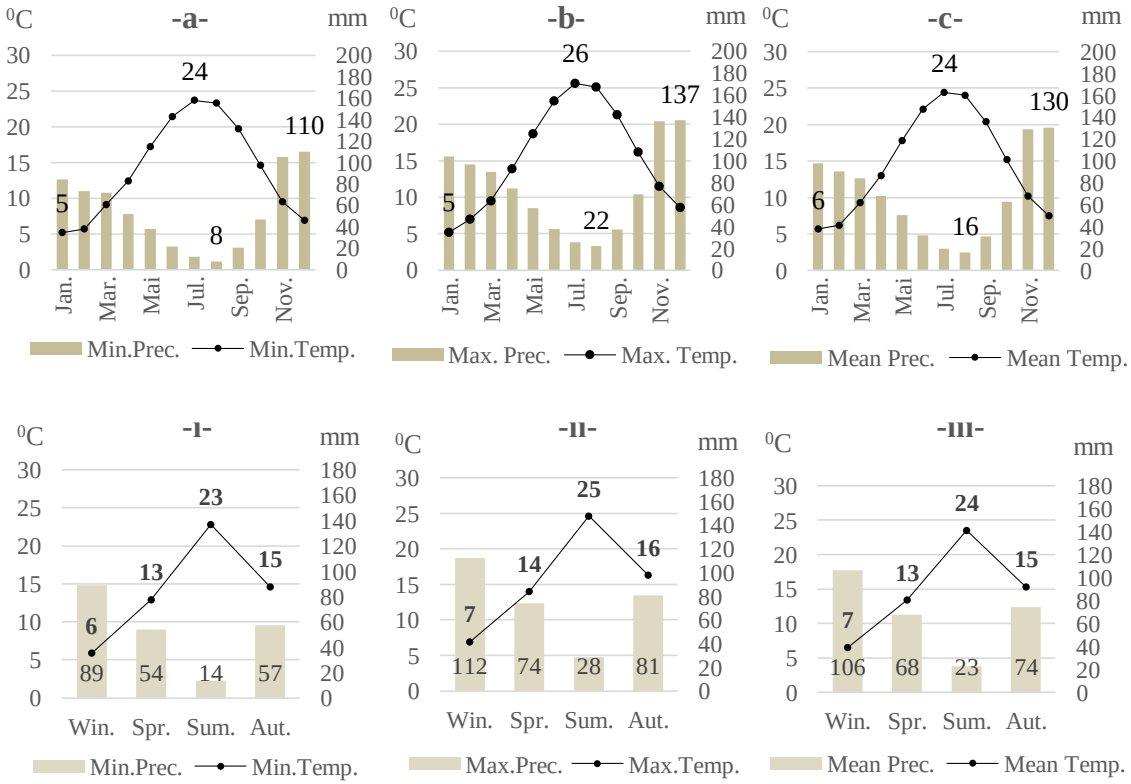


**Fig 2:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus pinea**Forest a, ı. Minimum; b, ıı: Maximum; c, ııı: Mean.

Pinus pinea (PPin) (Çf) is a type of pine, which has high temperature and light demand and prefers areas with mild climate and sea effects (Günal, 1997). Pinus pinea has an area of approximately 2 km$^2$ in Mt. Ida natural forest area (Hepbilgin, 2019c). Pinus pinea forest in Mt. Ida is located between 89 meters and 302 meters on the northern slope, while on the south slope it can be seen up to 422 meters above sea level (Hepbilgin and Koç, 2019b). While 93% of the Pinus pinea areas on the southern slope of Mt. Ida are between 250 and 500 meters elevation; the entire area of Pinus pinea on the northern slope of Mt. Ida is between 0 and 500 meters (Hepbilgin and Koç, 2019b).

Annual mean minimum, maximum and mean temperatures and precipitation in Mt. Ida Pinus pinea forests were obtained as 13.9$^0$C, 15.4$^0$C, 14.5$^0$C; 641 mm, 887 mm, 814 mm, respectively (Table 1).

In the Kazdağı pure Pinus pinea areas, monthly mean minimum temperatures are between 5$^0$C (in January), 24$^0$C (in July), and monthly average minimum precipitation is between 8 mm (in August) and 110 mm (in December) (Fig 2a). Monthly maximum average temperatures are between 5$^0$C (in January) and 26$^0$C (in July); monthly maximum mean precipitation ranges from 22 mm (in August) to 137 mm (in December) (Fig 2b). Average monthly temperatures in Mt. Ida Pinus pinea areas are between 6$^0$C (in January) and 24$^0$C (in July); precipitation varies between 16 mm (in August) and 130 mm (in December) (Fig 2c).

Seasonal minimum mean temperatures in pure Pinus pinea areas in Mt. Ida are 6$^0$C in winter and 23$^0$C in summer; the average minimum precipitation is observed to be between 14 mm (in summer) and 89 mm (in winter). In addition, the minimum average temperatures in spring and autumn and precipitation are around 14$^0$C and 55 mm (Fig 2ı). Maximum mean temperature and precipitation values are 7$^0$C in winter and 25$^0$C in summer; and between 28 mm in summer and 112 mm in winter. The maximum mean temperature and precipitation in spring and autumn are around 15$^0$C and 78 mm (Fig 2ıı). Seasonal mean temperatures are 7$^0$C (in winter) and 24$^0$C (in summer) respectively; and precipitation is between 23 mm (in summer) and 106 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 14$^0$C and 71 mm, respectively (Fig 2ıı).

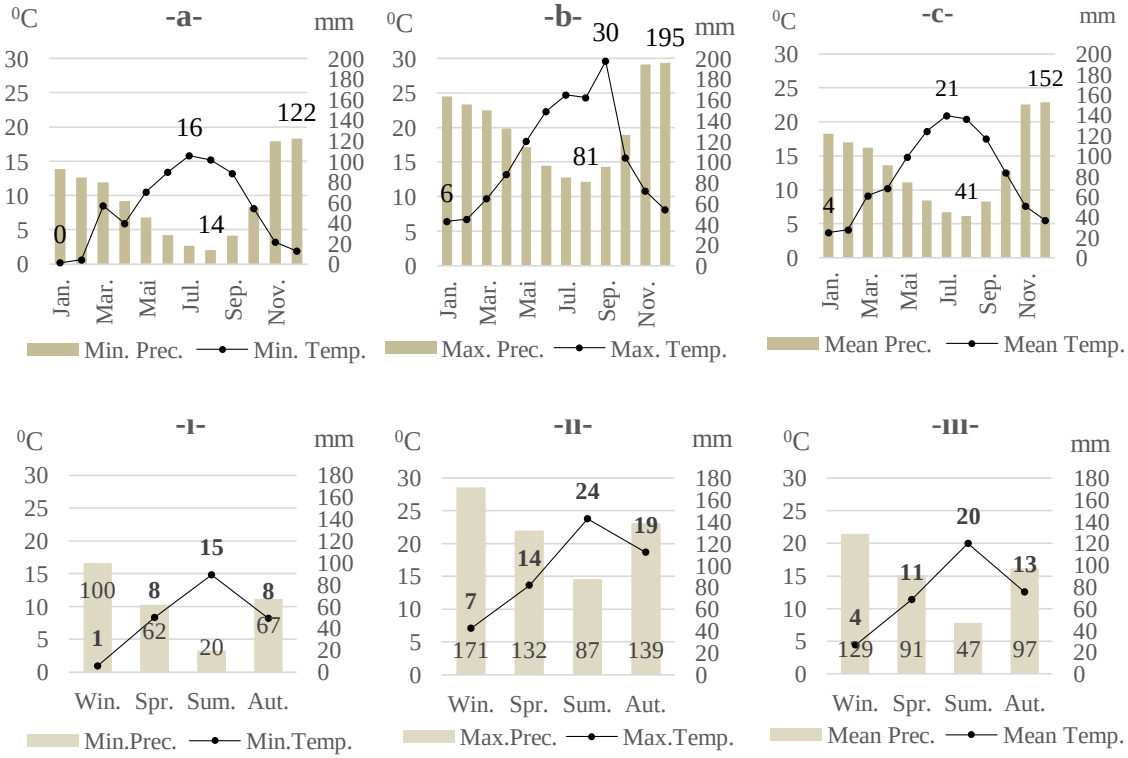


**Fig 3:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus nigra**Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Pinus nigra (Pni) (Çk) forests form 34% of the natural forest area in Mt. Ida. No particular aspect selectivity was found in the spread of Pinus nigra forests (Hepbilgin 2019c). Pure Pinus nigra forests are 216 m - 1708 m on the northern slope of Mt. Ida; on the south slope, it spreads in the range of 273 m - 1735 m (Hepbilgin and Koç, 2019b). 90% of the pure Pinus nigra area on the northern slope of Mt. Ida is between 250 m -1000 m and almost all of the pure Pinus nigra areas on the southern slope are between 500 m and 1500 m (Hepbilgin and Koç, 2019b). Annual mean minimum, maximum and average temperatures in pure Pinus nigra forests in Mt. Ida are 7.4$^0$C, 14.7$^0$C, and 11.7$^0$C, respectively; Annual average minimum, maximum and average precipitation were 745 mm, 1588 mm and 1092 mm respectively (Table 1).

It is observed that the monthly average minimum temperatures in pure Pinus nigra area in Mt. Ida are form $0^0$C (in January) to $16^0$C (in July), and the monthly mean minimum precipitation is between 14 mm (in August) and 122 mm (in December) (Fig 3a). Monthly maximum mean temperatures are between $6^0$C (in January) and $30^0$C (in July); monthly maximum mean precipitation varies between 81 mm (in August) and 195 mm (in December) (Fig 3b). Monthly mean temperatures in pure Pinus nigra area in Mt. Ida are between $4^0$C (in January) and $21^0$C (in July); precipitation varies between 41 mm (in August) and 152 mm (in December) (Fig 3c).

The seasonal minimum mean temperatures in Mt. Ida pure Pinus nigra area are $1^0$C in winter and $15^0$C in summer; minimum mean precipitation is between 20 mm (in summer) and 100 mm (in winter).

In addition, the average minimum temperatures in spring and autumn and precipitation are around $8^0$C and 65 mm (Fig 3i). Maximum winter and summer mean temperatures and precipitation are between $7^0$C and $24^0$C; 87 mm and 171 mm respectively. The average maximum temperature and precipitation in spring and autumn are around $16^0$C and 135 mm (Fig 3ii). Seasonal mean temperatures are $4^0$C (in winter) and $20^0$C (in summer) respectively; precipitation values are between 47 mm (in summer) and 129 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around $12^0$C and 95 mm, respectively (Fig 3iii).

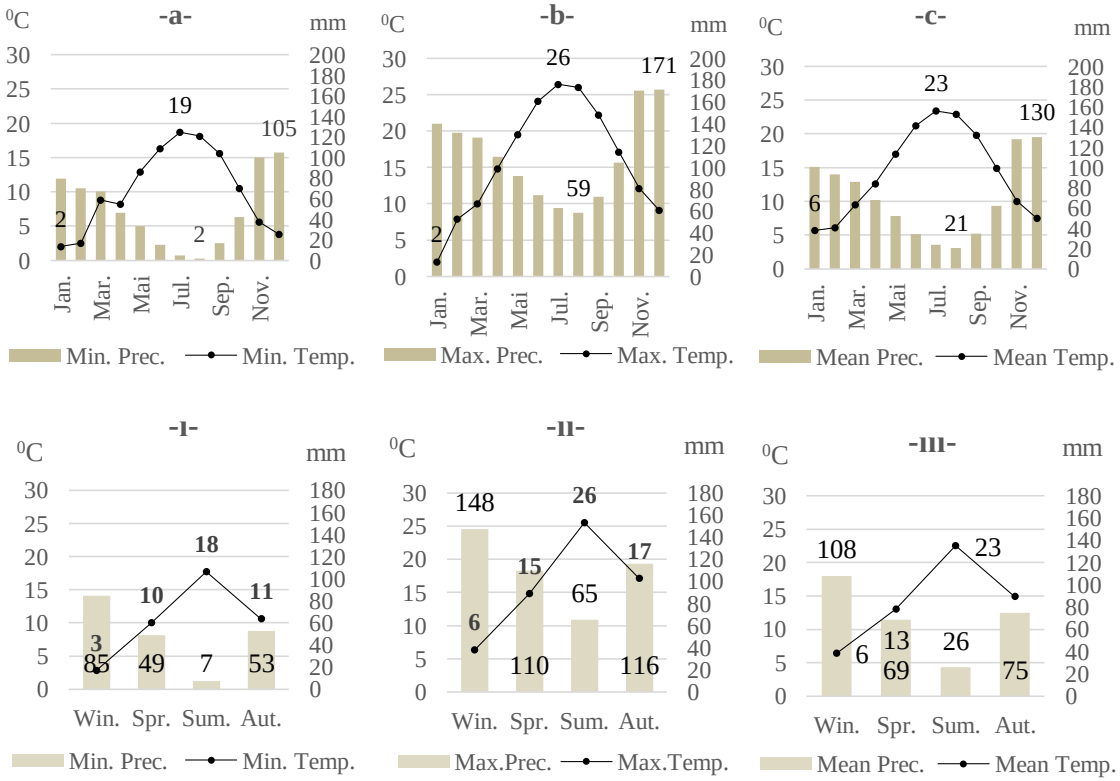


**Fig 4:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus brutia**Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Pinus brutia (Pbru), which has a natural distribution area in the Eastern Mediterranean, covers 25% of the natural forest area of Mt. Kaz (Hepbilgin 2019c). In Mt. Ida, 70% of pure Pinus brutia forests with an area of approximately 300 $km^2$ are spread between 250-500 meters of elevation (Hepbilgin and Koç, 2019a). Pure Pinus brutia areas are located between the elevations of 70 m - 757 m on the northern slope; the areas are spread between the sea level and 1175 m elevations on the southern slope (Hepbilgin and Koç, 2019b). 88% of the pure Pinus brutia (Pbru) fields on the northern slope of Mt. Ida are located between 0 m and 500 m elevations; approximately 90% of the pure Pbru areas on the southern slope are between 250 m and 750 m elevations (Hepbilgin and Koç, 2019b).

The annual minimum, maximum and average temperatures in Ida Mountain Pinus brutia forests are 9.7$^0$C, 16.3$^0$C, and 14.1$^0$C, respectively; while the annual minimum, maximum and average precipitation values are 600 mm, 1316 mm, and 833 mm respectively (Table 1).

Maximum mean temperatures in the Pinus brutia forests in Mt. Ida vary between 2$^0$C and 26$^0$C during the year (Fig 4b). The lowest mean temperatures in the Pinus brutia forests are between 2$^0$C and 19$^0$C (Fig 4a), the highest temperatures range between 6$^0$C (in January) and 26$^0$C (in July) (Fig 4b). Mean temperatures range between 6$^0$C (in January) and 23$^0$C (in July), and average precipitation ranges from 21 mm (in August) to 130 mm (in December) in Pinus brutia area in Mt. Ida (Fig 4c).

In seasonal charts; minimum, maximum and average temperatures are 3-18$^0$C, 6-26$^0$C and 6-23$^0$C in winter and summer. In spring, the minimum, maximum and average temperatures are 10$^0$C, 15$^0$C and 13$^0$C, respectively (Fig 4ı, ıı, ııı). Again, the minimum, maximum and average precipitation of spring and autumn seasons are 50 mm, 110 mm and 70 mm, respectively (Fig 4ı, ıı, ııı).

Spring precipitation is very important for the Pinus brutia forests, which are especially at risk of fire in the summer drought, to overcome this risk phase more easily (Günal, 1997). Pinus brutia forests which spread from the south of Italy to Israel and to Jordan then, reaches the widest spreading in Turkey (Günal, 1997). The best spreading of Pinus brutia, which has high temperature and light, and low humidity demand, is in the Mediterranean region can be considered as an indicator that the most important factor determining the spreading area of Pinus brutia is the temperature. (Günal, 1997). The annual average temperature values in these spreading areas of Pinus brutia are between 12-18$^0$C (Günal, 1997). The average temperature range of the coldest month is 5-9$^0$C, and the average temperature range of the warmest month is 23-29$^0$C; falling average annual precipitation is over 600 mm (Günal, 1997).

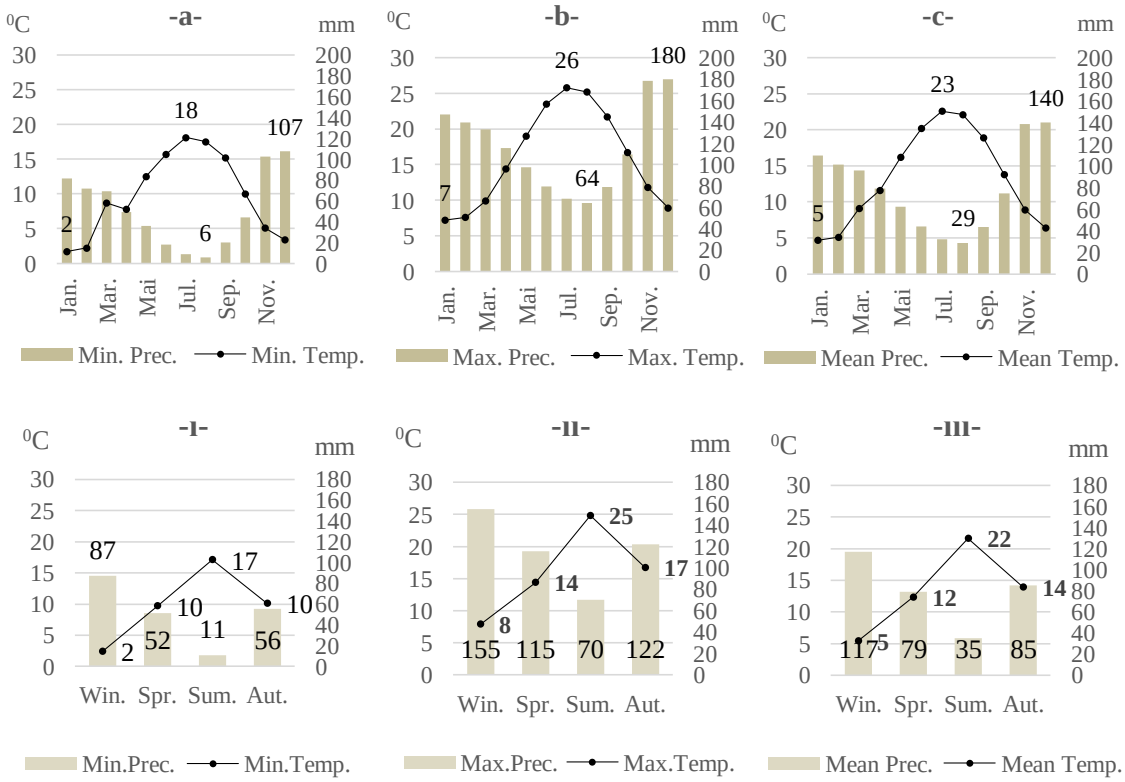


**Fig 5:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Quercus**Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Quercus is a type of tree with a wide spread area in second place after pine in total forest area with 18 native species in Turkey (Günal, 1997). Quercus has an area of 3.11% in pure distribution and approximately 26% in mixed form

within Mt. Ida natural forest area (Hepbilgin 2019c). While pure spreading Quercus forests are at between 90 m and 1212 m elevations on the northern slope of Mt. Ida, they are located between 78 m - 1367 m elevations on the southern slope of Mt. Ida (Hepbilgin and Koç, 2019b). 90% of the pure Quercus areas on the southern slope of Mt. Ida are at between 250 m and 1000 m elevations; approximately 95% of the pure Quercus areas are between 0 m and 750 m on the northern slope of Mt. Ida (Hepbilgin and Koç, 2019b).

Annual mean minimum, maximum and average temperatures in Mt. Ida pure Quercus (oak) forests are 9,3$^0$C, 15,9$^0$C and 13, 1$^0$C respectively, while Annual mean minimum, maximum and average precipitation values were 622 mm, 1390 mm and 949 mm, respectively (Table 1).

In Mt. Ida, pure Quercus areas, monthly mean minimum temperatures are observed between 2$^0$C (in January) and 18$^0$C (in July), and monthly minimum mean precipitation is between 6 mm (in August) and 107 mm (in December) (Fig 5a). Average monthly maximum temperatures vary between 7$^0$C (in January) and 26$^0$C (in July), monthly maximum mean precipitation varies between 64 mm (in August) and 180 mm (in December) (Fig 5b). Average monthly temperatures in Mt. Ida pure Quercus areas are between 5$^0$C (in January) and 23$^0$C (in July); precipitation varies between 29 mm (in August) and 140 mm (in December) (Fig 5c).

Seasonal average minimum temperatures and precipitation in Mt. Ida pure Quercus areas are between 2$^0$C in winter, 17$^0$C in summer, 11 mm (in summer) and 87 mm (in winter) respectively.

