Assessment and conservation of *Iris atrofusca* in the North Eastern Slopes Region Key Biodiversity Area, Palestine

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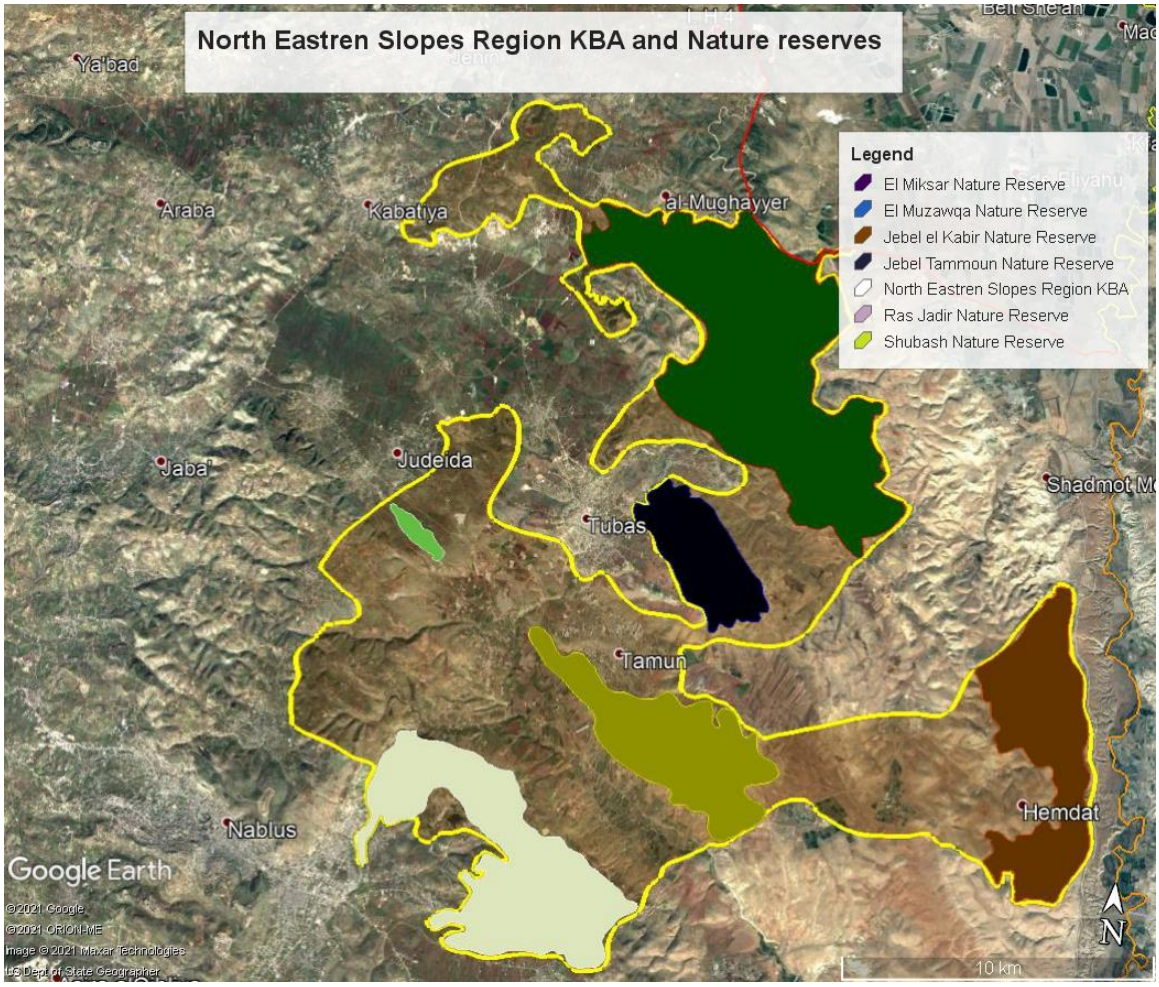
I. Background:

Despite its small size, Palestine enjoys rich floral diversity comprising a high number of endemic, near endemic and rare plants species, where 1613 vascular plant species were recorded in the West Bank, only. However, the flora of Palestine is facing major threats that could lead to the extinction of many plant species, especially plant populations that cannot withstand further degradation and habitat loss.

The project addresses the assessment, conservation, and protection of Iris atrofusca, a near-endemic plant species within "Jabal Tammoun" nature reserve. The reserve is located in the north-eastern part of the West Bank; extend between Tammoun and Atuf Villages within Tubas District. The reserve is part of the North-Eastern Slopes Region KBA that covers about 305 km2, while the total area of "Jabal Tammoun" nature reserves is 18.5 km2 (map 1, black polygon). The KBA is considered of high flora diversity and characterized by its Mediterranean biome in the west and transitional biome in the east, with a variety of vegetation types ranging from chaparral, degraded chaparral, remnants of Carob woodland and phrygana. Many rare, near-endemic range-restricted plant species, such as Iris atrofusca, Iris lortetii, Biarum pyrami, Scutellaria tomentosa, Iris vartanii and Colchicum hierosolymitanum were documented in the site, but not in a systematic methodology. The "North Eastern Slopes Regions" KBA include six nature reserves, namely; Jabal Tamoun, Ras Jadir, Shubash, El Muzawqa, El Miksar, and Jabal Al-Kabeir. The total area of these nature reserves is 132.22-km^2, which is equivalent to 43.5% of the KBA's area (map 1). To fulfil the project's proposed objectives, taking into consideration the governmental precautionary measures to avoid the spread of COVID-19, the team of NPS focused his efforts on several important activities and fieldwork. These activities include plant taxonomic survey, engagement of stakeholders and decision makers in conservation activities and planning (e.g., in-situ conservation), and capacity building for both NPS team and local communities to contribute conservation and protection activities and data collection, prioritizing the efforts on near endemic and threatened plant species.