In addition, the seasonal minimum mean temperatures and precipitation in spring and autumn are around 10$^0$C and 54 mm (Fig 5ı). The average maximum winter and summer temperatures and precipitation are 8$^0$C and 25$^0$C, 70 mm and 155 mm respectively, while the average maximum temperature and precipitation in spring and autumn are around 15$^0$C and 120 mm. (Fig 5ıı). Seasonal average temperatures and precipitation range between 5$^0$C (in winter) and 22$^0$C (in summer), 35 mm (in summer) and 117 mm (in winter), respectively. In addition, the average temperature and precipitation in spring and autumn are around 13$^0$C and 82 mm, respectively (Fig 5ıı).

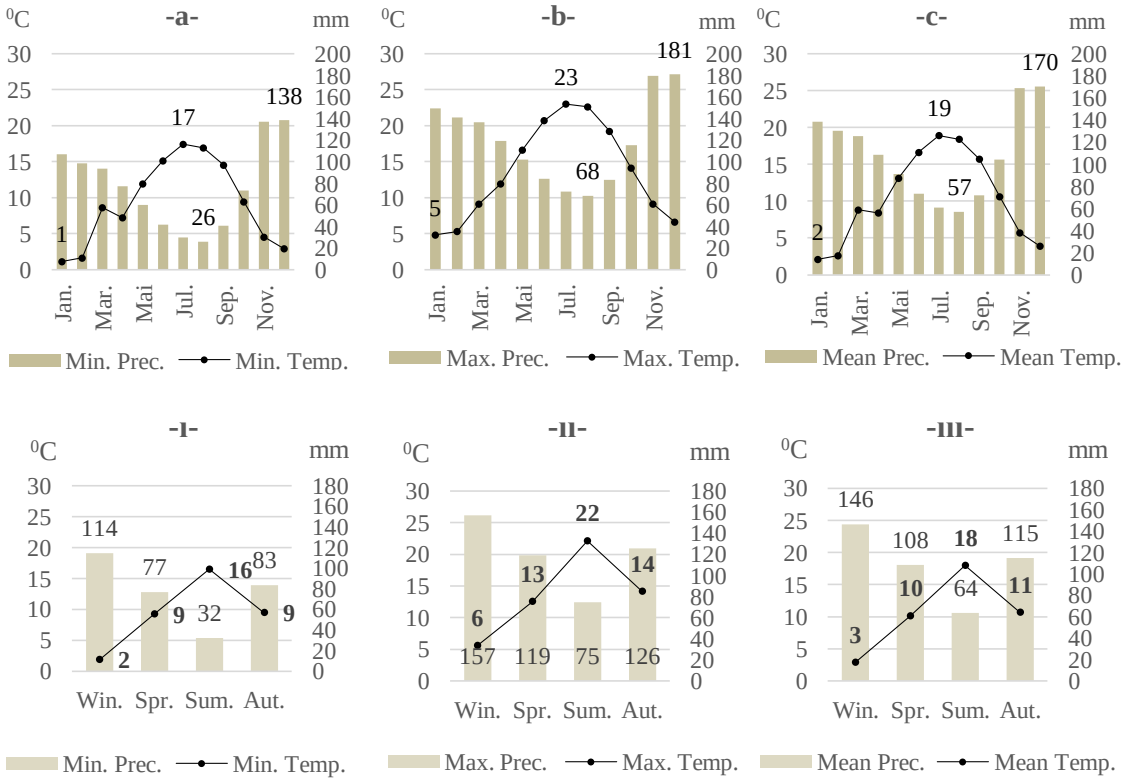


**Fig 6:-** Monthly Total Temperature and Precipitation Diagrams in **Fagus**Forest a, ı: Minimum; b, ıı: Maximum; c, ıı: Mean.

Fagus spp. (Fag) (Kn) covers the second largest area after pine (Pinus spp.) of the total forest area in Turkey (Günal, 1997). It is located on an area of 6 $km^2$ in pure dispersed Fagus in Mt. Ida. More than half of this area is on lands facing northern aspect (Hepbilgin, 2019c). The pure stands of Fagus in Mt. Ida are located between minimum 489 m and maximum 559 m elevation on the north slope, and minimum 816 m and maximum 1432 m elevations on the south slope (Hepbilgin and Koç, 2019b). 78% of the pure stands of Fagus on the southern slope of Mt. Ida are seen between 1250 m and 1500 m, while 78% of the pure Fagus stands on the northern slope are between 1000 m and 1500 m elevations (Hepbilgin and Koç, 2019b).

The Annual minimum, maximum and average temperature values were obtained as 8.7$^0$C, 13.3$^0$C and 9.9$^0$C in pure Fagus forests in Mt. Ida, while annual minimum, maximum and average precipitation were 922 mm, 1430 mm and 1301 mm, respectively (Table 1).

It is observed that the monthly average minimum temperatures in Mt. Ida pure Fagus areas are between 1$^0$C (in January) and 17$^0$C (in July), and the monthly average minimum precipitation is between 26 mm (in August) and 138 mm (in December) (Fig 6a). It is also observed that the mean monthly maximum temperatures range from 5$^0$C (in January) to 23$^0$C (in July), and the average monthly maximum precipitation ranges from 68 mm (in August) to 181 mm (in December) (Fig 6b). The monthly mean temperatures in Mt. Ida pure Fagus stands range from 2$^0$C (in January) to 19$^0$C (in July), and precipitation ranges from 57 mm (in August) to 170 mm (in December) (Fig 6c).

Seasonal average minimum temperatures in Mt. Ida pure Fagus stands are obtained as 2$^0$C in winter and 16$^0$C in summer; the average minimum precipitation is observed to be between 83 mm (in summer) and 114 mm (in winter). In addition, the average minimum temperature and precipitation in spring and autumn are around 9$^0$C and 80 mm (Fig 6ı). The average maximum winter and summer temperature and precipitation values are between 6$^0$C and 22$^0$C, 75 mm - 157 mm respectively, and the average maximum temperature and precipitation in spring and autumn are around 13$^0$C and 123 mm. (Fig 6ıı). Seasonal mean temperatures and precipitation range between 3$^0$C (in winter) and 18$^0$C (in summer) and precipitation values range between 64 mm (in summer) and 146 mm (in winter) respectively. In addition, the average temperature and precipitation values in spring and autumn are obtained around 10$^0$C and 112 mm, respectively (Fig 6ıı).

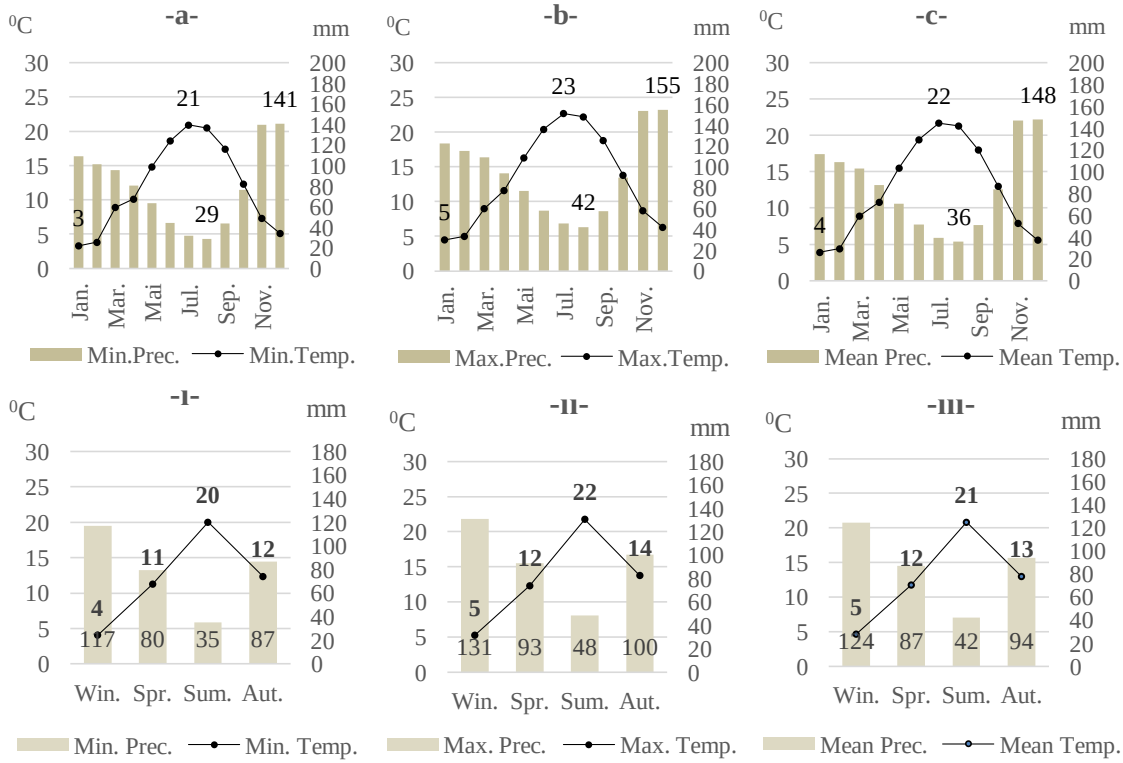


**Fig 7:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Castanea**Forest a, ı: Minimum; b, ıı: Maximum; c, ıı: Mean.

Approximately 75% of pure Castanea (Castanea sativa) forests in Mt. Ida are facing to the North, Northwest direction and 22% of the formation is facing to the West. (Hepbilgin 2019c). Pure Castanea stands are found only on the northern slope of Mt. Kaz at between 549 m and 852 m elevations (Hepbilgin and Koç 2019b). 75.2% of this area on the northern slope only is located at elevations between 500 m - 750 m, and 22.6% of the area is at 750 m - 1000 m elevations(Hepbilgin and Koç 2019b).

Annual mean minimum, maximum and average temperatures and precipitation in pure Castanea forests in Mt. Ida are 11,5$^0$C, 13$^0$C and 12,2$^0$C; 955 mm, 1119 mm and 1043 mm, respectively (Table 1).

Monthly average minimum temperatures in Mt. Ida pure Castanea forest range from 3$^0$C (in January) to 21$^0$C (in July), while minimum mean precipitation ranges from 29 mm (in August) to 141 mm (in December) (Fig 7a).

While the mean of the maximum temperatures is 5$^0$C (in January), 23$^0$C (in July), the mean of the maximum precipitation ranges from 42 mm (in August) to 155 mm (in December) (Fig 7b). In Mt Ida pure Castanea stands where monthly mean temperatures are between 4$^0$C and 22$^0$C, monthly mean precipitation vary between 36 mm and 148 mm (Fig 7c).

In pure Castanea forest in Ida Mountain, seasonal average minimum temperatures range between 4$^0$C (in January) and 20$^0$C (in July), and seasonal average minimum precipitation ranges from 35 mm (in summer) to 117 mm (in winter) (Fig 7ı). Average maximum temperatures are between 5$^0$C (in January) and 22$^0$C (in December), while average maximum precipitation is between 48 mm (in summer) and 131 mm (in winter) (Fig 7ıı).In pure Castanea forests in Mt. Ida where seasonal mean temperatures are 5$^0$C in winter and 21$^0$C in summer, seasonal mean precipitation is between 42 mm (summer) and 124 mm (winter).

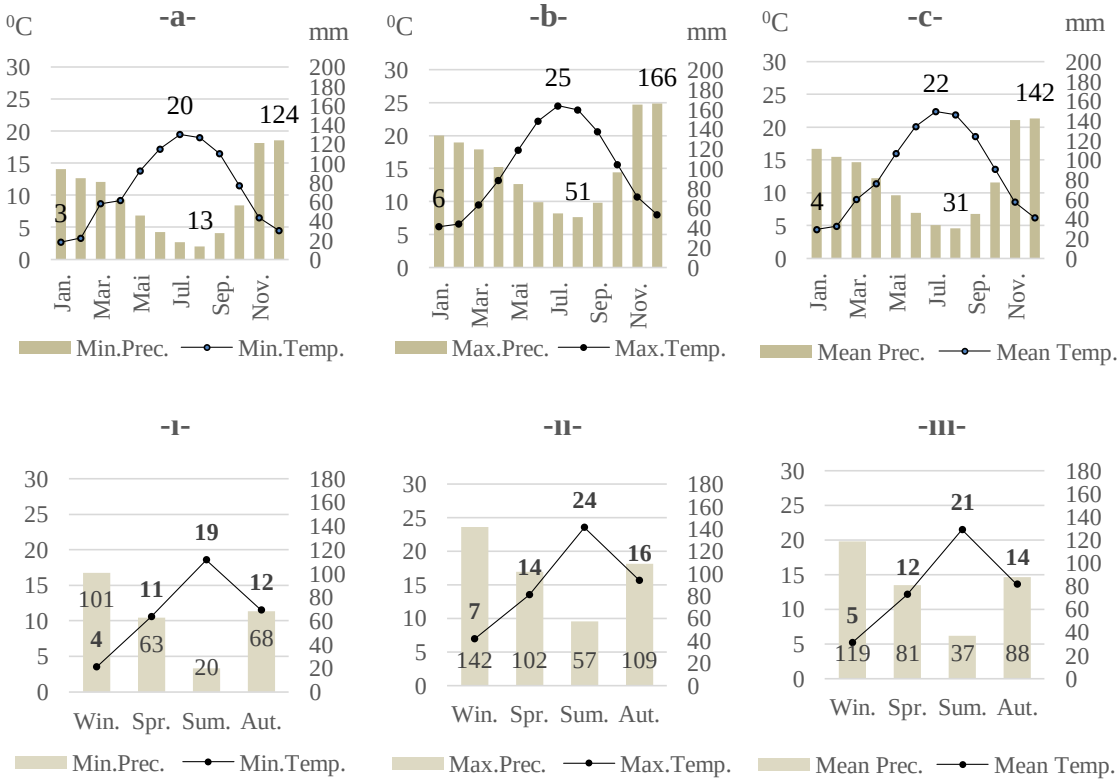


**Fig 8:-** Monthly Total Temperature and Precipitation Diagrams in **Maquis**Forest a, ı: Minimum; b, ıı: Maximum; c, ıı: Mean.

Almost half (48%) of the maquis stands in Mt. Ida are located in the areas in south and southeast sectors (Hepbilgin, 2019c). Again, 72% of these areas are located on the north slope and 28% of them is on the south slope (Hepbilgin and Koç, 2019b). While 52% of the pure maquis areas on the northern slope of Ida Mountain are located between 250 m and 500 m, 45% of them are in the range of 500 m - 750 m, 65% of the pure maquis areas on the southern

slope of Mt. Ida are between 750 m -1000 m, 26% of the area is between 500 m and 750 m. elevation. The maquis areas on the northern slope of Mt. Ida are between minimum 229 m. and maximum 1065 m elevations, the maquis communities on the southern slope are at minimum 579 m and maximum 1082 m. elevations (Hepbilgin and Koç, 2019b).

Annual average minimum, maximum and average temperatures in maquis areas of Mt. Ida are $10,7^0$C, $14,8^0$C and $12,8^0$C respectively, and annual mean minimum, maximum and precipitation values are 754 mm, 1227 mm and 974 mm, respectively (Table 1).

Monthly minimum mean temperatures of Mt. Ida maquis areas are obtained between $3^0$C (in January) and $20^0$C (in July); and monthly average minimum precipitation is 13 mm (in August) and 124 mm (in December). It is observed that average monthly maximum temperatures range from $6^0$C (in January) to $25^0$C (in July), and average monthly maximum precipitation ranges from 51 mm (in August) to 166 mm (in December) (Fig 8b). Average monthly temperatures in maquis areas of Mt. Ida are between $4^0$C (in January) and $22^0$C (in July); and precipitation was obtained from 31 mm (August) to 142 mm (December) (Fig 8c).

Seasonal average minimum temperatures in Ida Mountain's maquis areas are $4^0$C in winter and $19^0$C in summer; the average minimum precipitation is observed to be between 20 mm (in August) and 101 mm (in winter). In addition, the average minimum temperature and precipitation in spring and autumn are $11^0$C and 65mm (Fig 8ı). The maximum mean winter and summer temperatures are between $7^0$C and $21^0$C, while the maximum mean temperature and precipitation in spring and autumn are around $15^0$C and 105 mm (Fig 8ıı). Seasonal average temperatures and precipitation in Mt. Ida maquis areas are between $5^0$C (in winter) and $21^0$C (in summer) and 37 mm (in summer) and 119 mm (in winter). Again, the average temperature in spring and autumn is about $13^0$C (Fig 8ııı).

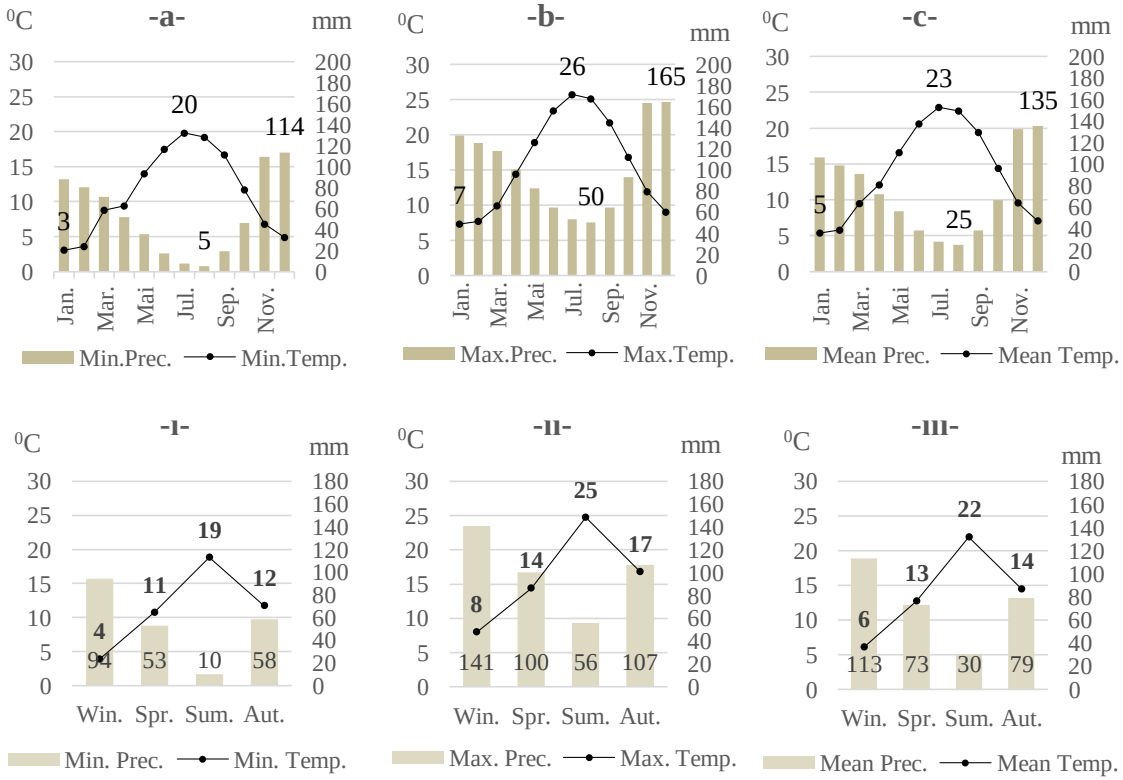


**Fig 9:-** Monthly Total Temperature and Precipitation Diagrams in **Pinus brutia-Quercus**Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

The dominant forests of Pinus brutia-Quercus (Pbru-Qu) (ÇzM) in Mt. Ida occupy an area of 29 $km^2$, the percentage of these areas in natural forest of Mt. Ida is 2.5% (Hepbilgin 2019c). 70% of the Pinus brutia-Quercus stands on the northern slope of Mt. Ida are located between 250-500 meters; 30% of them are at between 500 m - 750 m elevations (Hepbilgin 2019c). 53% of the Pinus brutia-Quercus-dominant stands on the southern slope of Mt. Ida are

located between 500m - 750m elevations, and 32% of them are between 250 m – 500 m (Hepbilgin and Koç 2019b). Pbru-Qu dominant stands are located between 159 m and 776 m elevations on the northern slope, while they are located between 66 m-1064 m. elevations on the southern slope. (Hepbilgin and Koç 2019b).

Annual mean minimum, maximum and average temperatures and precipitation in Pbru-Qu stands in Ida Mountain were obtained as $11^0$C, $15.9^0$C, $13.6^0$C and 657mm, 1212 mm and 888 mm, respectively (Table 1).

The monthly average minimum temperature and precipitation of Ida Mountain, Pbru-Qu stands are $3^0$C (in January) and $20^0$C (in July), 5 mm (in August) and 114 mm (in December), respectively (Fig 9a). It is observed that monthly maximum mean temperatures range from $7^0$C (in January) to $26^0$C (in July), while monthly maximum mean precipitation values are between 50 mm in August and 165 mm in December (Fig 9b). The monthly mean temperature and precipitation in Pbru-Qu stands in Mt. Ida are obtained as $5^0$C in January and $23^0$C in July; 25 mm in August and 135 mm in December (Fig 9c).

Seasonal minimum mean temperatures and precipitation values in Pbru-Qu areas are between $4^0$C in winter and $19^0$C in summer, 10 mm in summer and 94 mm in winter (Hepbilgin 2019c). In addition, the minimum mean temperatures and precipitation in spring and autumn are around $11^0$C and 55 mm (Fig 9ı). The maximum winter and summer mean temperatures and precipitation are around $8^0$C to $25^0$C, 56 mm - 141 mm respectively, and the spring and autumn average maximum temperature and precipitation values obtained around $15^0$C and 103 mm (Fig 9ıı). Seasonal mean temperatures and precipitation in Pbru-Qu stands in M.Ida are between $6^0$C in winter and $22^0$C in summer and 30 mm in summer and 113 mm in winter respectively. For the average temperature and precipitation values in spring and autumn varies around $13^0$C and 76 mm, respectively (Fig 9ıı).

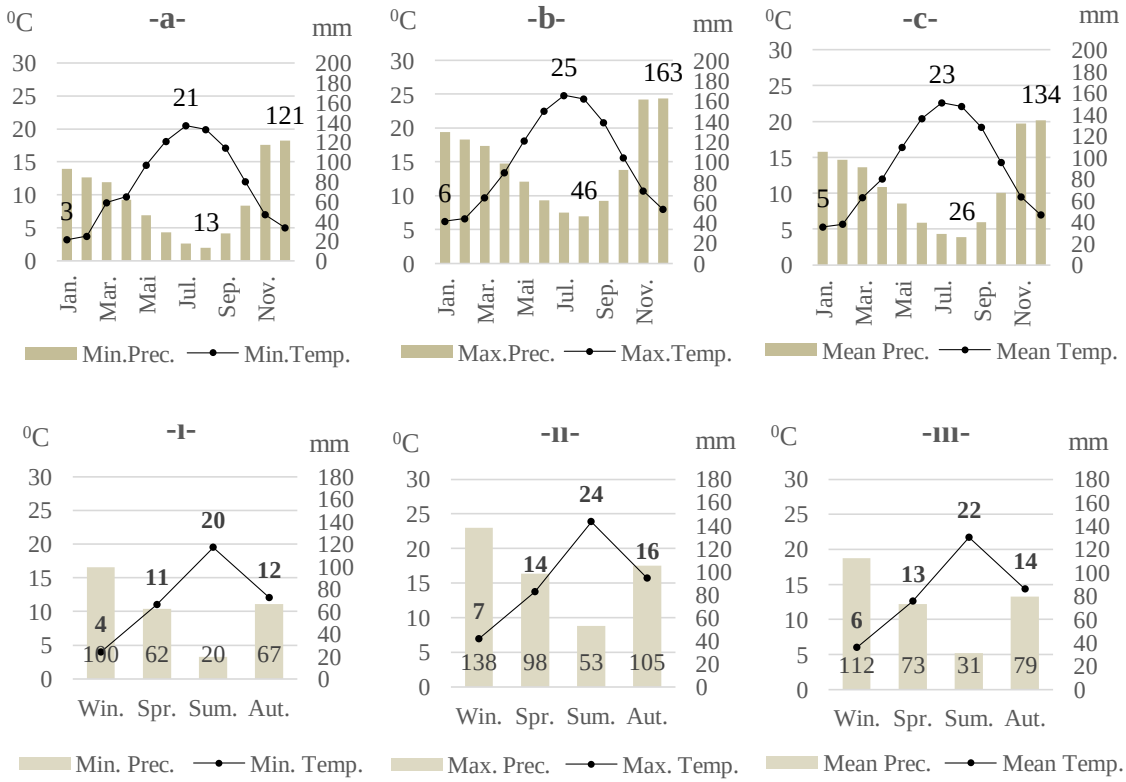


**Fig 10:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus brutia-Pinus nigra**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Pbru-Pni (Pinus brutia-Pinus nigra) (Pbru-Pni) stands covers 2% of the natural forest area in Mt. Ida (Hepbilgin 2019c). Pbru-Pni areas are found in the western part of Ida Mountain and mostly in the north and the northwest

directions (Hepbilgin 2019c). Almost all (97.9%) of the Pbru-Pni on the northern slope of Ida Mountain is located between 250-750 m elevations and those on the southern slope are between 500 m - 1000 m. Pbru-Pni forests are at elevations of minimum 211 m and maximum 732 m on the northern slope, while they are located between 256 m. and 978 m. maximum on the southern slope (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures in the Pbru-Pni stands are 11,3$^0$C, 14,9$^0$C and 13,5$^0$C; while annual minimum, maximum and average precipitation values were 753, 1183 and 889 mm, respectively (Table 1).

Monthly average minimum temperatures in Pbru-Pni stands are between 3$^0$C (in January) and 21$^0$C (in July), and monthly minimum mean precipitation value is 13 mm in August and 121 mm in December (Fig 10a). It is observed that the average monthly maximum temperatures range from 6$^0$C in January to 25$^0$C in July, and the average monthly maximum precipitation ranges from 46 mm in August to 163 mm in December (Fig 10b). Monthly mean temperature and precipitation indicators in Ida Mountain Pbru-Pni areas were obtained as 5$^0$C (in January) and 23$^0$C (in July), 26 mm (in August) and 134 mm (in December) (Fig 10c).

It is observed that seasonal average minimum temperatures in Pbu-Pni stands are between 4$^0$C in winter and 20$^0$C in summer, and average minimum precipitation is between 20 mm in summer and 100 mm in winter. In addition, the average minimum temperatures and precipitation in spring and autumn are around 11$^0$C and 65 mm (Fig 10ı). The average maximum winter and summer temperature and precipitation are between 7$^0$C and 24$^0$C, 53 mm and 138 mm, respectively. Spring and autumn maximum mean temperature and precipitation are around 15$^0$C and 105 mm (Fig 10ıı). Seasonal average temperatures are 6$^0$C (in winter) and 22$^0$C (in summer) respectively; precipitation is between 31 mm (in summer) and 112 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 13$^0$C and 75 mm, respectively (Fig 10ıı).

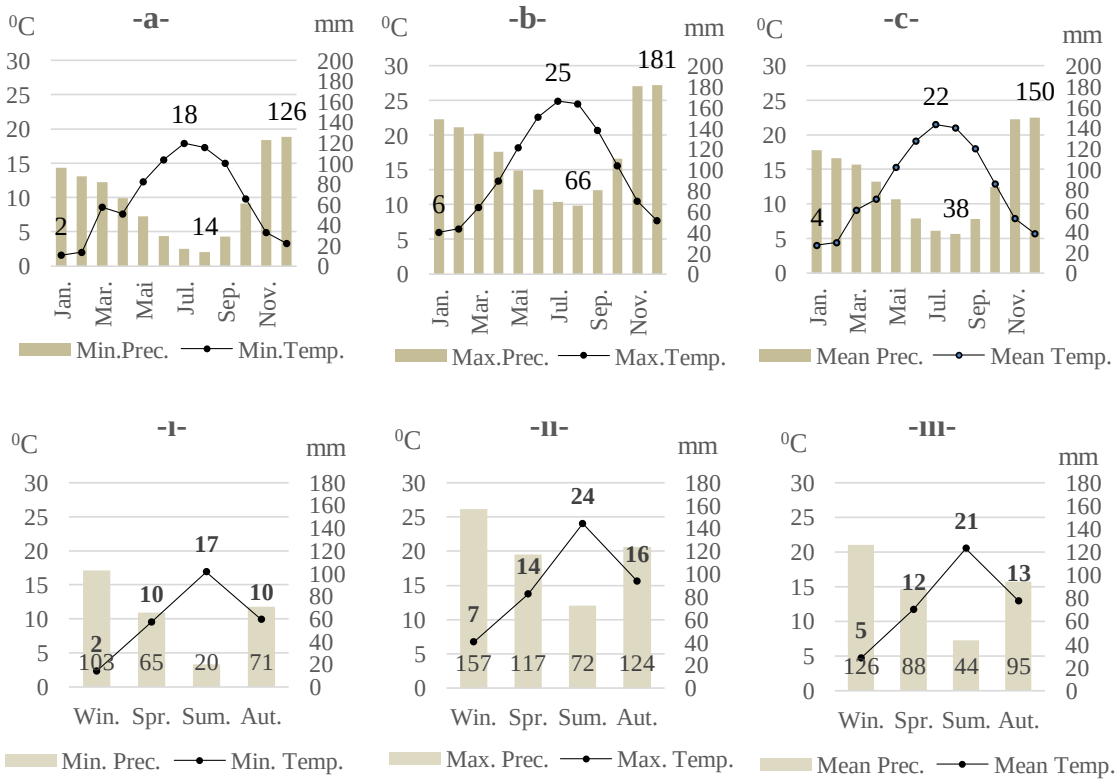


**Fig 13:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus nigra-Maquies**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ıı: Mean.

Pni-Ma (Pinus nigra – Maquis) dominant areas have coverage of 15 km$^2$ in Ida Mountain (Hepbilgin 2019c). 65% of Pni-Ma stands are located in areas with south-facing sectors (Hepbilgin 2019c). While almost all (99.7%) of the Pni-

Ma sovereign unit on the northern slope of Mt. Ida is between 250 m and 750 m, the Pni-Ma stands on the southern slope of Mt. Ida are intensely located between 500 meters and 1000 meters (Hepbilgin & Koç, 2019b). Pni-Ma forests are at elevations of 750 m and 990 m on the north slope of Ida Mountain; while these areas are at minimum height of 235 m and maximum height of 1403 m on the south slope. (Hepbilgin & Koç, 2019b).

Annual minimum, maximum and average temperatures and precipitation in Pinus nigra-Maquis stands were obtained as 9,1$^0$C, 14,9$^0$C, 12,1$^0$C; 786 mm, 1410 mm, 1058 mm, respectively (Table 1).

In Pni-Ma stands in Mt. Ida monthly average minimum temperatures are observed between 2$^0$C (in January) and 18$^0$C (in July), and monthly average minimum precipitation is between 14 mm (in August) and 126 mm (in December) (Fig 11a). It is observed that the average monthly maximum temperatures range from 6$^0$C (in January) to 25$^0$C (in July), and average monthly maximum precipitation ranges from 66 mm (in August) to 181 mm (in December) (Fig 11b). Monthly mean temperature and precipitation indicators in Pni-Ma stands in Ida Mountain were obtained as 4$^0$C (in January) and 22$^0$C (in July), 38 mm (in August) and 150 mm (in December) (Fig 11c).

It is observed that seasonal average minimum temperatures in Ida Mountain Pni-Ma areas are between 2$^0$C in winter and 17$^0$C in summer, and average minimum precipitation is between 20 mm (in August) and 103 mm in winter. In addition, the average minimum temperatures and precipitation in spring and autumn are around 10$^0$C and 68 mm (Fig 11ı). The mean maximum winter and summer temperature and precipitation are around 7$^0$C to 24$^0$C, 72 mm - 157 mm, and the spring and autumn average maximum temperature and precipitation are around 15$^0$C and 120 mm (Fig 11ıı). Seasonal average temperatures range between 5$^0$C in winter and 21$^0$C in summer, respectively, and precipitation ranges between 44 mm in summer and 126 mm in winter. In addition, the average temperature and precipitation in spring and autumn are around 12$^0$C and 92 mm, respectively (Fig 11ıı).

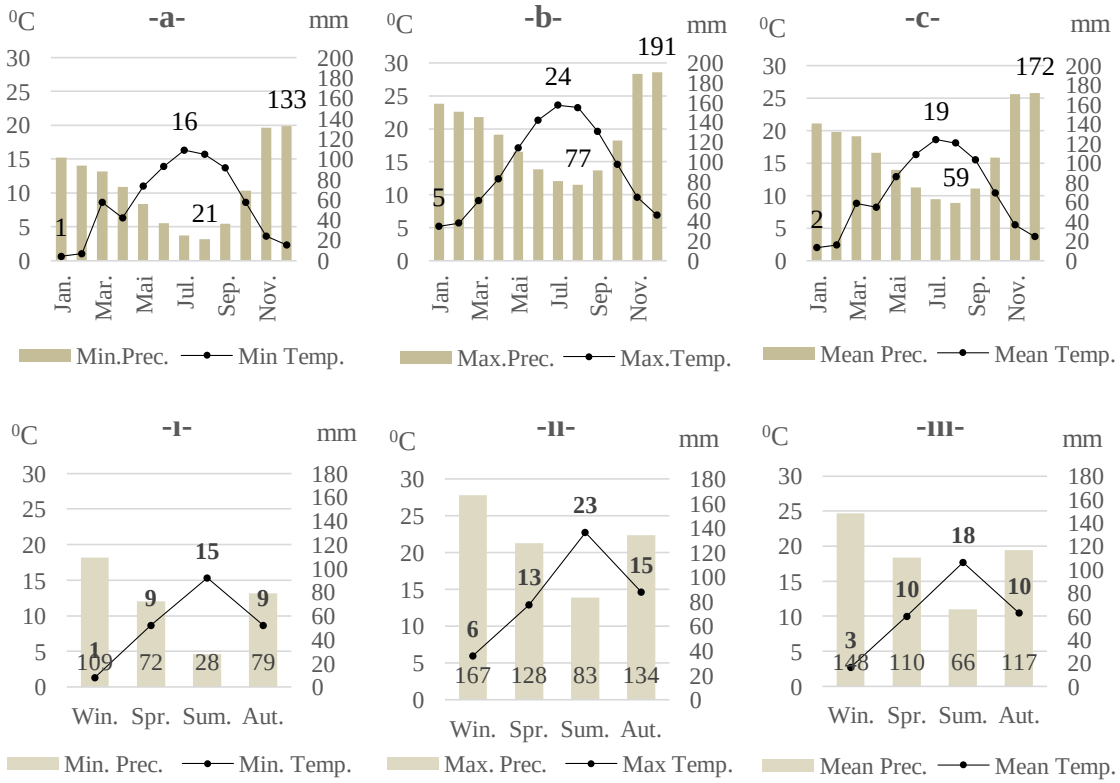


**Fig 12:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus nigra-Abies**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

The dominant areas of Pinus nigra - Abies (Pni-Abi) cover an area of 7 km$^2$ in Ida Mountain (Hepbilgin 2019c). 55% of Pni-Abi stands are spread on the North, West and the Northwest facing areas (Hepbilgin 2019c). While 90% of the Pni-Abi areas on the southern slope of Ida Mountain are located between 1250 m and 1500 m, 92% of them are spread between 750 m and 1500 m elevations (Hepbilgin & Koç, 2019b). Pni-Abi dominant stands are at the lowest 379 m. and the highest is 1642 m. elevation levels on the southern slope, while they are at 668 m. the lowest elevation and 1624 m. the highest. (Hepbilgin & Koç, 2019b).

Annual minimum, maximum and average temperatures and precipitation values in Pni-Abi stands wereobtained as 7,8$^0$C, 13,8$^0$C and 9,7$^0$C; 863, 1534 and 1323 mm respectively (Table 1).

The monthly minimum mean temperatures in Pni-Abi dominant stands of Ida Mountain are between 1$^0$C (in January) and 16$^0$C (in July), while the monthly average minimum precipitation is between 21 mm in August and 133 mm in December (Fig 12a). Monthly maximum mean temperatures range from 5$^0$C in January and 24$^0$C in July, while mean monthly maximum precipitation values are between 77 mm in August and 191 mm in December (Fig 12b). Monthly mean temperature and precipitation indicators in Ida Mountain Pni-Abi stands were obtained as 2$^0$C in January and 19$^0$C in July, 59 mm in August and 172 mm in December (Fig 12c).

It is observed that seasonal average minimum temperatures in Ida Mountain Pni-Abi areas are between 1$^0$C in winter and 15$^0$C in summer, and average minimum precipitation is between 28 mm in August and 109 mm in winter. In addition, the average minimum temperatures and precipitation in spring and autumn are around 9$^0$C and 75 mm (Fig 12ı). The maximum winter and summer mean temperature and precipitation values are between 6$^0$C and 23$^0$C, and 83 mm and 167 mm. In addition, spring and autumn average maximum temperatures and precipitation values are around 14$^0$C and 130 mm (Fig 12ii). Seasonal average temperatures range between 3$^0$C (in winter) and 18$^0$C (in summer), respectively, and precipitation ranges between 66 mm (in summer) and 148 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 10$^0$C and 113 mm, respectively (Fig 12ıı).

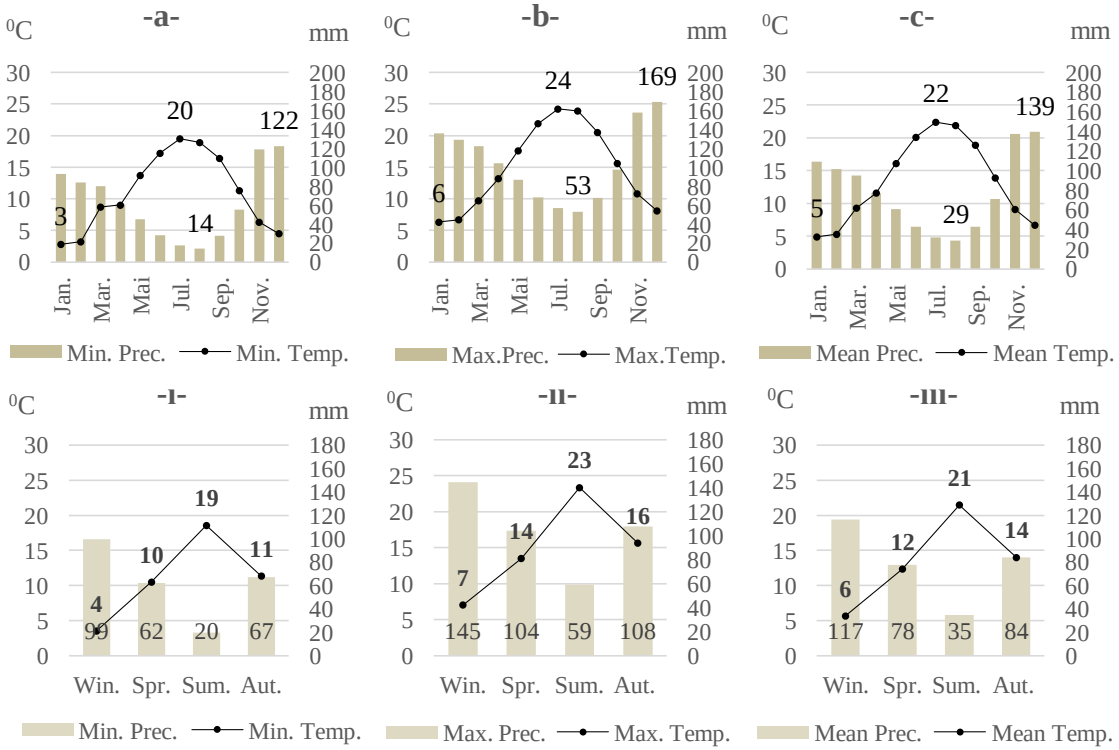


**Fig 13:-** Monthly and Seasonal Temperature and Precipitation Diagrams in Pinus nigra-Pinus brutiadominant Forest a, ı: Minimum; b, ıı: Maximum; c, ıı: Mean.

Pinus nigra - Pinus brutia (Pni-Pbru) dominant association has an area of 18 km$^2$ in Ida Mountain natural forest area (Hepbilgin 2019c). 35% of the Pni-Pbru stands are located facing the west and the northwest areas (Hepbilgin 2019c). 93% of the Pni-Pbru stands on the southern slope of Ida Mountain spread between 500 m and 1000 m elevations, and 99% of those on the northern slope of Mt. Ida spread between 250 m - 750 m elevations (Hepbilgin and Koç, 2019b). The Pni-Pbru forests of Ida Mountain are located between 240 m and 741 m. on the northern slope; while they are located between 338 m. and 1131 m. elevations on the southern slope of Ida Mountain (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures and precipitation in the Pni-Pbru stands were obtained as 10.5$^0$C, 14.7$^0$C, 13.1$^0$C; 745mm, 1257mm and 938mm, respectively (Table 1).

Monthly average minimum temperatures in Pni-Pbru stands are between 3$^0$C (in January) and 20$^0$C (in July), and monthly mean minimum precipitation is between 14 mm in August and 122 mm in December (Fig 13a). It is observed that the average monthly maximum temperatures range from 6$^0$C (in January) to 24$^0$C (in July), and the average monthly maximum precipitation ranges from 53 mm (in August) to 169 mm (in December) (Fig 13b). Average monthly temperature and precipitation on Pni-Pbru fields are 5$^0$C in January and 22$^0$C in July, 29 mm in August and 139 mm in December (Fig 13c).