Map1) show the North-Eastern Slopes Region KBA and its six nature reserves. The total area of the KBA is about 304 km^2; the KBA is shared between three districts (Jenin, Tubas and Nablus)

II. Project main objectives:

The project focuses on several objectives, including:

1) Assessing the distribution of *Iris Atrofusca (I.a)* at Jabal Tammoun nature reserve and at specific site within the North-Eastern Slopes Region KBA.

2) Creating an in-situ conservation site at 3.5 dunums.

3) Increasing public awareness.

4) Supporting and engaging local communities, stakeholders, and decision makers in the project activities and to practice and apply sustainable uses of land and resources

5) Capacity building for NPS's team and local communities.

III. Project's approach and activities

The project adapted several approaches and methodologies, from floristic survey, creating in-situ conservation site, capacity building, engagement of local communities and authorities' in the project activities, and increasing public awareness. The project focused on the following specific activities to achieve proposed goals and objectives:

a) Conducting field survey to identify the distribution, status, and populations size of *Iris atrofusca* within the proposed KBA (map 2). The survey was conducted beyond the proposed site and targeted several other areas with potential populations of *iris atrofusca* in various places in the West Bank, where the distribution of this species is not known at the national or international level

b) Training the team of Nature Palestine Society, volunteers, local authorities, and local communities on basic plant identification, focusing on *Iris atrofusca* and other flagship plant species,

c) Developing an in-situ conservation site (3.5 dunums) to support conserving and protecting several populations of *Iris atrofusca* within the North-Eastern Slopes Region KBA,

d) Conducting three workshops for local authorities, local communities, landowners and farmers, to promote social and legal adoption of conservation for Iris Atrofusca at local communities and authority level to ensure their engagement in our activities and to spread our conservation and protection activities and goals,

e) Conducting field visits and public awareness activities for school and university students. The focus was on student of the local communities from Tubas district, specifically from Tammoun town and Atuf village.

f) Developing three small botanical gardens at three schools located within Tammoun and Atuf villages, and one large scale mural painting that represent the life cycle of Iris *Atrofusca*, to engage students and teaching staff in conserving and protecting the population of *Iris atrofusca,* and to increase their awareness toward the importance of near endemic and threatened plant species.

g) Identifying and developing different trails that leads to the in-situ conservation site, therefore, attracting local and surrounding communities to visit the site to learn more about *Iris Atrofusca*, plant conservation methods, and to help increasing the public awareness.

IV. Implemented activities :

In order to comply with the project objectives and goals, the team of NPS with the generous support of the Ministry of Agriculture, Environmental Quality Authority, the Governorate of Tubas District, Tammoun municipality and Atuf village, as well as the WW-GVC organization, implemented successfully the project activities and achieved proposed targets.

a) Plant Taxonomic Survey:

I. Methodology

The plant taxonomist (Mr Banan El Sheikh) the team of NPS and volunteers conducted the plant survey within the KBA during the spring seasons of 2020 and 2021. In order to achieve the goals of this step, NPS team used the following methodology:

1) Conducting literature review to examine existing data regarding the distribution and status of *Iris atrofusca* in Palestine.
2) Enhancing the capacity and knowledge of NPS's team on near-endemic Iris species, different conservation methods (e.g., in-situ and ex-situ), and enhancing the team's identification skills of Iris species and other threatened plant species.
3) Identifying the suitable habitat for *Iris atrofusca* within the proposed site using different techniques (Satellite Image and google earth, GIS, and site visits,
4) Conducting field survey to examine the occurrence, distribution, abundance and species densities of *Iris Atrofusca* within the proposed site. In this part, we used several methodologies including:

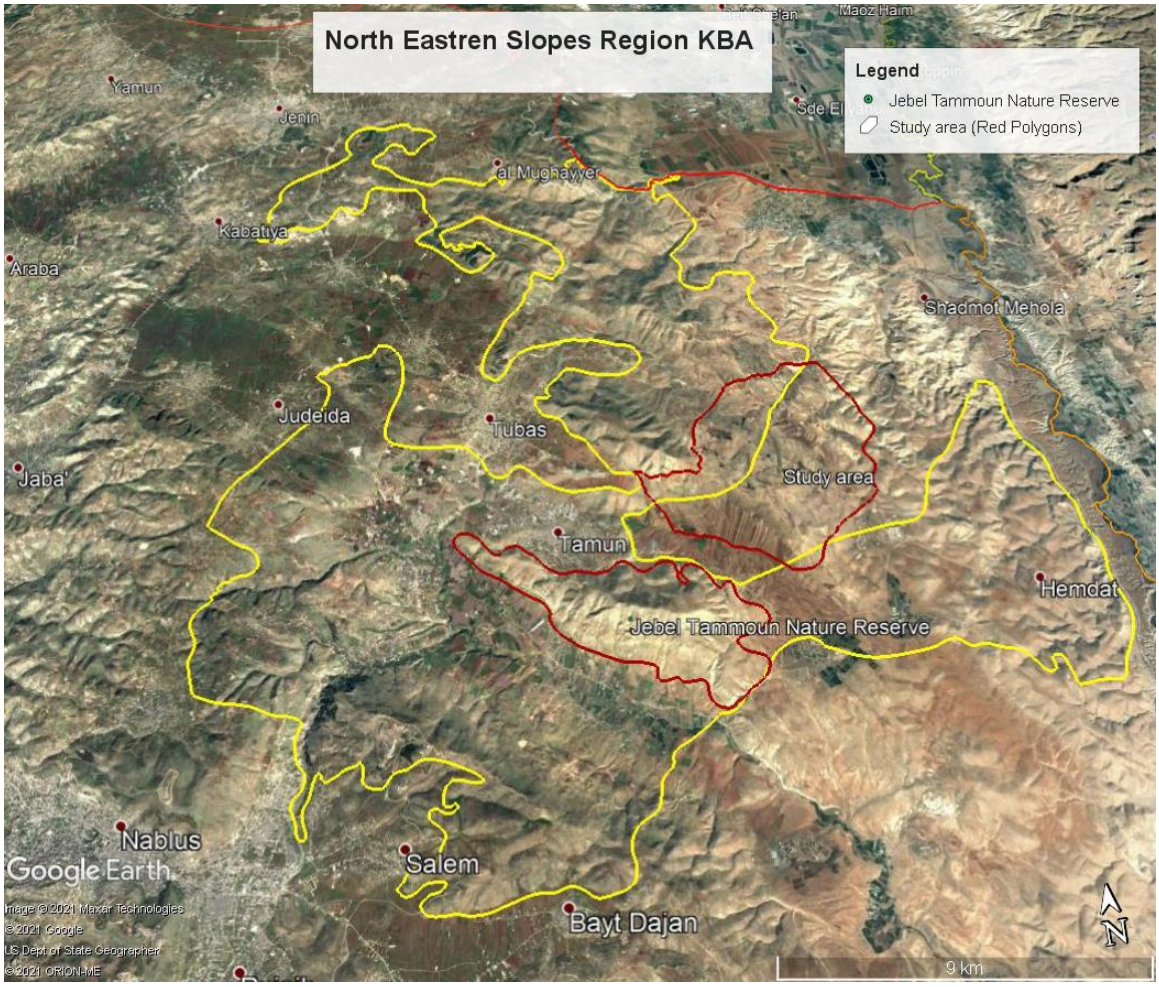
4.1) Interviewing local people, shepherds, and Bedouins within the studied areas to gather information about possible observations for *Iris atrofusca*.