It is observed that seasonal average minimum temperatures in Pni-Pbru stands are between 4$^0$C in winter and 19$^0$C in summer; and average minimum precipitation is between 20 mm (in August) and 99 mm (in Winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around 100C and 65 mm (Fig 13ı). The mean maximum winter and summer temperature and precipitation values are between 7$^0$C and 23$^0$C; 59 mm and 145 mm respectively, while the average maximum temperature and precipitation in spring and autumn are around 15$^0$C and 106 mm (Fig 13ıı). Seasonal average temperatures range between 6$^0$C in winter and 21$^0$C in summer, respectively, and precipitation ranges between 35 mm in summer and 117 mm in winter. In addition, the average temperature and precipitation in spring and autumn are around 13$^0$C and 81 mm, respectively (Fig 13iii).

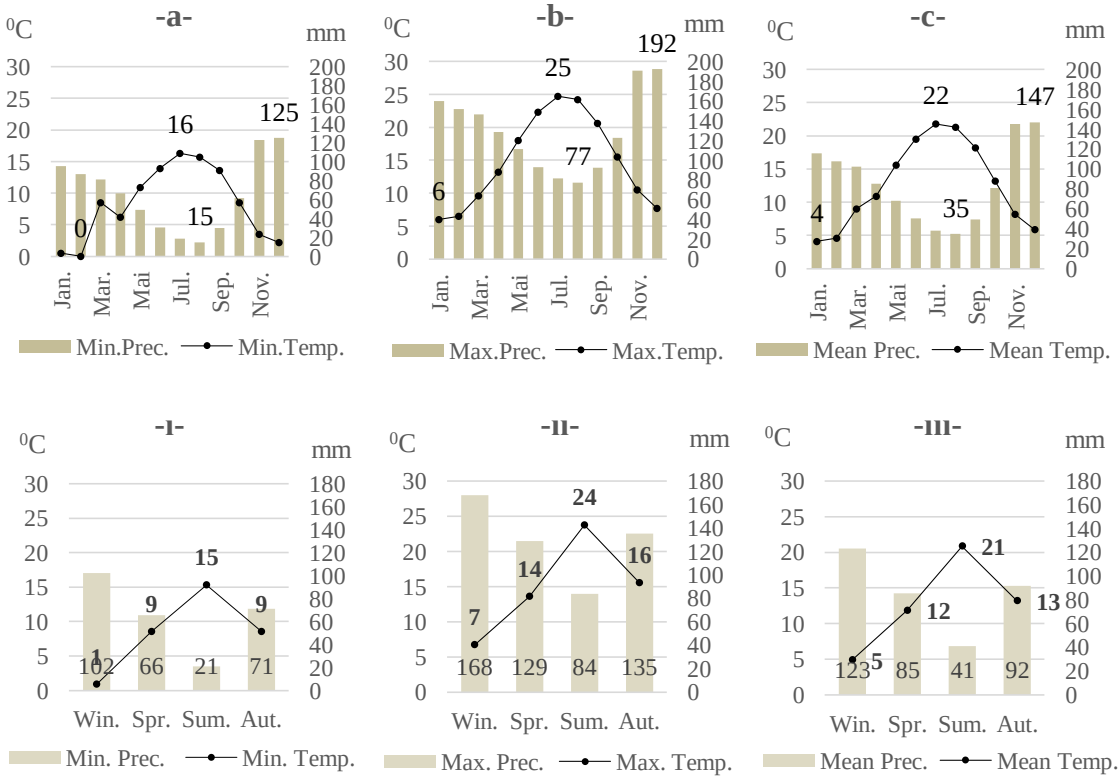


**Fig 14:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus nigra-Quercus**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Pinus nigra-Quercus (Pni-Qu) dominant stands cover 14% proportion in Ida Mountain natural forest area (Hepbilgin 2019c). 52% of Pni-Qu dominant stands are between 750-1000 m, 21% of them are between 500-750 m and other 24% are between 1000-1250 m. on the southern slope; approximately 85% of the Pni-Qu stands are on the northern slope at 250 m and 750 m elevations (Hepbilgin and Koç, 2019b). Pni-Qu stands are between 249 m minimum and 1366 m maximum elevation levels on the northern slope, while they are located 263 m and 1660 m elevations on the southern slope (Hepbilgin and Koç, 2019b).

The annual minimum, maximum and average temperatures in the Pni-Qu areas were 7.8$^0$C, 14.7$^0$C and 12.4$^0$C respectively, and annual minimum, maximum and average precipitation were 791, 1548 and 1025 mm, respectively (Table 1).

It is observed that the monthly average minimum temperatures in Pni-Qu stands are between 0$^0$C (in January) and 16$^0$C (in July), and the monthly average minimum precipitation is between 15 mm (in August) and 125 mm (in December) (Fig 14a). Average monthly maximum temperatures are between 6$^0$C (in January) and 25$^0$C (in July); monthly maximum mean precipitation values vary between 77 mm (in August) and 192 mm (in December) (Fig 14b). Average monthly temperature and precipitation indicators in Pni-Qu areas were obtained as 4$^0$C (in January) and 22$^0$C (in July), 35 mm (in August) and 147 mm (in December) (Fig 14c).

It is observed that seasonal average minimum temperatures in Pni-Qu areas are between 1$^0$C in winter and 15$^0$C in summer, and average minimum precipitation is between 21 mm (in August) and 102 mm (in Winter). In addition, spring and autumn average minimum temperatures and precipitation are around 9$^0$C and 68 mm (Fig 14ı). The average maximum winter and summer temperatures and precipitation values are between 7$^0$C and 24$^0$C, 84 mm (in summer) and 168 mm (in winter), respectively, while the average maximum temperature and precipitation in spring and autumn are around 15$^0$C and 132 mm (Fig 14ıı). Seasonal average temperatures range between 5$^0$C (in winter) and 21$^0$C (in summer), and while seasonal mean precipitation values are between 41 mm in summer and 123 mm in winter, respectively. In addition, the average temperature and precipitation in spring and autumn are around 12$^0$C and 90 mm, respectively (Fig 14ııı).

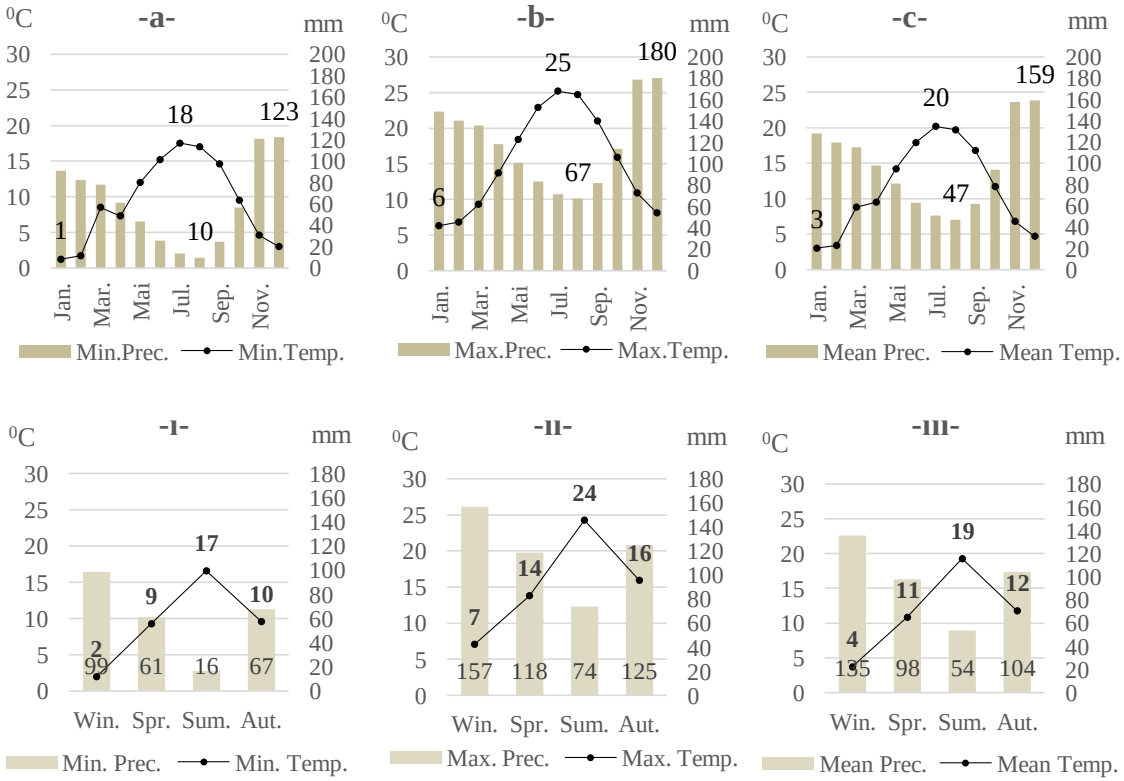


**Fig 15**:- Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus nigra-Fagus**dominant Forest a,ı: Minimum; b,ıı: Maximum; c,ııı: Mean.

The dominant areas of Pinus nigra - Fagus (Pni-Fag) cover an area of 29 km$^2$ in Kazdağı (Hepbilgin 2019c). 55% of the Pni-Fag dominant stands on the southern slope of Ida Mountain is between 1000 m - 1250 m. and 24% of the stands are between the 1250 and 1500 meters. 24% of the Pni-Fag forests on the northern slope are located between 500 m -1250 m. (Hepbilgin and Koç, 2019b). The Pni-Fag forests are located between 135 m and 1358 m on the northern slope and between 558 m - 1421 m on the southern slope (Hepbilgin and Koç, 2019b).

The annual minimum, maximum and average temperatures and precipitations in the Pni-Fag areas were 9,1$^0$C, 14,9$^0$C and 12,1$^0$C; 786 mm, 1410 mm and 1058 mm, respectively (Table 1).

It is observed that the monthly average minimum temperatures in Mt. Ida Pni-Fag stands are between 1$^0$C (in January) and 18$^0$C (in July), and the monthly average minimum precipitation is between 10 mm (in August) and 123 mm (in December) (Fig 15a). It is observed that the average monthly maximum temperatures range from 6$^0$C (in January) to 25$^0$C (in July), and the average monthly maximum precipitation values range from 67 mm (in August) to 180 mm (in December) (Fig 15b). Monthly mean temperature and precipitation in Pni-Fag areas in Mt. Ida were obtained as 3$^0$C in January and 20$^0$C in July, 47 mm in August and 159 mm in December (Fig 15c).

Seasonal minimum mean temperature and precipitation in Pni-Fag stands of Mt. Ida were obtained as 2$^0$C (in winter) and 17$^0$C (in spring), 16 mm (in summer) and 99 mm (in Winter) (Fig 15c). In addition, the average minimum temperatures and precipitation in spring and autumn are around 10$^0$C and 65 mm (Fig 15ı). The average maximum winter and summer temperatures and precipitation are between 7$^0$C and 24$^0$C and between 74mm (in summer) and 157mm (in winter) while the average maximum temperature and precipitation in spring and autumn are 15$^0$C and 120mm (Fig 15ıı). Seasonal average temperatures are 4$^0$C (in winter) and 19$^0$C (in summer); precipitation is between 54 mm (in summer) and 135 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 12$^0$C and 101 mm, respectively (Fig 15ııı).

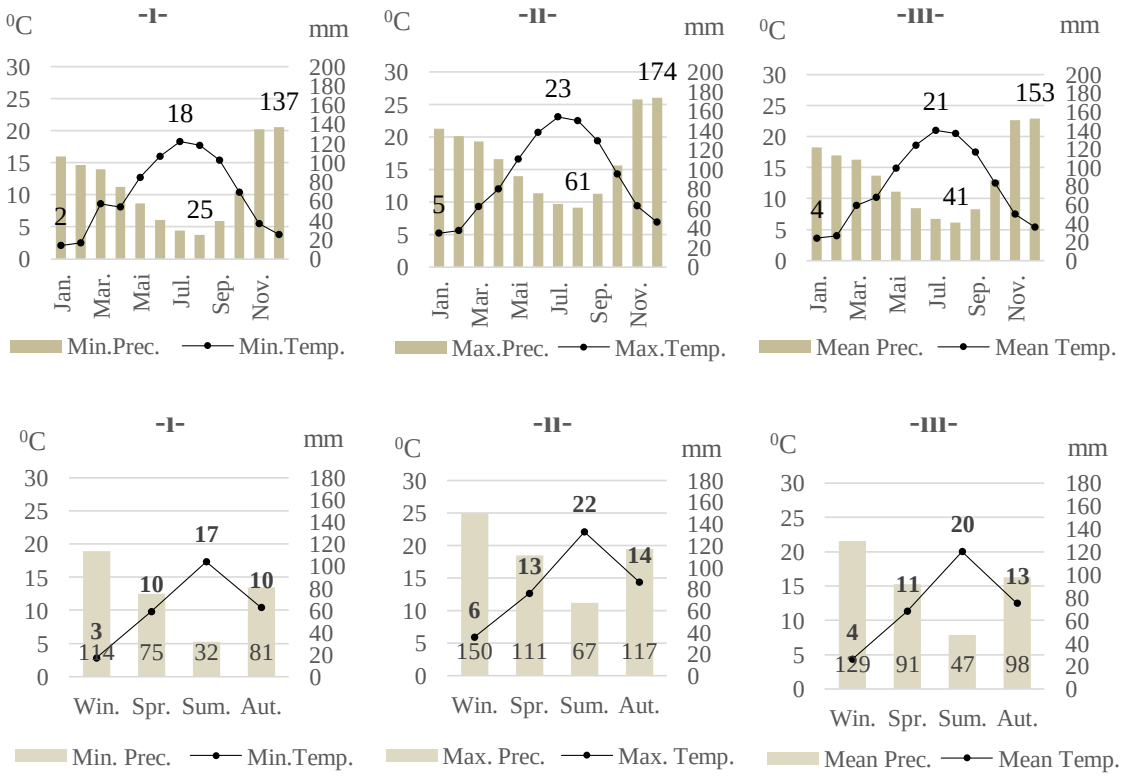


**Fig 16:** Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus nigra-Other Leafed Trees**dominant Forests a,ı: Minimum; b,ıı: Maximum; c,ııı: Mean.

The dominant stands of Pinus nigra - Other Leafed Trees (Pni-OtLe) cover an area of approximately 6 km$^2$ in Mt. Ida, and make up 1% of Ida Mountain natural forest area (Hepbilgin 2019c). Approximately 80% of the Pni-OtLe stands on the southern slope is between 750 m -1250 m elevations; 95% are located between 500 m - 1000 m

elevations on the northern slope (Hepbilgin and Koç, 2019b). Pni-OtLe forests are between 489 m - 1263 m elevations on the northern slope and between 541 m and 1290 m elevations on the southern slope (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and mean temperatures and precipitations are obtained as 9,6$^0$C, 13,5$^0$C, 11,7$^0$C, 904, and 1333mm-1098 mm (Table 1).

In Pni-OtLe stands in Ida Mountain,the monthly average minimum temperatures are observed between 2$^0$C (in January) and 18$^0$C (in July), and the monthly average minimum precipitation is between 25 mm (in August) and 137 mm (in December) (Fig 16a). It is observed that the average monthly maximum temperatures range from 5$^0$C (in January) to 23$^0$C (in July), and the average monthly maximum precipitation ranges from 61 mm (in August) to 174 mm (in December) (Fig 16b). Average monthly temperature and precipitation values in Pni-OtLe stands are 4$^0$C (in January) and 21$^0$C (in July); the precipitation values are 41 mm in August and in 153 mm in December (Fig 16c).

It is observed that seasonal average minimum temperatures in Ida Mountain Pni-OtLe dominant stands are between 3$^0$C in winter and 17$^0$C in summer, and average minimum precipitation is between 32 mm (in August) and 114 mm (in winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around 10$^0$C and 77 mm (Fig 16ı). The average maximum winter and summer temperatures and precipitation are between 6$^0$C and 22$^0$C, 67 mm - 150 mm, while the average maximum temperature and precipitation in spring and autumn are around 13$^0$C and 115 mm (Fig 16ıı). Seasonal average temperatures range between 4$^0$C (in winter) and 20$^0$C (in summer), and precipitation varies between 47 mm (in summer) and 129 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 12$^0$C and 95 mm, respectively (Fig 16ıı).

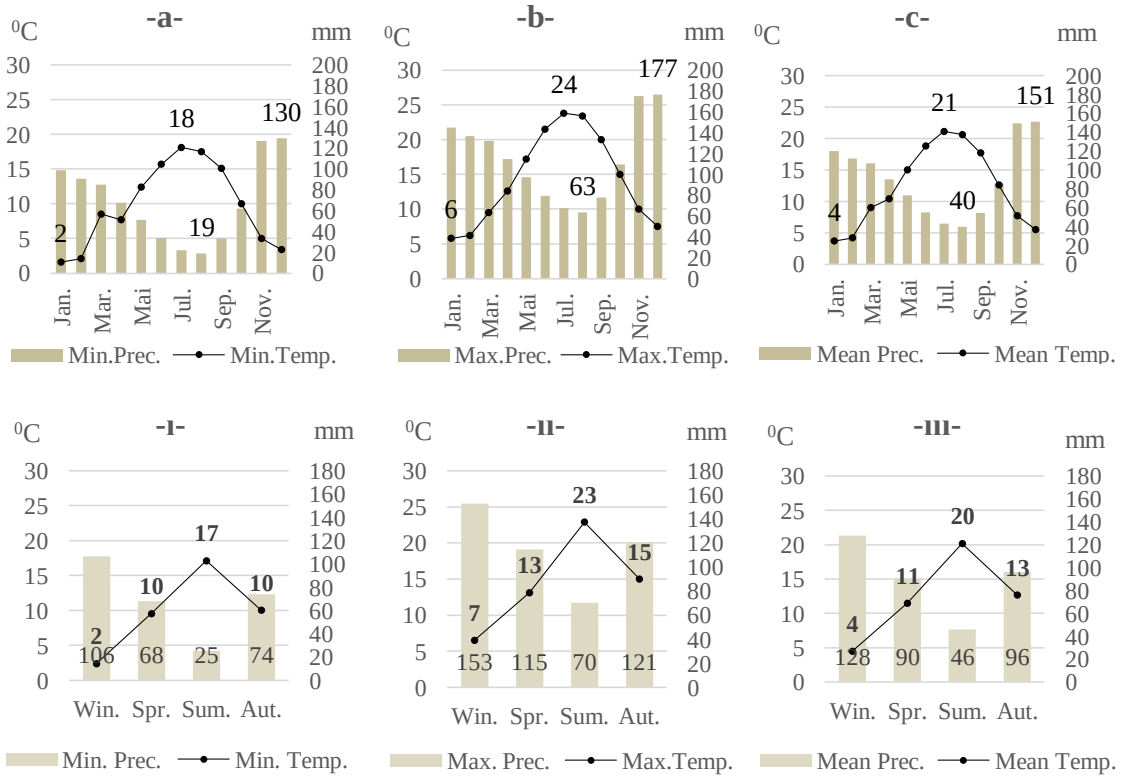


**Fig 17:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Pinus nigra-Castanea**dominant Forest
a, ı: Minimum; b, ıı: Maximum; c, ıı: Mean.

The dominant areas of Pinus nigra - Castanea (Pni-Cas) covers an area of 28 km$^2$ in Ida Mountain (Hepbilgin 2019c). 90% of the Pni-Cas stands on the southern slope are between 750 m-1250 m elevation values and 86% of them are on the northern slope and between 500 m -1000 m elevations (Hepbilgin and Koç, 2019b). The minimum and maximum elevation levels of the Pni-Cas forests on the northern slope are between 327 m and 1336 m, while those on the southern slope are between 597 m and 1333 m elevations (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures and precipitation in Pni-Cas stands in Ida Mountain are $9,2^0$C, $14,2^0$C, $11,8^0$C; 824, 1375 and 1081 mm, respectively (Table 1).

It is observed that the monthly average minimum temperatures in Pni-Cas stands in Ida Mountain are between $2^0$C (in January) and $18^0$C (in July), and the monthly average minimum precipitation is between 19 mm (in August) and 130 mm (in December) (Fig 11a). It is observed that mean monthly maximum temperatures range from $6^0$C (in January) to $24^0$C (in July), and average monthly maximum precipitation ranges from 63 mm (in August) to 177 mm (in December) (Fig 11b). Monthly mean temperature and precipitation indicators in Pni-Cas stands were obtained as $4^0$C (in January) and $21^0$C (in July), 40 mm (in August) and 151 mm (in December) (Fig 11c).

It is observed that seasonal average minimum temperatures in Pni-Cas stands are between $2^0$C in winter and $17^0$C in summer, and average minimum precipitation is between 25 mm (in August) and 106 mm (in Winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around $10^0$C and 71 mm (Fig 11ı). Average maximum winter and summer temperatures and precipitation are between $7^0$C and $23^0$C, 70 mm - 153 mm, while the average maximum temperature and precipitation in spring and autumn are around 140C and 117 mm (Fig 11ıı). Seasonal average temperatures and precipitation are $4^0$C (in winter) and $20^0$C (in summer) respectively; falls between 46 mm (in summer) and 128 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around $12^0$C and 93 mm, respectively (Fig 11ıı).