4.2) Large-scale observation of potential sites for *Iris atrofusca* using binoculars and telescopes. In case we observed a single clone of *Iris atrofusca* or other Iris species within the scanned site, NPS team followed this observation with a comprehensive survey.

4.3) Plant taxonomic survey was conducted at all located sites (Jabal Tammoun Nature reserve and the main study area, map 2) within the KBA. The survey occurred during spring seasons of 2020 and 2021, mainly between March and early May, in a total of 45 days of fieldwork. During the spring season survey of 2020, we counted the number of clones and flowers of all located *Iris atrofusca*, which mean we did not use any method to estimate the density or the number of clones but we counted the actual number of flowers for located clones in each site. During the spring season survey of 2021, we conducted the survey for the second time, in order to evaluate the status of *Iris atrofusca* within previously identified and surveyed sites and to take the exact location (GPS points) of all located *Iris atrofusca* clones. During this survey, we used

an open source smart application (KoboCollect), that was possible to be modified to fit our requirements of collecting needed information (Name of researcher, email, mobile number, date, time, GPS point, and a picture of every located clone of Iris Atrofusca).

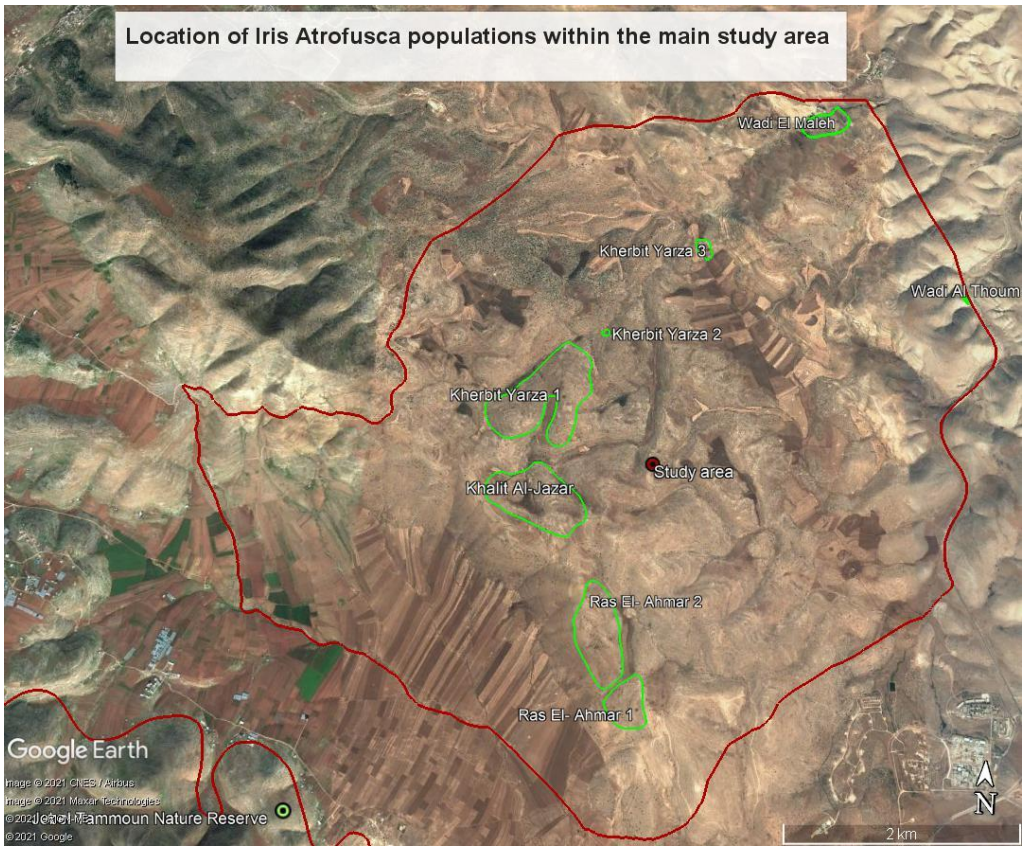
4.4) Throughout the fieldwork and plant survey, volunteers, individuals from the local communities of Tammoun town and Atuf village, and the ranger of Jebel Tammoun nature reserve, joined NPS team to learn about plant identification, specifically on near endemic and threatened plant species found in the KBA. In addition, participants learned about the important of endemic, near endemic and threatened plant species and methods of conservation. In addition, participants were introduced to systematic field data collection and how to use the smart application (e.g., the modified version of KoboCollect) for this purpose, and how important is the engagement of local communities in collecting such data that will be very useful for scientists and researchers in the field of plant conservation and protection.