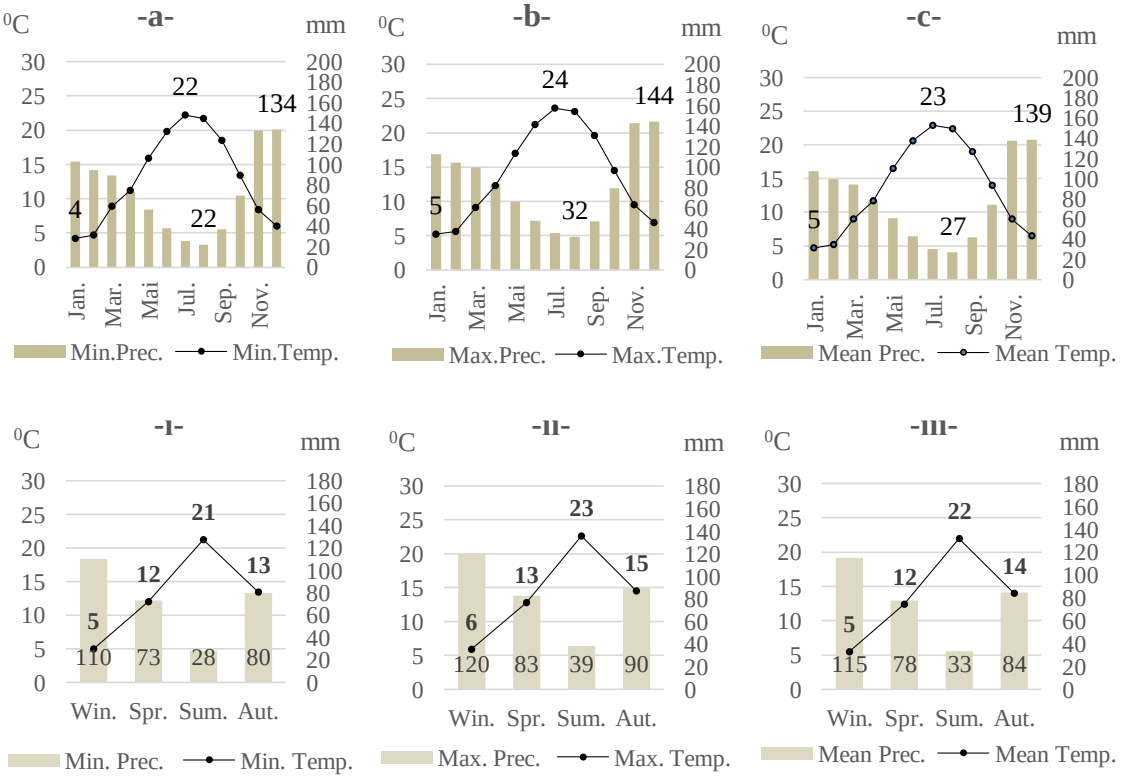


**Fig 18:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Quercus-Other Leafed Trees**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

The whole of the Quercus - Other Leafed Trees (Qu-OtLe) stands are located on the northern slope of Ida Mountain. 81% of the Qu-OtLe Stands' area is found in lands with south-sector direction (southeast, south, southwest) (Hepbilgin 2019c). 48% of Qu-OtLe stands are located between 250 m - 500 m, and the proportion of 54% is between 500 m - 750 m elevations (Hepbilgin and Koç, 2019b). Qu-OtLe dominant forests are located between 399 m and 626 m elevations on the northern slope (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures and precipitation in Qu-OtLe stands were obtained as $12,6^0$C, $13,8^0$C and $13,2^0$C, 874, 996 and 933 mm, respectively (Table 1).

The average monthly minimum temperatures in Qu-OtLe stands are between $4^0$C (in January) and $22^0$C (in July), and the monthly average minimum precipitation is between 22 mm (in August) and 134 mm (in December) (Fig 18a). It is observed that mean monthly maximum temperatures range from $5^0$C (in January) to $24^0$C (in July), and monthly maximum mean precipitation ranges from 32 mm (in August) to 144 mm (in December) (Fig 18b). Average monthly temperature and precipitation values in Qu-OtLe stands were obtained as $5^0$C (in January) and $23^0$C (in July), 27 mm (in August) and 139 mm (in December) (Fig 18c).

It is observed that seasonal average minimum temperatures in Qu-OtLe areas are between $5^0$C in winter and $21^0$C in summer, and average minimum precipitation is between 28 mm (in summer) and 110 mm (in winter). In addition, the average minimum temperatures in spring and autumn and precipitation are around $12^0$C and 77 mm (Fig 18ı). Average maximum winter and summer temperatures and precipitation values are between $6^0$C and $23^0$C, 39 mm - 120 mm respectively, and the average maximum temperature and precipitation in spring and autumn are around $14^0$C and 87 mm (Fig 18ıı). Seasonal average temperatures range between $5^0$C (in winter) and $22^0$C (in summer), while precipitation is between 33 mm (in summer) and 115 mm (in winter), while the average temperature and precipitation in spring and autumn are around $13^0$C and 81 mm, respectively (Fig 18ıı).

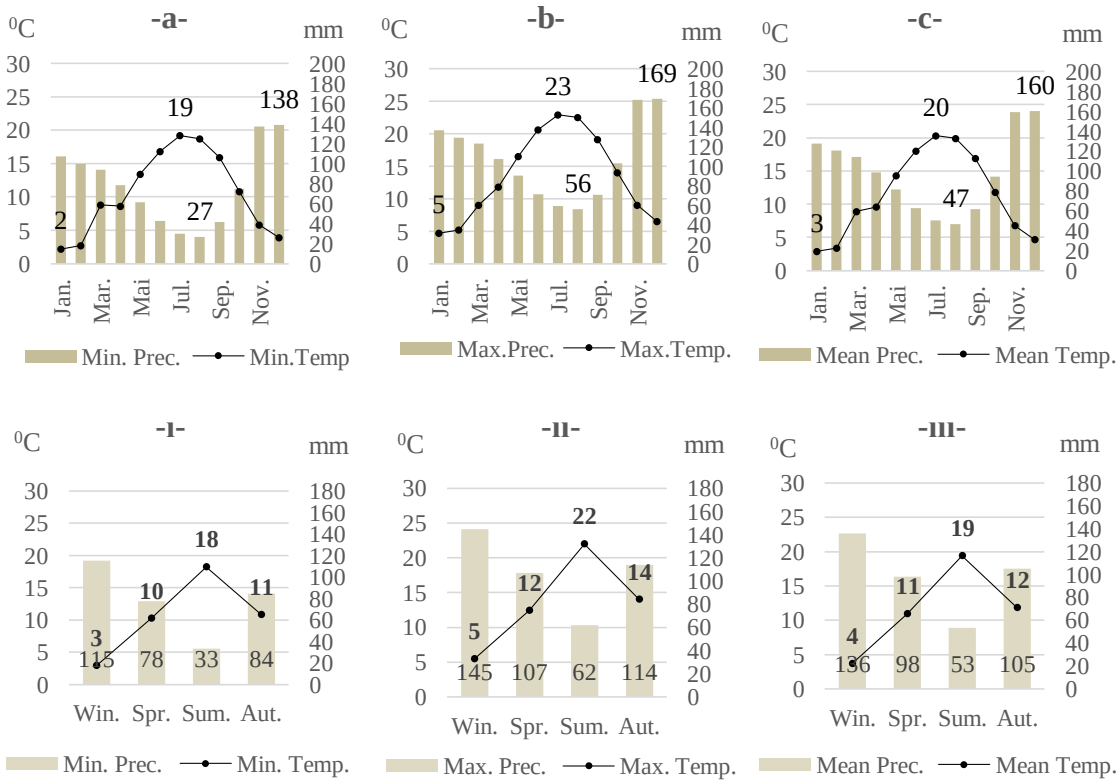


**Fig 19**:- Monthly and Seasonal Temperature and Precipitation Diagrams in **Quercus-Abies**dominant Forest a: Minimum; b: Maximum; c: Mean.

Quercus - Abies (Qu-Abi) dominant stands are found only on the northern slope of Ida Mountain. 90% of the Qu-Abi dominant stands are located in the fields facing north, east and northeast direction (Hepbilgin 2019c). 95% proportion of the Qu-Abi stands is located between 750 m - 1250 m. (Hepbilgin and 2019b).

Annual minimum, maximum and average temperature and precipitation values in Qu-Abi are $10,1^0$C, $13,2^0$C and $11^0$C; 933, 1284 and 1178 mm, respectively (Table 1).

The average monthly minimum temperatures in Qu-Abi areas are between $2^0$C (in January) and $19^0$C (in July), and monthly average minimum precipitation is between 27 mm (in August) and 138 mm (in December) (Fig 19a). It is observed that the average monthly maximum temperatures range from $5^0$C (in January) to $23^0$C (in July), and the average monthly maximum precipitation ranges from 56 mm (in August) to 169 mm (in December) (Fig 19b).

Average monthly temperature and precipitation in Qu-Abi stands are obtained $3^0$C (in January) and $20^0$C (in July); and 47 mm (in August) and 160 mm (in December) (Fig 19c).

It is observed that seasonal average minimum temperatures in Qu-Abi stands are between $3^0$C in winter and $18^0$C in summer, and average minimum precipitation is between 33 mm (in August) and 115 mm (in Winter). In addition, spring and autumn average minimum temperatures and precipitation are around $10^0$C and 82 mm (Fig 19ı). The average maximum winter and summer temperatures and precipitation are between $5^0$C and $22^0$C, 62 mm - 145 mm, respectively, while the average maximum temperature and precipitation in spring and autumn are around $13^0$C and 110 mm (Fig 19ıı). Seasonal average temperatures and precipitation values range between $4^0$C (in winter) and $19^0$C (in summer), and between 53 mm (in summer) and 136 mm (in winter), respectively. In addition, the average temperature and precipitation in spring and autumn are around $11^0$C and 101 mm, respectively (Fig 19 ııı).

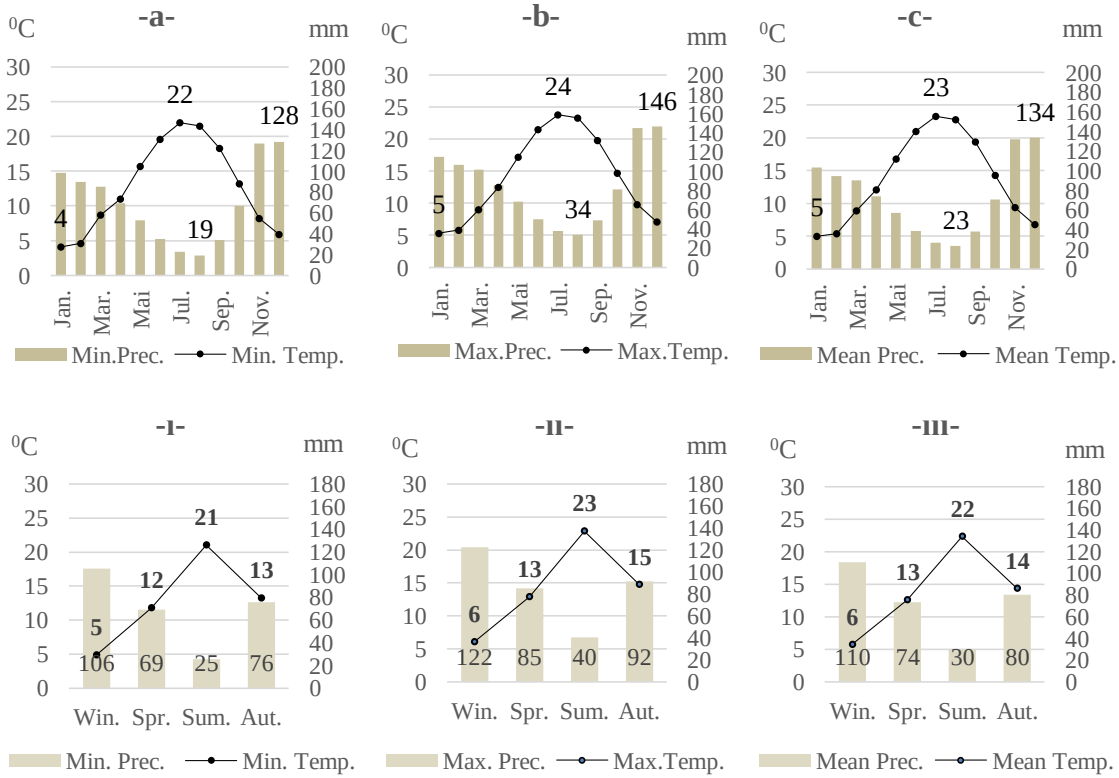


**Fig 20:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Quercus-Fagus**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Quercus - Fagus (Qu-Fag) dominant stands are found only on the northern slope in Ida Mountain (Hepbilgin 2019c). 86% of the Qu-Fag stands are located between 250 m - 500 m elevation levels, the proportion of 15% are in the range of 500 m and 750 m elevations (Hepbilgin 2019c). Quercus-Fagus (Qu-Fag) stands are located between 317 and 668 meters elevation (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperature and precipitation values in Qu-Fag stands are $12.5^0$C, $14^0$C, $13.5^0$C; 828, 1019 and 882 mm respectively (Table 1).

It is observed that the average monthly minimum temperatures in Qu-Fag areas are between $4^0$C (in January) and $22^0$C (in July), and the monthly average minimum precipitation is between 19 mm (in August) and 128 mm (in December) (Fig 20a). While the average monthly maximum temperatures vary between $5^0$C (in January) and $24^0$C (in July); average monthly maximum precipitation values change from 34 mm (in August) to 146 mm (in December) (Fig 20b). Average monthly temperature and precipitation values in Qu-Fag association areas in Ida Mountain were obtained as $5^0$C (in January) and $23^0$C (in July), 23 mm (in August) and 134 mm (in December) (Fig 20c).

It is observed that seasonal average minimum temperatures in Qu-Fag stands are between $5^0$C in winter and $21^0$C in summer, and average minimum precipitation is between 25 mm (in August) and 106 mm (in Winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around $12^0$C and 74 mm (Fig 20ı). Average maximum winter and summer temperatures are between $6^0$C and $23^0$C, 40 mm – 122 mm, spring and autumn average maximum temperature and precipitation values are around $14^0$C and 88 mm (Fig 20ıı). Seasonal average temperatures and precipitation values range between $6^0$C (in winter) and $22^0$C (in summer) and between 30 mm (in summer) and 110 mm (in winter), respectively. In addition, the average temperature and precipitation in spring and autumn are around $13^0$C and 77 mm, respectively (Fig 20ııı).

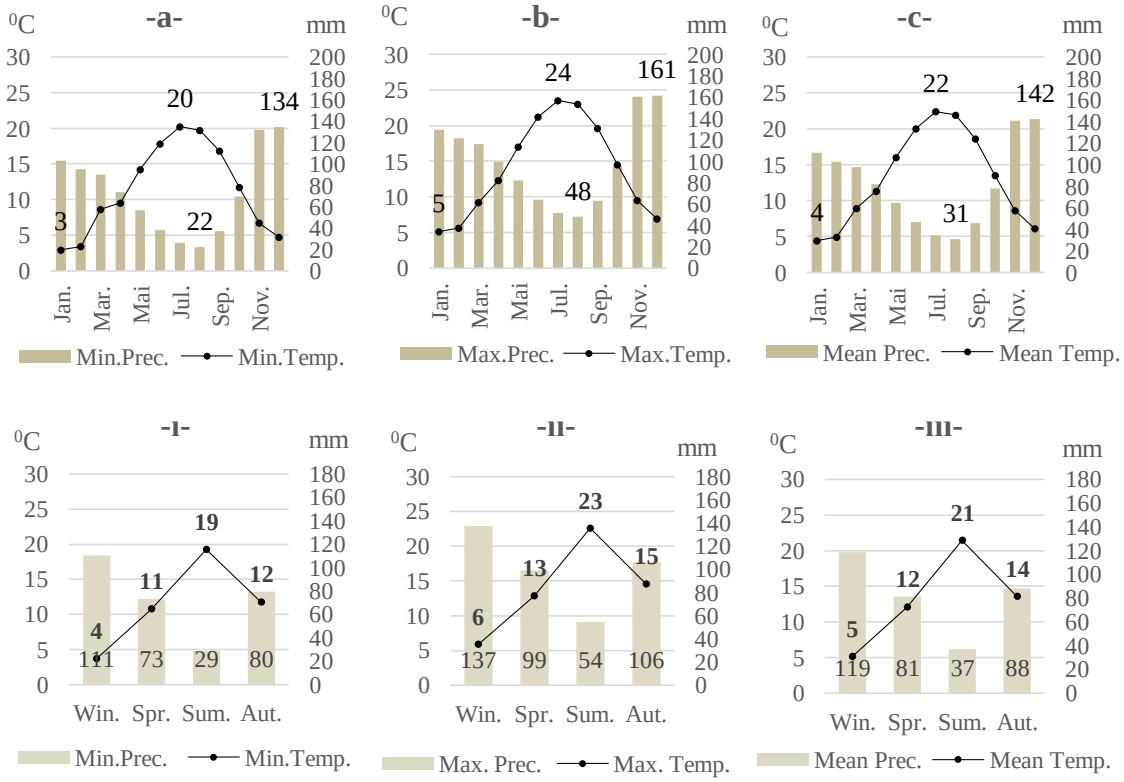


**Fig 21:-** Monthly Total Temperature and Precipitation Diagrams in **Quercus-Castanea**dominant Forest a: Minimum; b: Maximum; c: Mean.

Quercus – Castanea (Qu-Cas) dominant areas are located only on the northern slope of Ida Mountain. 71% of the total area of Qu-Cas stands covers approximately 2 $km^2$ on the lands facing the North and the East direction (Hepbilgin 2019c). 76% of the Qu-Cas stands are located between 500 m and 750 m elevation. (Hepbilgin & Koç, 2019b).

Annual minimum, maximum and average temperatures and precipitation in Qu-Cas areas are $10.9^0$C, $13.7^0$C and $12.8^0$C and 878 mm, 1191 mm and 977 mm, respectively (Table 1).

In the Qu-Cas stands in Ida Mountain, monthly average minimum temperatures are between $3^0$C (in January) and $20^0$C (in July), and monthly average minimum precipitation values are between 22 mm (in August) and 134 mm (in December) (Fig 21a). It is observed that the average monthly maximum temperatures range from $5^0$C (in January) to $24^0$C (in July), and the average monthly maximum precipitation varies from 48 mm (in August) to 161 mm (in December)in Qu-Cas stands (Fig 21b). Average monthly temperatures in Qu-Cas areas range from $4^0$C (in January) to $22^0$C (in July), and precipitation ranges from 31 mm (in August) to 142 mm (in December) (Fig 21c).

Seasonal mean minimum temperatures in Qu-Cas areas are between $4^0$C in winter and $19^0$C in summer, and average minimum precipitation is between 29 mm (summer) and 111 mm (winter). In addition, minimum mean temperatures and precipitation in spring and autumn are around $11^0$C and 77 mm (Fig 21ı). The average maximum winter and

summer temperatures are between $6^0$C and $23^0$C, 54 mm - 137 mm, and the spring and autumn average maximum temperature and precipitation are around $14^0$C and 103 mm (Fig 21ıı). Seasonal mean temperatures range between $5^0$C (in winter) and $21^0$C (in summer) and precipitation values are between 37 mm (in summer) and 119 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around $13^0$C and 85 mm, respectively (Fig 21ııı).