Map 2) The main study area (Red Polygon) and Jabal Tammoun nature reserves within the North-Eastern Slopes Region KBA (Yellow Polygon). The total area of main study area is about 33.2 km^2 and the total area of Jebel Tammoun nature reserve is 18.5 $km^{2.}$

II. Results:

The team of NPS managed to carry out the plant survey on a total area of 51.7 km^2 that covers Jabal Tammoun nature reserve (18.5 km^2) and the main study area (33.2 km^2) in the North-Eastern Slopes Region KBA (map. 2 red Polygon) during the spring season of 2020. Within the surveyed areas, *Iris atrofusca* was located in 1842.7 dunums, divided into eight sites, ranging in size from four dunums (Kherbit Yarza 2) to 561 dunums (Kherbit Yarza 1, map 3, table 1). The total number of counted clones in the eight sites was 1442 and the number of counted flowers was 7160 (table 2 & table 3). In addition, the team of NPS located several clones of *Iris atrofusca* with unique and rare colours, including yellow and white.



Map 3) the main sites of Iris atrofusca populations (green polygons) within the main study area (Red Polygon). *Iris atrofusca* was not found any where within Jabal Tammoun nature reserve.

The team of NPS conducted plant survey to locate other populations of *Iris atrofusca* outside the boarders of Jabal Tammoun and the main study area within the KBA, and through some areas within the eastern parts of Ramallah district as well. Three populations of *Iris atrofusca* were found at the eastern part of the KBA during the spring season of 2021. The first one holds three clones at Bqe'a 1, four clones at Bqe'a 2, and three clones at Wadi Abu El Firan (map.4, table 2). The later population is located at an elevation of

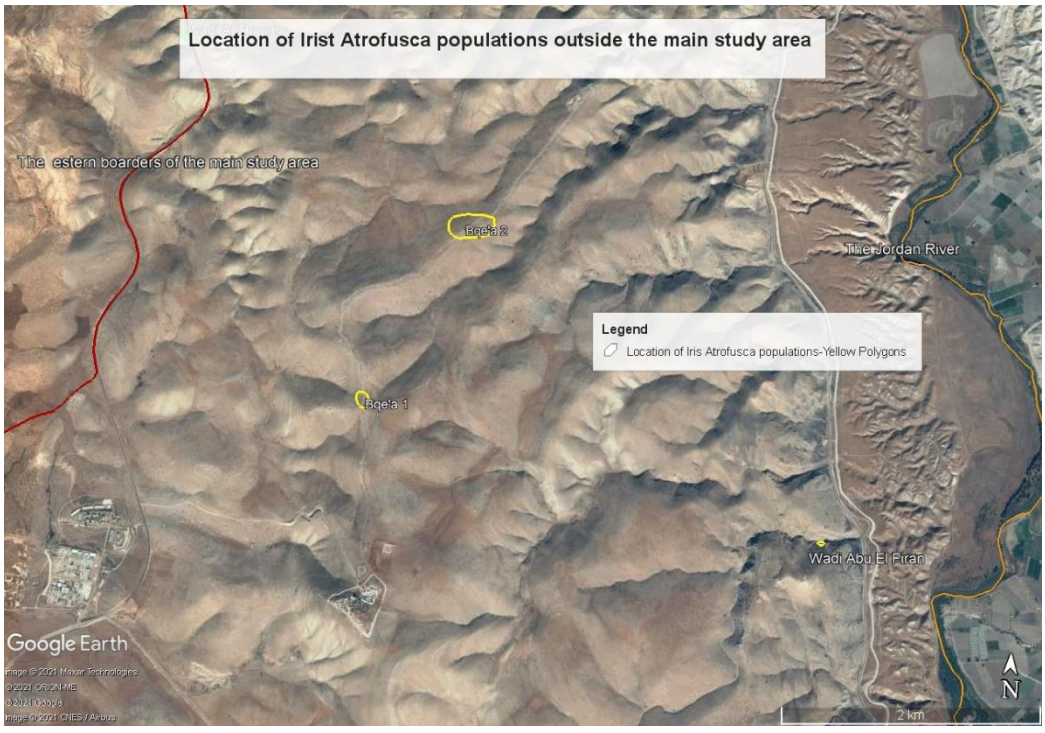
209 m below sea level, and we believe that this is the lowest location of *Iris atrofusca* ever recorded within its natural distribution at the regional level.

Table 1) Collected data from each site within the KBA. Data include number of *Iris atrofusca* clones, number of flowers, and the size of each site.

Site Name	Latitude	Longitude	# of clones	# of flowers	Area (Dunums
Kherbit Yarza 1	32° 18.057'N	35° 26.969'E	445	2629	561
Kherbit Yarza 2	32° 18.356'N	35° 27.334'E	2	7	4
Kherbit Yarza 3	32° 18.880'N	35° 27.956'E	5	9	24
Khalit Al-Jazar	32° 17.526'N	35° 27.162'E	520	3389	390
Ras El-Ahmar 1	32° 16.472'N	35° 27.480'E	336	725	104
Ras El- Ahmar 2	32° 16.932'N	35° 27.318'E	6	10	279
Wadi El Maleh	32° 19.689'N	35° 28.867'E	112	371	107
Wadi Al Thoum	32° 18.631'N	35° 29.575'E	17	20	2
	Total		**1442**	**7160**	**1471**