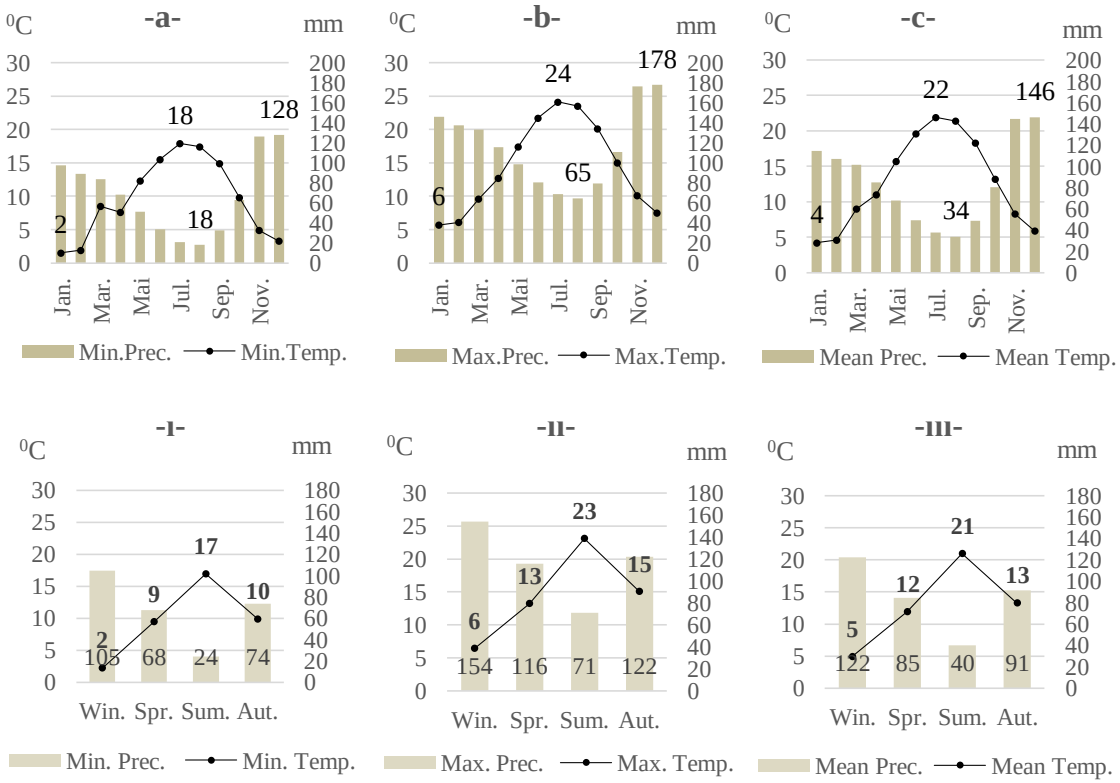


**Fig 22:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Quercus-Pinus nigra**dominant Forest
a: Minimum; b: Maximum; c: Mean.

Quercus - Pinus nigra (Qu-Pni) stands covers an area of 70 km$^2$ in Ida Mountain and 50 km$^2$ of this area is located on the northern slope and 20 km$^2$ of it is on the southern slope (Hepbilgin 2019c). 65% of the Qu-Pni stands are located in the areas facing the southern direction (Hepbilgin 2019c). Almost all of the Qu-Pni stands (99.7%) in Ida Mountain are between 250 and 750 meters elevation levels (Hepbilgin and Koç, 2019b). 40% of the Qu-Pni forests on the northern slope are between 250 m and 750 m; 25% of the Qu-Pni forests on the south slope is between 500 m - 750 m; 60% of them are between 750 m - 1000 m elevations (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures in Qu-Pni areas are $9,1^0$C, $14,3^0$C and $12,5^0$C, and annual minimum, maximum and average precipitation are 819, 1389 and 1016 mm, respectively (Table 1).

It is observed that the monthly average minimum temperatures in Qu-Pni stands of Ida Mountain are between $2^0$C (in January) and $18^0$C (in July), and monthly average minimum precipitation is between 18 mm (in August) and 128 mm (in December) (Fig 22a). It is observed that monthly maximum mean temperatures range from $6^0$C (in January) to $24^0$C (in July) and monthly maximum mean precipitation ranges from 65 mm (in August) to 178 mm (in December) (Fig 22b). Monthly mean temperature and precipitation in Pinus nigra-Maquis (Pni-Ma) stands were obtained as $4^0$C (in January) and $22^0$C (in July); 34 mm (in August) and 146 mm (in December) (Fig 22c).

It is observed that seasonal minimum mean temperatures and precipitation in Qu-Pni stands are $2^0$C in winter and $17^0$C in summer, and 24 mm (in August) and 105 mm (in winter). In addition, the minimum mean temperatures and precipitation in spring and autumn are around $10^0$C and 71 mm (Fig 22ı). The average maximum winter and summer temperatures and precipitation are $6^0$C to $23^0$C, 71 mm – 154 mm respectively, while the spring and autumn average maximum temperature and precipitation are around $14^0$C and 120 mm (Fig 22ii). Seasonal average temperatures

range between 5$^0$C (in winter) and 21$^0$C (in summer), and rains between 40 mm (in summer) and 122 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 12$^0$C and 88 mm, respectively (Fig 22ıı).

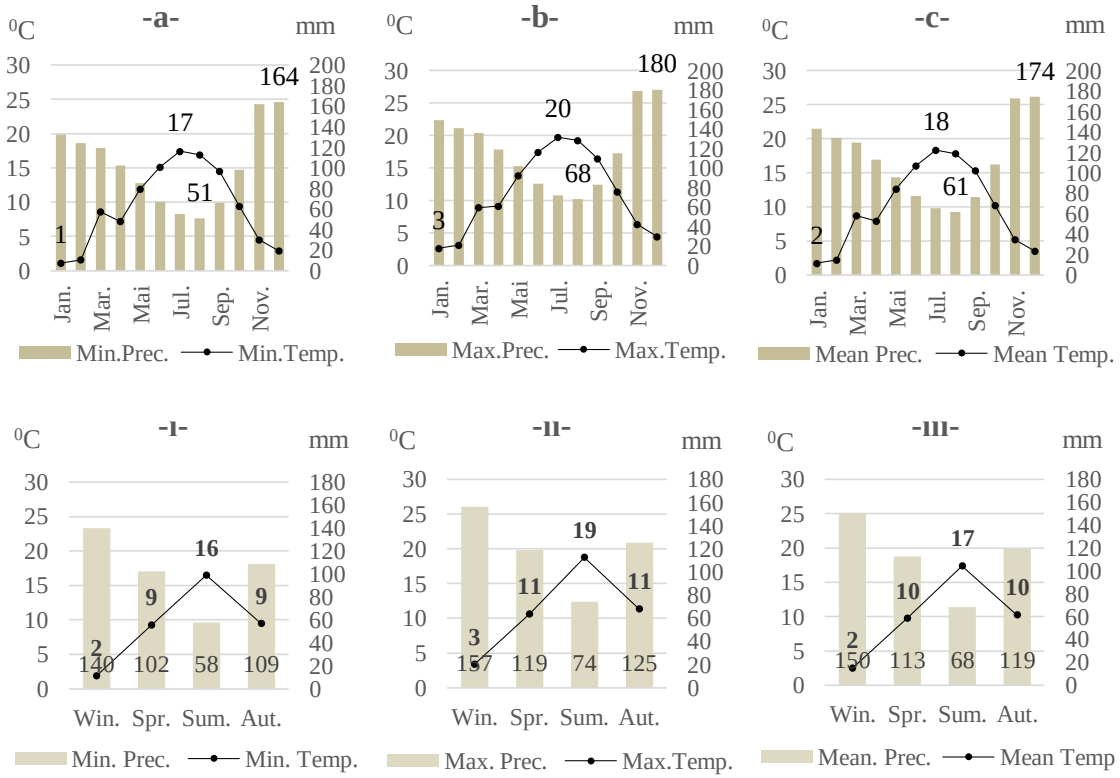


**Fig 23:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Abies-Fagus**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ıı: Mean.

Abies - Fagus (Abi-Fag) dominant stands cover a total area of 3.3 km$^2$ of Ida Mountain. Abi-Fag stands are located between 1055 m - 1426 m on the northern slope of Ida Mountain and between 1222 m - 1416 m on the southern slope. 70% of the Abi-Fag stands on the northern slope of Ida Mountain are at 1000 m - 1250 m elevations; 20% of that is in the range of 1250 m - 1500 m. While 50% of the Abi-Fag stands on the southern slope of Ida Mountain are between 1250 m - 1500 m elevation levels, the 30% portion is located between 1000 m and 1250 m. (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures are 8.7$^0$C, 10.6$^0$C and 9.4$^0$C, and annual minimum, maximum and average precipitation values are 1227 m, 1426 m and 1350 mm, respectively, in Abi-Fag stands in the Ida Mountain (Table 1).

It is observed that the monthly average minimum temperatures in Abi-Fag stands are between 1$^0$C (in January) and 17$^0$C (in July), and the monthly average minimum precipitation is between 51 mm (in August) and 164 mm (in December) (Fig 23a). Monthly maximum mean temperatures and precipitation are between 3$^0$C (in January) and 20$^0$C (in July); and 68 mm (in August) and 180 mm (in December), respectively (Fig 23b). Monthly mean temperature and precipitation values in Abi-Fag dominated areas were obtained as 2$^0$C (in January) and 18$^0$C (in July), 61 mm (in August) and 174 mm (in December) (Fig 23c).

It is observed that seasonal average minimum temperatures in Abi-Fag areas are between 2$^0$C in winter and 16$^0$C in summer, and average minimum precipitation is between 58 mm (in August) and 140 mm (in Winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around 9$^0$C and 105 mm (Fig 23ı). The average maximum winter and summer temperatures are between 3$^0$C and 19$^0$C, while the average maximum temperature and precipitation in spring and autumn are around 11$^0$C and 122 mm (Fig 23ıı). Seasonal average temperatures range between 2$^0$C (in winter) and 17$^0$C (in summer), and rainfalls change from 68 mm (in summer)

and 150 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around $10^0$C and 116 mm, respectively (Fig 23ıı).

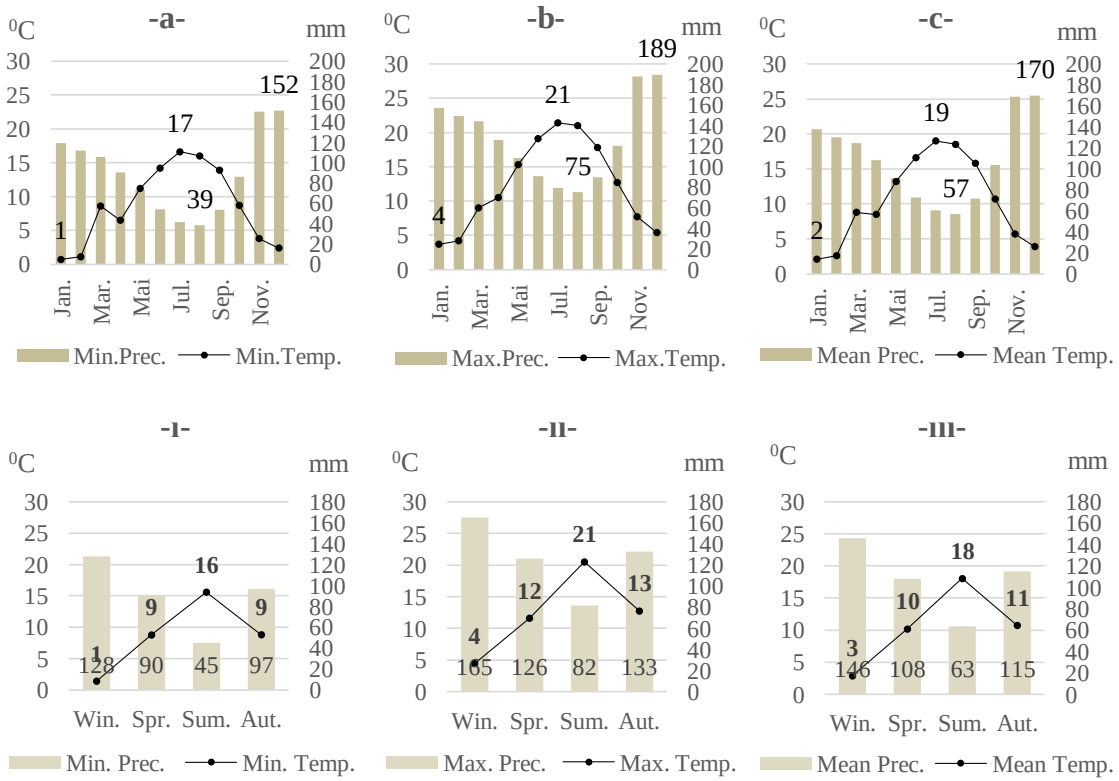


**Fig 24:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Abies-Pinus nigra**dominant Forest a: Minimum; b: Maximum; c: Mean.

Abies - Pinus nigra (Abi-Pni) stands cover an area of 3.3 $km^2$ in Ida Mountain, 64% of this area is located on the northern slope and the proportion of 40% is on the southern slope (Hepbilgin 2019c). Approximately 50% of Abi-Pni stands are located in the north-northwest facing (N-NW direction) areas (Hepbilgin 2019c). The Abi-Pni forests are located between 774 m and 1468 m on the northern slope and between 1023 m and 1605 m on the southern slope (Hepbilgin and Koç, 2019b). On the northern slope of Ida Mountain, 40% of Abi-Pni stands are located between 1000 m - 1250 m, and the 60% portion is located between 1250 m - 1500 m elevations, while almost all of the Abi-Pni stands on the southern slope (98%) are located between 1250 m - 1500 m elevations. (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and mean temperatures and precipitation in the Abi-Pni stands are $8^0$C, $12^0$C and $9.9^0$C; 1077, 1518 and 1297 mm respectively; (Table 1).

It is observed that the monthly minimum mean temperatures in Abi-Pni areas are between $1^0$C (in January) and $17^0$C (in July), and the monthly mean minimum precipitation is between 39 mm (in August) and 152 mm (in December) (Fig 24a). It is observed that the monthly maximum mean temperatures range from $4^0$C (in January) to $21^0$C (in July), and the mean monthly maximum precipitation ranges from 75 mm (in August) to 189 mm (in December) (Fig 24b). Monthly mean temperature and precipitation values in Abies - Pinus nigra (Abi-Pni) dominant stands were obtained as $2^0$C (in January) to $19^0$C (in July), and 57 mm (in August) to 170 mm (in December) (Fig 24c).

It is observed that seasonal minimum mean temperatures in Abi-Pni dominant stands are between $1^0$C in winter and $16^0$C in summer, and minimum mean precipitation is between 45 mm (in August) and 128 mm (in Winter). In addition, the minimum mean temperatures and precipitation in spring and autumn are around $9^0$C and 94 mm (Fig 24i). While the mean maximum winter and summer temperature and precipitation are $4^0$C to $21^0$C, 165 mm-82 mm respectively, the spring and autumn maximum mean temperature and precipitation are around $13^0$C and 130 mm (Fig 24ıı). Seasonal average temperatures range between $3^0$C (in winter) and $18^0$C (in summer), and precipitation

ranges between 63 mm (in summer) and 146 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around $10^0$C and 112 mm, respectively (Fig 24ıı).

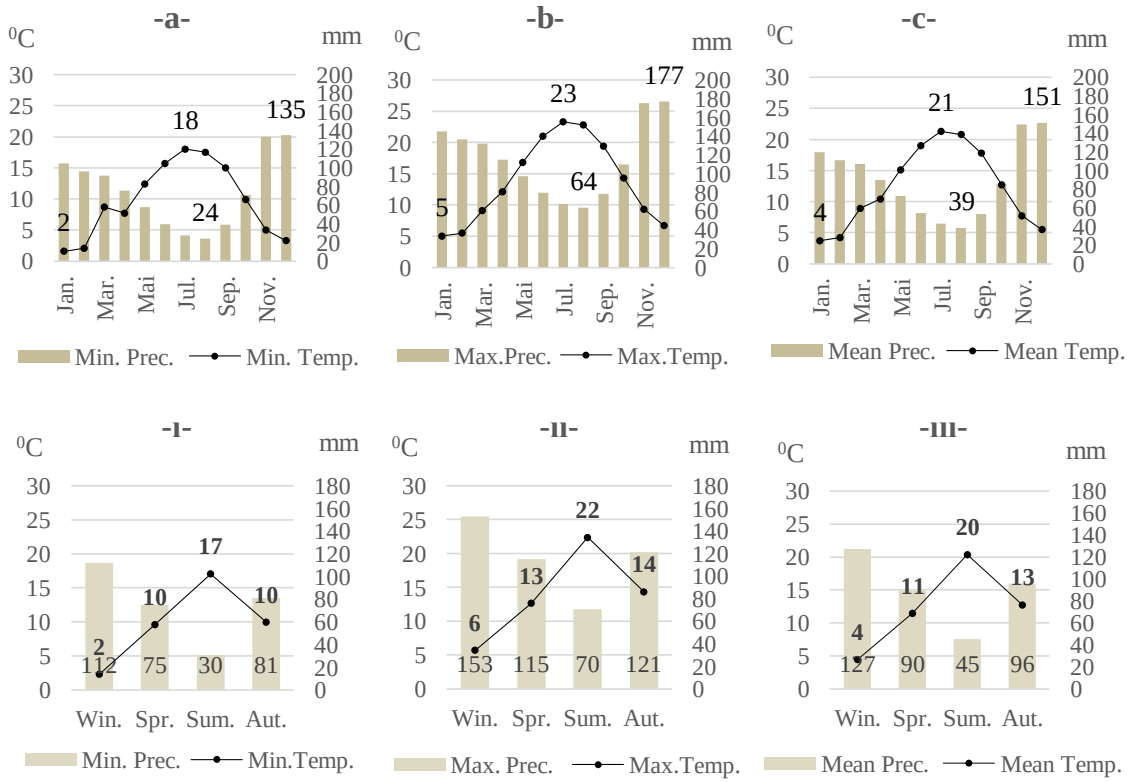


**Fig 25:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Fagus-Castanea**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Fagus - Castanea (Fag-Cas) stands cover an area of approximately 2.5 $km^2$ and are located only on the northern slope of Ida Mountain (Hepbilgin 2019c). 65% of the Fag-Cas areas are facing to the lands of the South direction sector (S, SW, SE), and approximately 50% of the portion is located on the lands facing to the East and the Northeast (E, NE) (Hepbilgin 2019c). 90% of the Fag-Cas dominant stands are in the range of 500 m - 1000 m elevation levels (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures in the Fag-Cas stands are 9,2$^0$C, 13,6$^0$C and 11,9$^0$C and annual minimum, maximum and average precipitation are 900 mm, 1379 mm and 1076 mm, respectively (Table 1).

Monthly minimum mean temperatures in Fag-Cas in Ida Mountain are between 2$^0$C (in January) and 18$^0$C (in July), and monthly minimum mean precipitation is between 24 mm (in August) and 135 mm (in December) (Fig 25a). Mean monthly maximum temperatures are between 5$^0$C (in January) and 23$^0$C (in July) and precipitation values are between 64 mm (and precipitation August) and 177 mm (and precipitation December) (Fig 25b). Monthly mean temperature and precipitation indicators in Fag-Cas stands in Ida Mountain were obtained as 4$^0$C (in January) and 21$^0$C (in July), 39 mm (in August) and 151 mm (in December) (Fig 25c).

It is observed that seasonal minimum mean temperatures in Fag-Cas stands in Ida Mountain are between 2$^0$C in winter and 17$^0$C in summer, and minimum mean precipitation is between 30 mm (in August) and 112 mm (in Winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around 10$^0$C and 77 mm (Fig 25ı). The maximum winter and summer mean temperature and precipitation values are 6$^0$C to 22$^0$C, 70mm - 153mm respectively, while the spring and autumn maximum mean temperature and precipitation are around 13$^0$C and 119mm (Fig 25ıı). Seasonal average temperatures range between 4$^0$C (in winter) and 20$^0$C (in summer), and precipitation between 45 mm (in summer) and 127 mm (in winter). In addition, the mean temperature and precipitation in spring and autumn are around 12$^0$C and 93 mm, respectively (Fig 25ıı).