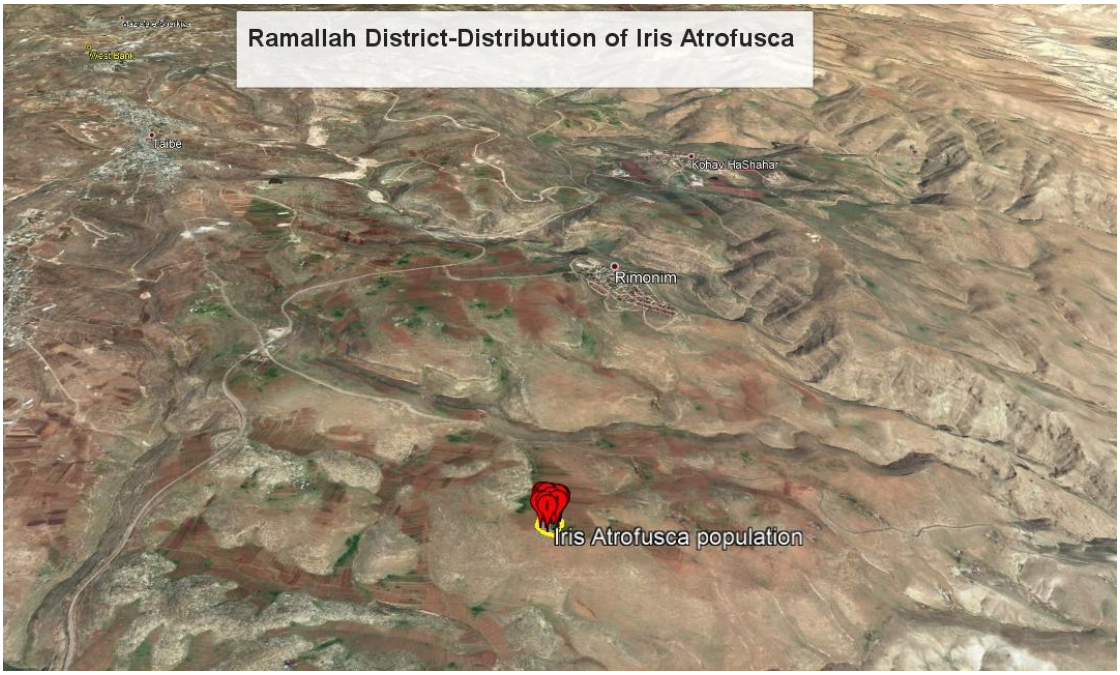
Table 2) Collected data from three sites located within the KBA but outside the main study area. Data include number of *Iris atrofusca* clones, number of flowers, and the size of each site.

Site Name	Latitude	Longitude	# of clones	# of flowers	Area (Dunums
at Bqe'a 1	32° 17.052'N	35° 30.680'E	3	11	8
at Bqe'a 2	32° 17.805'N	35° 31.090'E	4	28	57
Wadi Abu El Firan	32° 16.612'N	35° 32.887'E	3	17	10



Map. 4) Show the location of Iris Atrofusca populations outside the main study area. Bqe'a 1 and Bqe'a 2, are located about 2.4 km to the east of the main study area (red polygon), while Wadi Abu El Firan is located about 6 km to the east of the main study area. The three sites are located with the KBA. The Iris atrofusca population of Wadi El Firan are located at an elevation of 208m below mean see level and less than 1 km to the west of the Jordan River (orange line).

In addition, clones of *Iris atrofusca* were also found at the eastern part of Ramallah district, where about 23 clones were recorded within 12 dunums (map 5, table 3). The distance between the closest population of *Iris atrofusca* recorded within the North Eastern Slopes Region KBA and Ramun site is about 42 km in a south to north direction. This indicate that population of *Iris atrofusca* can be found along this area that extend from the KBA and Eastern parts of Ramallah within the suitable habitats. Therefore, the eastern slopes of the West Bank can be the home of *Iris atrofusca* populations that should be examined, protected, and conserved.



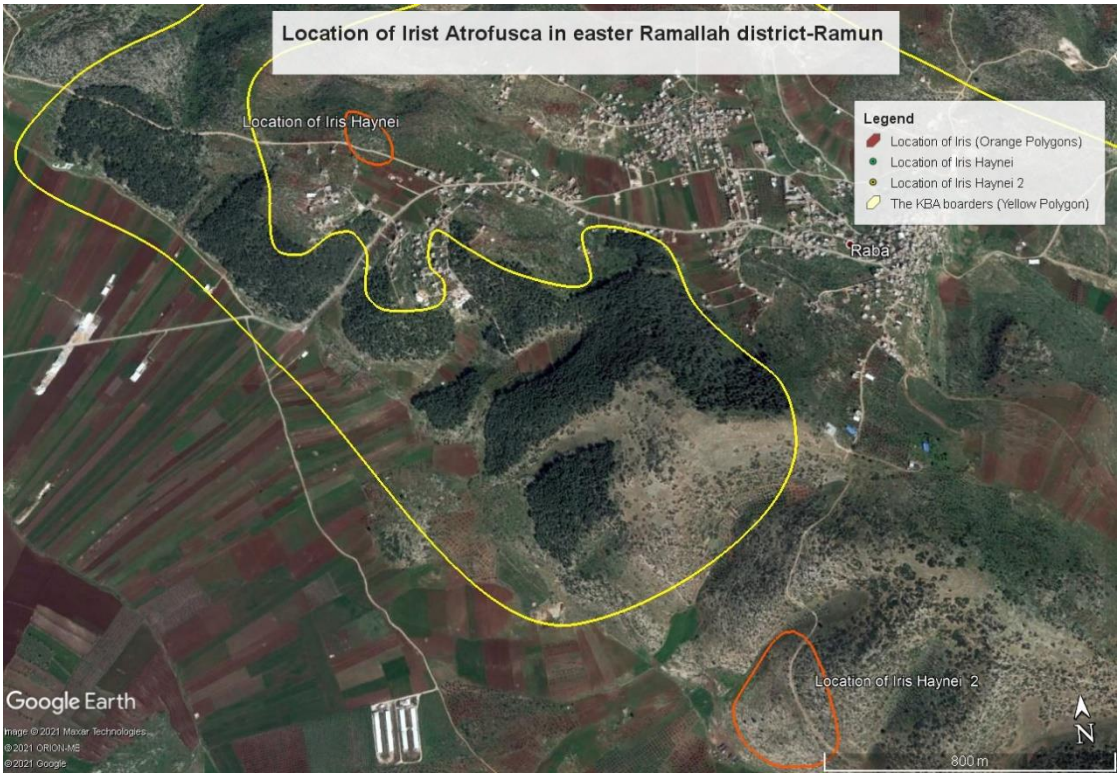
Map. 5) Show the location of Iris Atrofusca population within the eastern parts of Ramallah District.

Table 3) Collected data from Ramun site, east of Ramallah district. Data include number of *Iris atrofusca* clones, number of flowers, and the size of each site.

Site Name	Latitude	Longitude	# of clones	# of flowers	Area (Dunums
Ramun	31° 54.734'N	35° 20.151'E	22	83	12

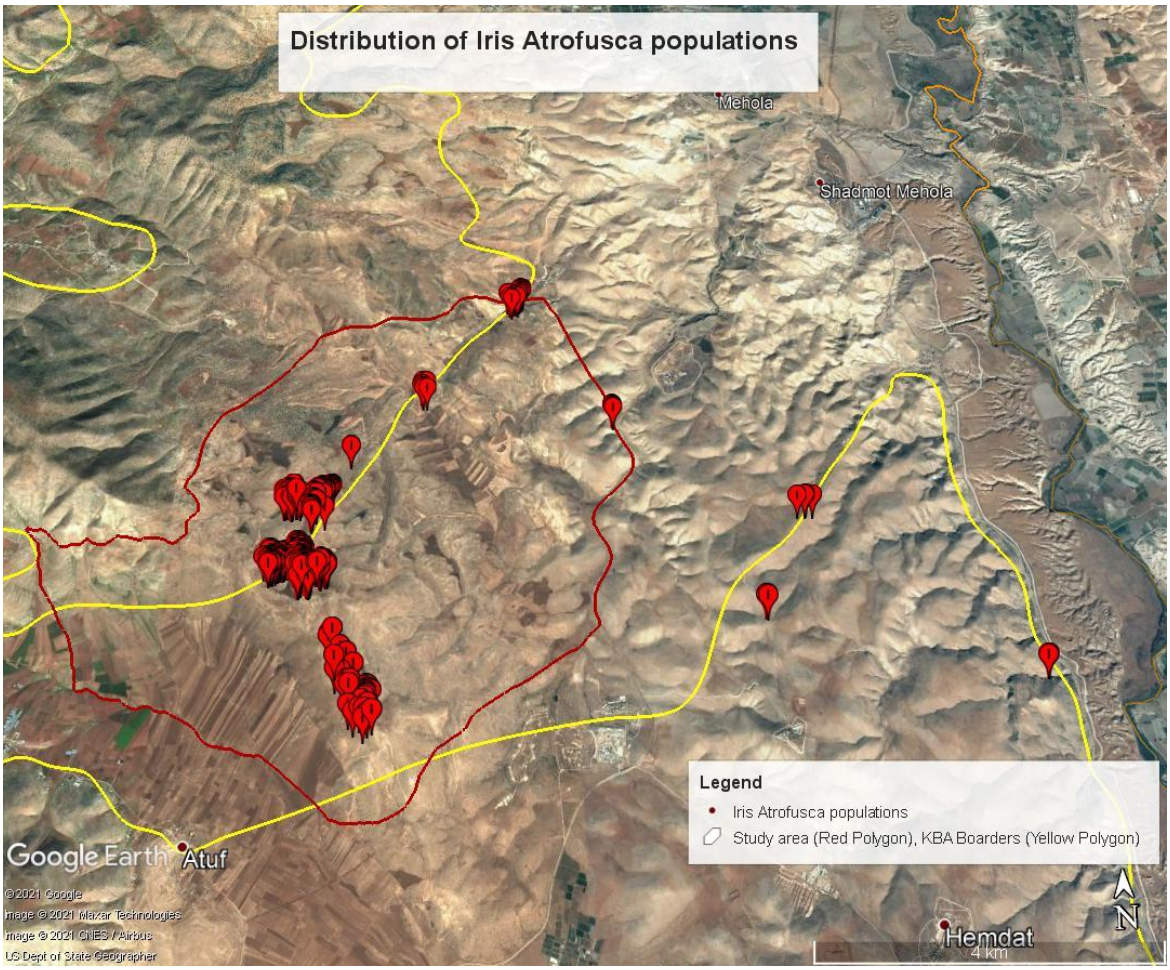
The team of NPS conducted several plant surveys at different areas in the north central parts of the KBA, and the adjacent area during the spring season of 2021. To our surprise, the team discovered a new location for an additional Iris species, the *Iris haynei*, to the south of Raba village, and outside the boarders of the North Eastern Slope Region KBA (map 6 & 8). The same plant taxonomist (project's consultant) who identifies this species

at Faqu'a-Jalbun area, where the species is recorded and identified, did the identification of this Iris species at the new discovered location. The aerial distance between the two locations, (Faqo'a-Jalbun and Raba site) is about 11.5 km in a southwest direction. The Raba site and it's the adjacent area needs further examination and survey to cover the whole area in order to locate and record all populations of *Iris haynei*, to estimate their densities, distribution, and major threats, and to prepare species conservation and protection action plan to conserve this population of *Iris haynei*.



Map 6) the new discovered location of *Iris Haynei* population near Raba village. Location 1 (west of Raba) is 24 dunums and holds about 20 clones, while location 2 (east south of Raba is 84 dunums and hold more than 60 clones.

During the spring season of 2021, the team of NPS with the help of several people from the local communities conducted the second spring survey. The purpose was to complete the surveying the designated areas and to evaluate the status of *Iris atrofusca* populations that were recorded during the spring season of 2020. In addition, the team GPS points were taken for each recorded Irises species (maps 7 & 8). The total number of recorded *Iris atrofusca's* clones were 1243, which is less than what was recorded during spring season of 2020 by 203 clones (tables 4 &5). However, in some locations, the number of clones was higher than previous year, for example, the number of recorded clones at Khalit Al-Jazar during spring season of 2020 was 520, and while during the spring season of 2021 was 639 clones. On the other hand, the number of Iris atrofusca clones recorded at Wadi El-Maleh during 2020 were 112, but decreased significantly during 2021, only 22 clones were recorded (see table 5).