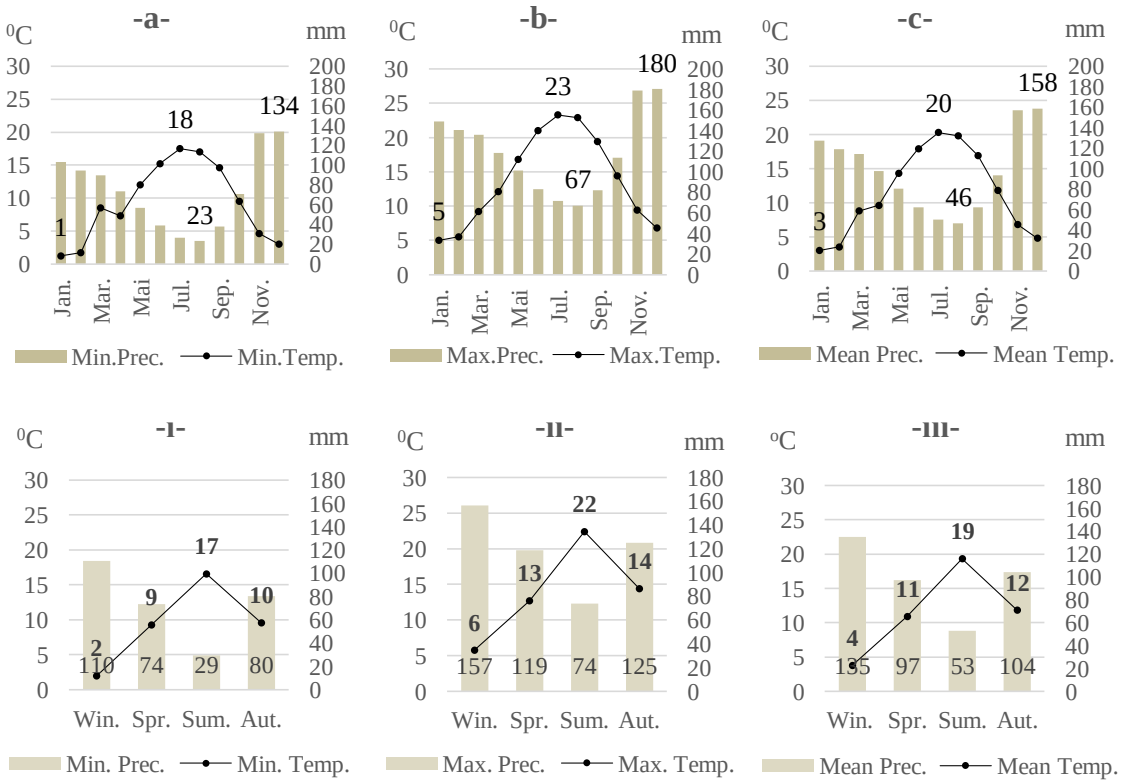


**Fig 26:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Fagus - Pinus nigra**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Fagus - Pinus nigra (Fag-Pni) (KnÇk) dominant stands cover an area of approximately 14 $km^2$ in Ida Mountain (Hepbilgin 2019c). 75% of Fag-Pni stands on the northern slope are in the range of 500 m - 1000 m, and 81% of Fag-Pni stands on the south slope are in the range of 1000 m - 1500 m (Hepbilgin and Koç, 2019b). Fagus-Pinus nigra stands are located between 414 m and 1278 m elevations on the northern slope of Mt. Ida and in the range of 599 m - 1421 m elevations on the southern slope (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures in Fag-Pni stands were obtained as $8.8^0$C, $13.6^0$C and $11.1^0$C, 881 mm, 1422 mm and 1157 mm, respectively (Table 1).

The monthly minimum mean temperatures in Ida Mountain Fag-Pni stands are between $1^0$C (in January) and $18^0$C (in July), and the monthly average minimum precipitation is between 23 mm (in August) and 134 mm (in December) (Fig 26a). It is observed that the mean monthly maximum temperatures vary between $5^0$C (in January) and $23^0$C (in July), and the average monthly maximum precipitation ranges from 67 mm (in August) to 180 mm (in December) (Fig 26b). Mean monthly temperature and precipitation values in Mt. Ida, Fag-Pni stands were obtained as $3^0$C (in January) and $20^0$C (in July), 46 mm (in August) and 158 mm (in December) (Fig 26c).

It is observed that seasonal minimum mean temperatures in Fag-Pni areas in Mt. Ida are between $2^0$C in winter and $17^0$C in summer, and mean minimum precipitation is between 29 mm (in August) and 110 mm (in Winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around $9^0$C and 78 mm (Fig 26ı). The mean maximum winter and summer temperature and precipitation values are between $6^0$C and $22^0$C, and in the range of 74 mm – 157 mm respectively, while the spring and autumn maximum mean temperature and precipitation are around $13^0$C and 122 mm (Fig 26ıı). Seasonal mean temperatures and precipitation range between $4^0$C (in winter) and $19^0$C (in summer), and between 53 mm (in summer) and 135 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around $11^0$C and 100 mm, respectively (Fig 26ııı).

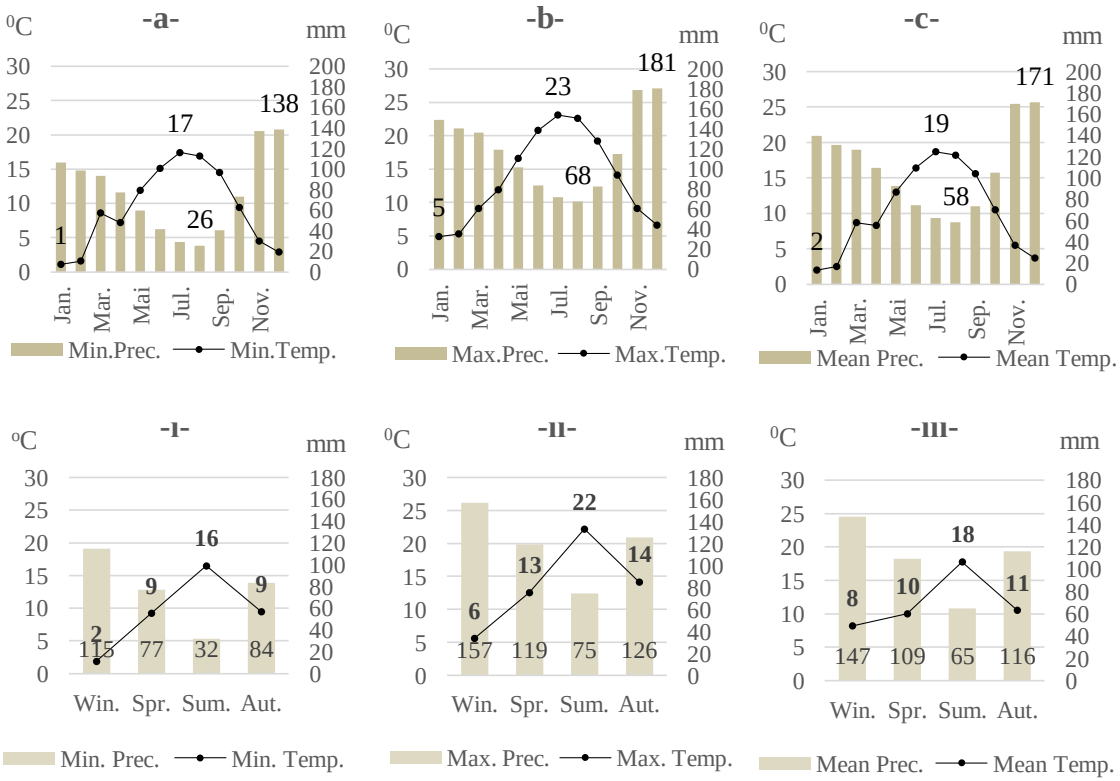


**Fig 27:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Fagus - Abies**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Fagus - Abies (Fag-Abi) stands cover an area of approximately 8 $km^2$ in Mt. Ida (Hepbilgin 2019c). 82% of the Fag-Abi areas on the northern slope of Mt. Ida are within the range of 1000 m - 1500 m, and 95% of the Fag-Abi areas on the southern slope are between 1250 m - 1500 m elevations (Hepbilgin and Koç, 2019b). Fag-Abi stands are located between 488 and 1425 meters elevation on the north slope of Ida Mount and 1106 m – 1431 m on the southern slope (Hepbilgin and Koç, 2019b).

The annual minimum, maximum and average temperatures in Fag-Abi stands were 8.7$^0$C, 13.4$^0$C and 9.8$^0$C, and annual minimum, maximum and average precipitation were 922 mm, 1429 mm and 1313 mm, respectively (Table 1).

The average monthly minimum temperatures in Fag-Abi stands are between 1$^0$C (in January) and 17$^0$C (in July), and the monthly average minimum precipitation is between 26 mm (in August) and 138 mm (in December) (Fig 27a). It is observed that the average monthly maximum temperatures range from 5$^0$C (in January) to 23$^0$C (in July), and the average monthly maximum precipitation ranges from 68 mm (in August) to 181 mm (in December) (Fig 27b). Monthly mean temperature and precipitation indicators in Mt. Ida Fag-Abi stands were obtained as 2$^0$C (in January) and 19$^0$C (in July), 58 mm (in August) and 171 mm (in December) (Fig 27c).

In Mt. Ida Fag-Abi areas, it is seen that seasonal average minimum temperatures are between 2$^0$C in winter and 16$^0$C in summer, and average minimum precipitation is between 32 mm (in August) and 115 mm (in winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around 9$^0$C and 80 mm (Fig 27ı). The average maximum winter and summer temperatures and precipitation are between 6$^0$C and 22$^0$C and 75 mm-157 mm, while the average maximum temperature and precipitation in spring and autumn are around 13$^0$C and 123 mm (Fig 27ıı). Seasonal average temperatures are 8$^0$C (in winter) and 18$^0$C (in summer); precipitation is between 65 mm (in summer) and 147 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 10$^0$C and 112 mm, respectively (Fig 27ııı).

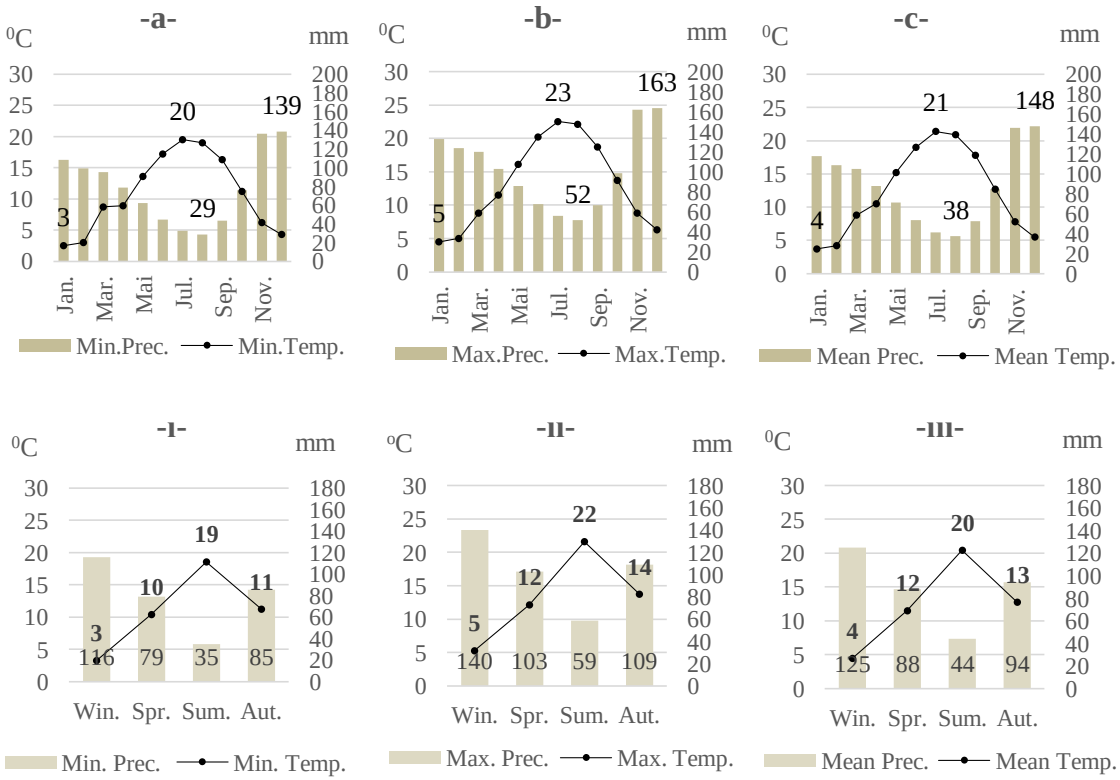


**Fig 28:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Castanea - Fagus**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

All the Castanea - Fagus (Cas-Fag) dominant stands are located on the northern slope of Kazdağı (Hepbilgin 2019c) between 535 m and 1067 m elevations (Hepbilgin & Koç, 2019b). 60% of Cas-Fag forests are located between 500 m and 750 m. The 20% of forests are located in the range of 750 m - 1000 m; 20% of that is between 1000 m - 1250 m elevations, and in the southern slope between 235 m and 1403 m. (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures of Cas-Fag are 10,4$^0$C, 12,9$^0$C and 12,9$^0$C, and annual minimum, maximum and average precipitation are 945 mm, 1231 mm and 1055 mm, respectively (Table 1).

Monthly minimum mean temperatures in Kazdağı, Cas-Fag stands are between 3$^0$C (in January) and 20$^0$C (in July), and monthly average minimum precipitation is in the range of 29 mm (in August) and 139 mm (in December) (Fig 28a). It is observed that monthly maximum mean temperatures vary between 5$^0$C (in January) and 23$^0$C (in July), and average monthly maximum precipitation varies between 52 mm (in August) and 163 mm (in December) (Fig 28b). The monthly mean temperature and precipitation in the Cas-Fag areas in Mt. Ida were obtained as 4$^0$C (in January) and 21$^0$C (in July), 38 mm (in August) and 148 mm (in December) (Fig 28c).

The seasonal mean minimum temperatures in the Cas-Fag dominated areas of Mt. Ida are between 3$^0$C in winter and 19$^0$C in summer, and the average minimum precipitation is between 35 mm (in August) and 116 mm (in winter). In addition, the minimum mean temperatures and precipitation in spring and autumn are around 5$^0$C and 22 mm (Fig 28ı). The maximum winter and summer mean temperatures and precipitation are between 5$^0$C and 22$^0$C and 59 mm - 140 mm, while the average maximum temperature and precipitation in spring and autumn are around 13$^0$C and 106 mm (Fig 28ıı). Seasonal mean temperatures range between 4$^0$C (in winter) and 20$^0$C (in summer), and the relevant precipitation values are between 44 mm (in summer) and 125 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 12$^0$C and 92 mm, respectively (Fig 28ıı).

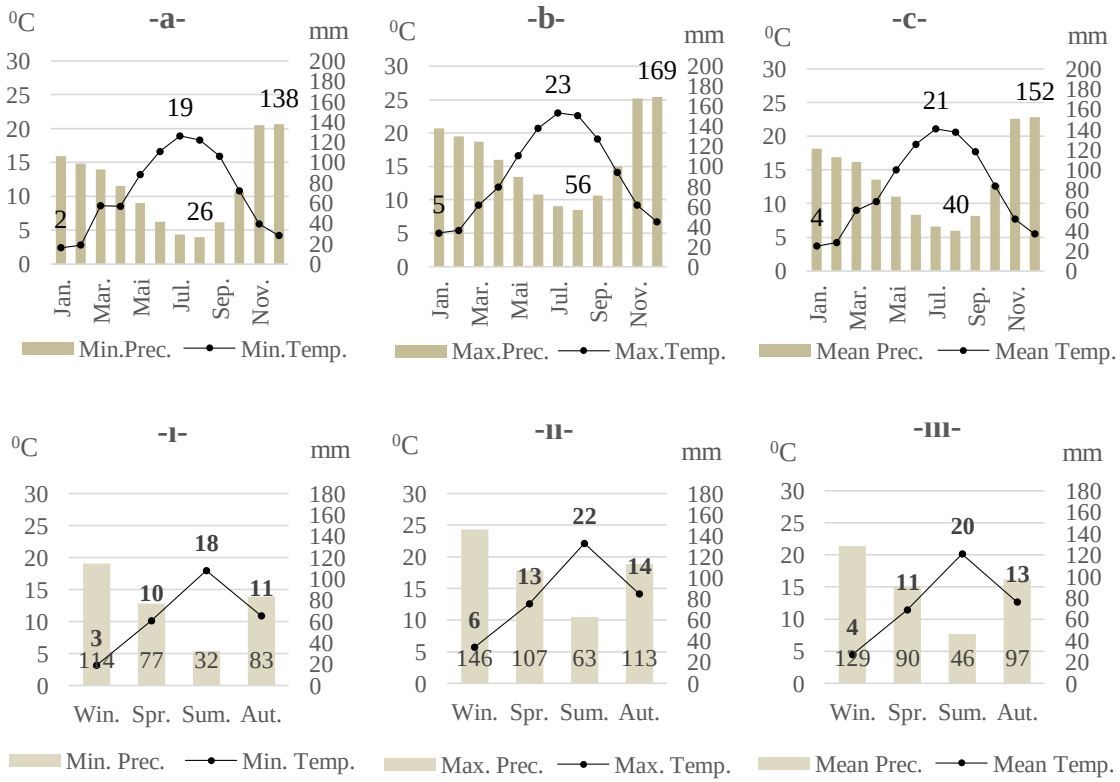


**Fig 29:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Castanea – Pinus nigra**dominant Forest
a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

The dominant areas of Castanea - Pinus nigra (Cas-Pni) cover an area of approximately 6.5 $km^2$ in Mt. Ida (Hepbilgin 2019c). Cas-Pni forests are only on the northern slope of Mt. Ida and at 489 m - 1192 m elevation levels (Hepbilgin and Koç, 2019b). Approximately 90% of Cas-Pni forests spread between 500 m - 1000 m in the elevation range (Hepbilgin 2019c).

Annual minimum, maximum and average temperatures are 10,1$^0$C, 13,3$^0$C and 11,8$^0$C, annual minimum, maximum and average precipitation in Cas-Pni areas are 923, 1285 and 1087 mm, respectively (Table 1).

It is observed that the monthly minimum mean temperatures are between 2$^0$C (in January) and 19$^0$C (in July) and monthly average minimum precipitation is between 26 mm (in August) and 138 mm (in December) in the Cas-Pni areas (Fig 29a). It is observed that the mean monthly maximum temperatures range from 5$^0$C (in January) to 23$^0$C (in July), and the average monthly maximum precipitation ranges from 56 mm (in August) to 169 mm (in December) (Fig 29b). Mean monthly temperature and precipitation values in the Cas-Pni stands of Mt. Ida were obtained as 4$^0$C (in January) and 21$^0$C (in July), 40 mm (in August) and 152 mm (in December) (Fig 29c).

It is observed that seasonal average minimum temperatures in Cas-Pni stands are between 3$^0$C in winter and 18$^0$C in summer, and average minimum precipitation is between 32 mm (in August) and 114 mm (in Winter). In addition, spring and autumn average minimum temperatures and precipitation are around 10$^0$C and 80 mm (Fig 29ı). While the mean maximum winter and summer temperature values are 6$^0$C to 22$^0$C, and the maximum mean temperature and precipitation in spring and autumn are approximately 13$^0$C and 110 mm (Fig 29ıı). Seasonal average temperatures range between 4$^0$C (in winter) and 20$^0$C (in summer), and rains between 46 mm (in summer) and 129 mm (in winter), respectively. In addition, the average temperature and precipitation in spring and autumn are around 12$^0$C and 94 mm, respectively (Fig 29ıı).

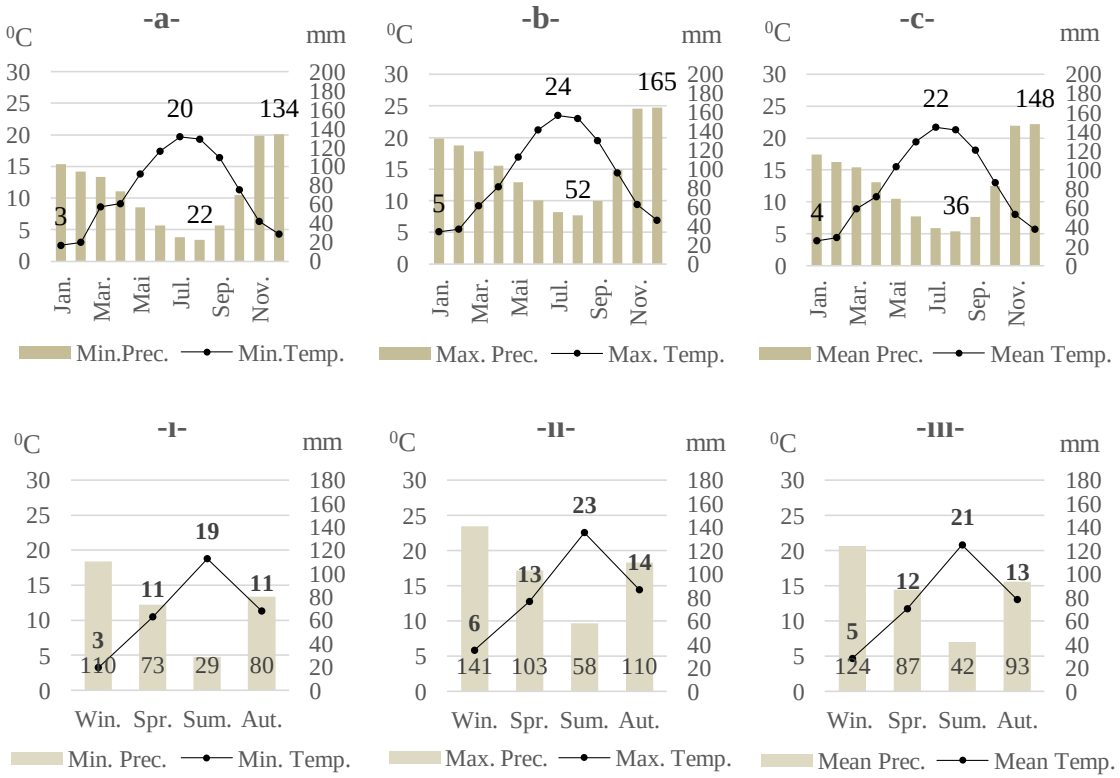


**Fig 30:-** Monthly Total Temperature and Precipitation Diagrams in **Castanea – Quercus**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

The dominant areas of Castanea - Quercus (Cas-Qu) cover an area of approximately 2 $km^2$ in Mt. Kaz (Hepbilgin 2019c). Half of the Cas-Qu stands are located in north, northwest facing areas (Hepbilgin 2019c). Cas-Qu forests are found only on the northern slope of Mt. Ida. Approximately 60% of these areas are between 500 m and 750 m and approximately 40% is between 750 m and 1000 m elevations (Hepbilgin and Koç, 2019b).

Annual minimum, maximum and average temperatures of Cas-Qu are 10,6$^0$C, 13,7$^0$C and 12,2$^0$C; and annual minimum, maximum and average precipitation values are 877 mm, 1234 mm and 1039 mm, respectively (Table 1).

It is observed that the monthly average minimum temperatures in Cas-Qu dominant areas in Mt. Ida are between 3$^0$C (in January) and 20$^0$C (in July) and the monthly average minimum precipitation is between 22 mm (in August) and 134 mm (in December) (Fig 30a). It is observed that the average monthly maximum temperatures range from 5$^0$C (in January) to 24$^0$C (in July), and the average monthly maximum precipitation ranges from 52 mm (in August) to 165 mm (in December) (Fig 30b). Mean monthly temperature and precipitation in the Cas-Qu areas of Mt. Ida were obtained as 4$^0$C (in January) and 22$^0$C (in July), 36 mm (in August) and 148 mm (in December) (Fig 30c).

It is observed that seasonal average minimum temperatures in the Cas-Qu areas of Mt. Ida are between 3$^0$C in winter and 19$^0$C in summer, and average minimum precipitation is between 29 mm (in August) and 110 mm (in winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around 11$^0$C and 78 mm (Fig 30ı). The average maximum winter and summer temperatures and precipitation are between 6$^0$C and 23$^0$C, 58 mm-141 mm, respectively, while the average maximum temperature and precipitation in spring and autumn are approximately 13$^0$C and 106 mm (Fig 30ıı). Seasonal mean temperatures range between 5$^0$C (in winter) and 21$^0$C (in summer), and precipitation values are between 42 mm (in summer) and 124 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 12$^0$C and 90 mm, respectively (Fig 30ııı).

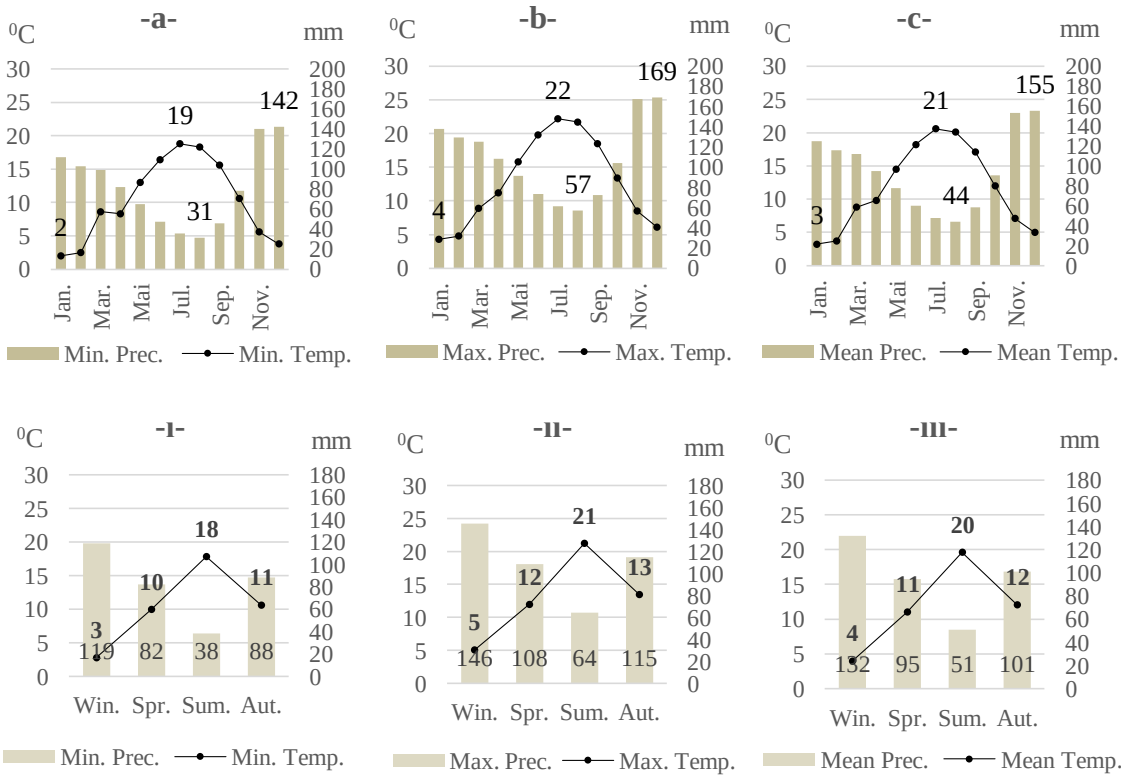


**Fig 31:-** Monthly Total Temperature and Precipitation Diagrams in **Other Leafed Trees – Pinus nigra**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

OtLe-Pni stands cover an area of 1.4 km$^2$ in the dominant forest Mt. Ida (Hepbilgin 2019c). OtLe-Pni stands are found only on the northern slope of Mt. Ida. Approximately 60% of these areas are between 750 m - 1000 m, and about 30% are between 1000 m - 1250 m elevation ranges (Hepbilgin and Koç, 2019b). OtLe-Pni stands are seen on the northern slope of Mt. Ida at an elevation of 609 m and 1190 m (Hepbilgin and Koç, 2019b).

The annual minimum, maximum and average temperatures and precipitations in the OtLe-Pni areas were 9,8$^0$C, 12,7$^0$C and 11,3$^0$C; and 982 mm, 1298 and 1134 mm, respectively (Table 1).

The monthly minimum mean temperatures in Mt. Ida, OtLe-Pni stands are between 2$^0$C (in January) and 19$^0$C (in July), and monthly minimum mean precipitation is between 31 mm (in August) and 142 mm (in December) (Fig 31a). It is observed that the average monthly maximum temperatures range from 4$^0$C (in January) to 22$^0$C (in July), and the average monthly maximum precipitation ranges from 57 mm (in August) to 169 mm (in December) (Fig 31b). Mean monthly temperature and precipitation in OtLe-Pni stands in Mt. Ida were obtained as 3$^0$C (in January) and 21$^0$C (in July), 44 mm (in August) and 155 mm (in December) (Fig 31c).

It is observed that seasonal minimum mean temperatures in OtLe-Pni areas in Mt. Ida are between 3$^0$C in winter and 18$^0$C in summer, and mean minimum precipitation is between 38 mm (in August) and 119 mm (in winter). In addition, spring and autumn average minimum temperatures and precipitation are around 10$^0$C and 85 mm (Fig 31i). The average maximum winter and summer temperatures and precipitation are between 5$^0$C and 21$^0$C, and 64 mm and 146 mm respectively, while the spring and autumn average maximum temperature and precipitation are around 12$^0$C and 112 mm (Fig 31ıı). Seasonal average temperatures are 4$^0$C (in winter) and 20$^0$C (in summer) and the seasonal mean precipitation values are between 51 mm (in summer) and 132 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 11$^0$C and 100 mm, respectively (Fig 31ıı).

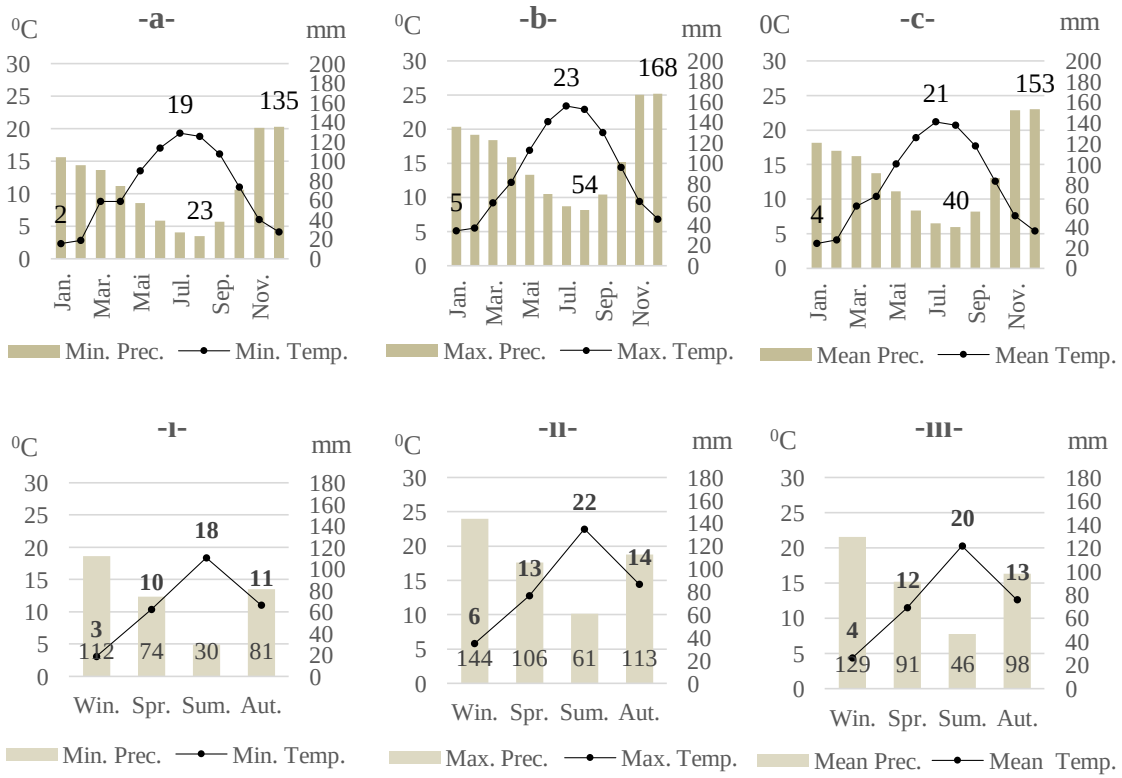


**Fig 32:-** Monthly and Seasonal Temperature and Precipitation Diagrams in **Fagus – Quercus**dominant Forest a, ı: Minimum; b, ıı: Maximum; c, ııı: Mean.

Fagus - Quercus (Fag-Qu) dominant areas cover an area of 2.16 $km^2$ in Mt. Ida (Hepbilgin 2019c). Half of the Fag-Qu stands in Mt. Ida are located on the eastern sector lands (Hepbilgin 2019c). Fag-Qu dominant stands are located both on the northern slope and on the southern slope. 90% of the Fag-Qu stands on the southern slope of Mt. Ida are located between 750 m and 1250 m and 85% of the Fag-Qu stands on the northern slope is located in the elevation range 500 m and 1000 m (Hepbilgin and Koç, 2019b). Fag-Qu forests are seen between 428 m and 1129 m elevation levels on the northern slope of Mt. Ida and the levels of between 598 m and 1131 m on the southern slope. (Hepbilgin and Koç, 2019b).

The annual minimum, maximum and average temperatures in Fag-Qu stands were 10.2$^0$C, 13.6$^0$C and 11.8$^0$C respectively, and 889 mm, 1269 mm and 1096 mm, respectively (Table 1).

In Kazdağı Fag-Qu stands, monthly average minimum temperatures are between 2$^0$C (in January) and 19$^0$C (in July), and monthly average minimum precipitation is between 23 mm (in August) and 135 mm (in December) (Fig 32a). It is observed that average monthly maximum temperatures vary between 5$^0$C (in January) and 23$^0$C (in July), and average monthly maximum precipitation varies between 54 mm (in August) and 168 mm (in December) (Fig 32b). Average monthly temperature and precipitation in Fag-Qu stands of Mt. Ida were obtained as 4$^0$C (in January) and 21$^0$C (in July), 40 mm (in August) and 153 mm (in December) (Fig 32c).

In Fag-Qu stands of Ida Mountain, it is observed that seasonal average minimum temperatures are between 3$^0$C in winter and 18$^0$C in summer, and the average minimum precipitation is between 30 mm (in August) and 112 mm (in winter). In addition, the average minimum temperatures and precipitation in spring and autumn are around 10$^0$C and 78 mm (Fig 32ı). Average maximum winter and summer temperatures and precipitation are between 6$^0$C and 22$^0$C, 61 mm -144 mm respectively, while the average maximum temperature and precipitation in spring and autumn are around 13$^0$C and 107 mm (Fig 32ıı). Seasonal mean temperatures vary between 4$^0$C (in winter) and 20$^0$C (in summer), and the seasonal mean precipitation changes between 46 mm (in summer) and 129 mm (in winter). In addition, the average temperature and precipitation in spring and autumn are around 12$^0$C and 94 mm, respectively (Fig 32ıı).

## Conclusion:-

In this study, the annual, monthly and the seasonal minimum, maximum and average temperature and precipitation values of pure dispersed tree species and dominant associations/stands in the natural forest area of Ida Mountain were obtained through Geographical Information Systems' query and analysis by basic modeling method. In this part, the status of annual, monthly and seasonal average temperature and precipitation values in pure dispersed tree communities and union areas are evaluated respectively.

The lowest annual average temperature preferences in Kazdağı pure spreading tree genus are Abies with $10^0$C, Pinus nigra with $11.7^0$C, Fagus with $9.9^0$C, and Castanea with $12.2^0$C. It is observed that these tree species show similarities in annual average precipitation values. The tree genus having the highest annual mean precipitation is Abies with 1286 mm, Fagus with 1301 mm, Pinus nigra with 1092 mm and Castanea with 1043 mm. The highest annual average temperature preferences in Ida Mountain pure spreading tree communities were obtained as Pinus brutia with $14.1^0$C, other leafed tree group with $14.2^0$C and Pinus pinea with $14.5^0$C. These species are similar in annual mean precipitation preferences.

The tree species with the lowest annual average rainfall in pure dispersed groups were obtained as Pinus brutia with 833 mm, Pinus pinea with 814 mm and the stands of other leafed trees with 773 mm. The stands with the lowest annual average temperature preference and the ones with the highest average annual precipitation preference show similarity. Indeed, Pni-Abi stands have an annual mean temperature of $9,7^0$C, Abi-Fag stands have $9,4^0$C, Abi-Pni stands, $9,9^0$C, and Fag-Abi stands have the preferences of temperature $9,8^0$C. It is observed that the annual mean rainfall preferences of these associations are also the highest. Indeed, the stands of Pni-Abi, Abi-Fag, Abi-Pni and the Fag-Abi stands have an annual mean rainfall of 1323 mm, 1350 mm, 1297 mm, and 1313 mm, respectively. According to the minimum mean temperature values obtained for January, Pinus nigra pure stands have an average minimum temperature of $0.2^0$C, Pinus nigra-Abies stands have $0.6^0$C, Pinus nigra-Quercus stands have $0.5^0$C and Abies-Pinus nigra union have the temperature of $0.7^0$C. At the lowest minimum mean temperature in January, Fagus has the temperature of $2.1^0$C, Pinus nigra-Abies stands $2.0^0$C, Abies-Fagus Stands $1.7^0$C and Fagus-Abies stands have the lowest minimum mean temperature of $2.0^0$C. The lowest values in the minimum precipitation averages of January were obtained as Pinus pinea with 84 mm, Pinus brutia with 79.4 mm, Quercus with 81.7 mm and other leafed trees with 84 mm. The lowest values of the mean precipitation in January in Ida Mountain are Pinus pinea with 98 mm, Pinus brutia with 101 mm and other leafed trees have the lowest average precipitation values with 94.2mm.

The highest values of the maximum mean temperature in July are Pinus pinea with $25.6^0$C; Pinus brutia with $26.4^0$C; other-leafed tree stands with $25.7^0$C; the Pinus brutia-other leafed stands with $25.4^0$C and the Pinus brutia-Quercus stands with $25.7^0$C. The highest values of the mean temperatures in July are of Pinus pinea with $24.4^0$C, Pinus brutia with $23.4^0$C, other-leafed tree group with $23.3^0$C and Pinus brutia-other leafed-trees with $23.3^0$C. The lowest minimum precipitation values of July are; 4.9 mm for Pinus brutia, 10.4 mm for Pinus brutia-other leafed stands with and 7.7 mm for Pinus brutia-Quercus stands. The average precipitation values in July are; Pinus pinea with 20 mm, Pinus pinea with 23.6 mm and other-leafed tree areas with 21.3 mm have the lowest July precipitation values.

Important seasonal values were evaluated, considering the minimum, maximum and mean temperature and precipitations in winter, spring, summer and autumn respectively. The species and associations with the lowest values in the average minimum temperatures in winter are Pinus nigra with $0,9^0$C, Pinus nigra-Abies with $1.3^0$C and Pinus nigra-Quercus with $0,9^0$C. The species and the stands with the highest average precipitation in winter are Pinus nigra with 171 mm, Pinus nigra-Abies with 167 mm and Pinus nigra-Quercus with 168 mm. The species and stands where the average temperatures are the lowest in winter season are Pinus nigra with $2.7^0$C and Abies-Fagus with $2.5^0$C; the species and stands where the average temperatures are the highest in winter are Pinus pinea with $6.5^0$C and pure Pinus bruita stands with $6.4^0$C. The species and stands with the highest annual precipitation values in the winter season are the Pinus nigra-Abies stands with 148 mm, the Fagus-Abies stands with 147 mm, the Pure Fagus areas with 146 mm and the Pure Abies areas with 145 mm. Species and associations/stands with the lowest minimum temperatures in the spring season are Pure Pinus nigra areas with $8.3^0$C, Pinus nigra-Abies stands with $8.6^0$C, Pinus nigra-Quercus stands with $8.5^0$C and Abies-Pinus nigra with $8.8^0$C.

The lowest minimum precipitation in spring season was obtained in pure Quercus forests with 52 mm, in Pinus brutia-Quercus forests with 52 mm and in Pinus pinea forests with 54 mm. The highest values of the mean maximum temperatures in the spring season in Ida Mountain are in the areas of pure Pinus brutia with $14.8^0$C, in the

pure Quercus areas with 14.4$^0$C and in the combination of Red Pine and Quercus with 14.4$^0$C. The highest values in the spring seasonal highest precipitation average values are in the pure Pinus nigra forests with 132 mm, in the pure Abies forests with 130 mm, in the Pinus nigra-Quercus union with 129 mm and in the Pinus nigra-Abies union with 128 mm. The lowest values of the spring seasonal average temperatures were obtained in the areas of pure Abies with 10,2$^0$C, in pure Fagus stands with 10.1$^0$C, in the Pinus nigra-Abies with 10$^0$C, in Abies-Fagus stands with 9,7$^0$C and Fagus-Abies stands with 10$^0$C. The lowest values of the spring seasonal average precipitation are in the pure Pinus pinea with 68 mm, in the pure Pinus brutia with 69 mm, in the Pinus brutia-Quercus stands with 73 mm and the Pinus brutia-Pinus nigra stands with 73 mm. The lowest values of the summer seasonal minimum precipitation were obtained in the areas of Pinus brutia with 7 mm, in Quercus stands with 11 mm, and in Pinus brutia-Quercus stands with 10 mm. The highest values of average maximum temperatures in summer season are in combination of Pbru with 25.5$^0$C, Qu (Quercus) with 24.8$^0$C and Pbru-Qu with 24.7$^0$C. The highest values of the mean summer temperatures were similarly obtained in Pinus pinea, Pinus brutia, Pinus brutia-Quercus, Quercus-Other leafed tree stands. The lowest values of seasonal average precipitation are in the areas of pure Pinus pinea with 23 mm and in pure Pinus brutia stands with 26 mm. The highest values of autumn seasonal maximum temperatures are in Pinus nigra stands with 18,7$^0$C and in Pinus brutia stands with 17,1$^0$C. The highest values of seasonal average maximum precipitation are in Pinus nigra with 139 mm, in Pinus nigra-Abies with 134 mm and in Pinus brutia with 135 mm. The highest values of seasonal average temperatures are in Pinus pinea with 15.3$^0$C and in Pinus brutia with 14.9$^0$C; the lowest value of seasonal average temperatures are in the dominant stands of Abies-Fagus with 10.2$^0$C and in Fagus-Abies stands with 10.5$^0$C. The lowest values of seasonal average precipitation are in the Quercus-Fagus union with 80 mm, in the Pinus nigra-Pinus brutia stands with 84 mm. The highest values of seasonal mean precipitation are in Pinus nigra-Abies with 117 mm, in Abies-Fagus stands with 119 mm and in Fagus-Abies with 116 mm.

With this study, minimum, maximum and average temperature and precipitation values for the main tree species and dominant associations of the Forest of Ida Mountain were determined. These monthly, seasonal and annual climatological values are expected to contribute to the related researches to be carried out with different modeling methods and to next ecological researches for the forests of Ida Mountain.

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