Map. 7) the GPS location of all recorded *Iris atrofusca* populations, during the spring season of 2021, within the North Eastern Slopes Region KBA.

Table 4) Show collected data from each site within the KBA during spring season of 2021. Data include number of *Iris Atrofusca* clones, and number of flowers.

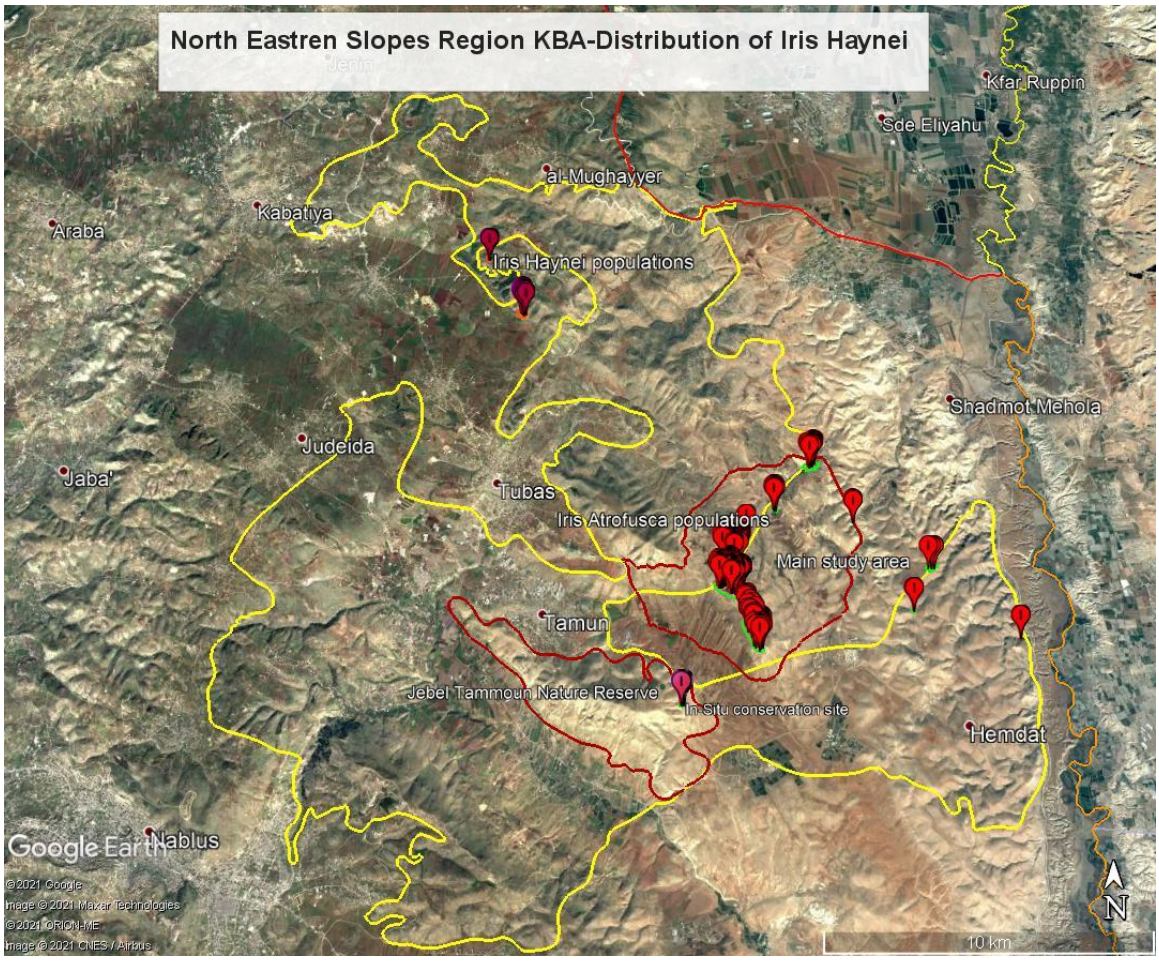
Site Name	Latitude	Longitude	# of clones	# of flowers
Kherbit Yarza 1	32° 18.057'N	35° 26.969'E	317	2847
Kherbit Yarza 2	32° 18.356'N	35° 27.334'E	2	8
Kherbit Yarza 3	32° 18.880'N	35° 27.956'E	7	14
Khalit Al-Jazar	32° 17.526'N	35° 27.162'E	639	5258
Ras El-Ahmar 1	32° 16.472'N	35° 27.480'E	237	1232
Ras El- Ahmar 2	32° 16.932'N	35° 27.318'E	13	51
Wadi El Maleh	32° 19.689'N	35° 28.867'E	22	95
Wadi Al Thoum	32° 18.631'N	35° 29.575'E	5	16

Wadi Abu El Firan	32° 16.612'N	35° 32.890'E	1	4

Table 5) Show recorded numbers of *Iris atrofusca* clones during the spring seasons of 2020 and 2021 in each site, within the KBA, except clones that recorded only during the spring season of 2021 (Bqe'a 1, Bqe'a 2, and Ramun). Last column indicate the population trend between the two seasons.

Site	# of clones (2021)	# of clones (2020)	Population trend
Kherbit Yarza 1	317	445	Decrease
Kherbit Yarza 2	2	2	No change
Kherbit Yarza 3	7	5	Increased
Khalit Al-Jazar	639	520	Increase
Ras El-Ahmar 1	237	336	Decrease
Ras El- Ahmar 2	13	6	Increased
Wadi El Maleh	22	112	Decrease
Wadi Al Thoum	5	17	Decrease
Wadi Abu El Firan	1	3	Decrease

The reason for the decrease in the number of *Iris atrofusca* clones between the two seasons is not clear. We examined each site for any evidence of human interference and there was no evidence of uprooting, digging or collecting of flowers, except in very few cases, or even distraction of habitat (e.g., land ploughing). The only reason that we could think of is environmental conditions that might affect the germination and growth of *Iris atrofusca* clones including, percentage of precipitation, intensity and frequency of precipitation, or humidity level. Taking into consideration that the most effected populations of Iris atrofusca (e.g., Wadi El Maleh) are more close to the Jordan valley where precipitation is lower, which might indicate that the population of *Iris atrofusca* within these sites received lower amount of rain to a degree that it affected their germination and growth.



Map 7) show the distribution of all located Iris populations (*atrofusca and haynei*) within the North Easter slope region and adjacent area. Red polygons represent the main study area, while the Yellow polygon represent the borders of the KBA. Red balloon represent the location of *Iris atrofusca*, purple balloon represent the location of *Iris atrofusca* within the in-situ conservation sit, while the dark red balloons represent the location of *Iris haynei*.

b) Outdoor workshops and establishment of the in-situ conservation site- The *Iris atrofusca* Botanical Garden

The in-situ conservation site was established at a governmental land within Jabal Tammoun nature reserve. It is located in the east-southern part of the nature reserve on a total area of about 14.2 dunums (maps 8 & 9). The fencing of the site was supported financially and implemented by the WW-GVC, as part of an ongoing project with the Ministry of Agriculture. More than 120 *Iris atrofusca* clones, collected carefully from different locations within the KBA, were planted in the site during three outdoor workshops. The transferred clones to the in-situ conservation site were under anthropogenic threat of extinction as these clones were located either near roadsides, agricultural lands, or within areas of high human activities.

Map 8) show the location of the 14 dunums In-situ conservation site at the easter northern part of Jebel Tammoun Nature reserve. The site was given the name "*Iris Atrofusca*" Botanical Garden. The perimeter of the fenced area is 525m.

The first planting activity (outdoor workshop) took place on December 21st 2020 were about 30 people participated in the event, including 10 university students (Al-Najah University and Al-Quds Open University), representatives of Tammoun municipality, principals of three local schools and 6 students, the ranger of Jabal Tammoun nature reserve, and NPS team and 2 volunteers (pic. 1). The number of participants was supposed to be higher but because of the pandemic (COVID-19) and the governmental restriction on movement and people congregation, the invitation was limited to specific numbers.

Picture 1) part of the group that participated in the first outdoor workshop. Participants helped and engaged in planting clones of Iris Atrofusca, learned about near endemic plant species, iris atrofusca, nature reserves, and KBAs.

Map 9) show the boundaries of the In-situ conservations site and planted Iris atrofusca.

The second planting event (second outdoor workshop) was during the opening ceremony of the botanical garden, on January 3rd, 2021. The designated in-situ conservation site named the "*Iris atrofusca* Botanical Garden". Despite the governmental restrictions on movements because of the pandemic (Covid-19), 80 people attended the opening ceremony (pictures 2 &3). The event included planting *Iris atrofusca*, introducing the participants to the concept and importance of in-situ conservation, the importance of conserving and protecting near endemic and threatened plant species, the concept and importance of KBAs. In addition, an informative sign was installed (dimensions: 120X100 cm, on 2.5 m pole) at the main gate of the garden and during the activity. At the end of the event, the local media and the national TV interviewed the General Director of the EQA, the executive director of NPS, selected stakeholder and local authorities about the project, its activities, goals, the funders, and the importance of the project. In addition, the participants were provided with a light lunch and beverages. The participants of this workshops were of wide spectrum, which include the governor of Tubas district, the general director of the EQA, representatives of the main office of the Ministry of Agriculture in Tubas district, the director of EQA office in Tubas district, the director of the environmental police in Tubas district (pictures 3 &4) . In addition, the principles of 5 local schools, the mayor and four members of Tammoun town municipality and members of Atouf village counsel, local farmers and landowners, the ranger of Jabal Tamoun nature reserve, and students from Al-Quds Open University and from the local schools. At the event, the site was declared as a special protected and educational site to support conserving and protecting *Iris atrofusca* populations in Palestine. The In-situ conservation site received a tremendous support from Mr. Jameel Mtour- the Director General of the EQA, the governor of Tubas

district-Major General Younes Al'assi, Mr. Husam Tlaib-Director General of Forests, Rangeland and Wildlife- MoA, and Mr. Abd Elatteif Besharat- the mayor of Tammoun Village.

Picture 2) the In-situ conservations site "Iris atrofusca botanical garden" that was established at Jabal Tammoun nature reserve within the east northern parts of the North Eastern Slopes Region KBA. The Picture shows the southern part of the site, the installed fence and informative sign.

Picture 3) the opening ceremony of the In-situ conservation site "the *Iris atrofusca* Botanical Garden" that took place on the January 3rd, 2021.

Picture 4) represent the main stakeholders, decision makers and local authorities that participated in the opening ceremony of the In-situ conservation site "Iris atrofusca botanical garden. This including the governor of Tubas district, the Director General of the EQA, the Director General of the Environmental Resources Directorate at the EQA, Director General of the MoA office in Tubas district, mayor of Tammoun municipality, representatives of the governorate of Tubas district.

The third planting event happened during the celebration of the Environmental Day, which took place on the 29th of March 2021. The event was an outdoor workshop organized by NPS. This workshop was the biggest of the three outdoor workshops were more than 200 people participated in outdoor activities. The event started by opening the mural painting (picture 5) at Muscat Secondary Boys School, which is located at the main road to Jabal Tammoun Nature reserve.

Picture 5) the opening of the Iris atrofusca mural by the Director General of the EQA Mr. Jameel Mtour and the governor of Tubas district-Major General Younes Al'assi.

Four local schools participated in the opening ceremony of the Iris atrofusca mural, and performed several welcoming and awareness activities (picture 6). The painting represent the life cycle of *Iris atrofusca*, the general landscape and habitat of the Iris.

Picture 6) represent part of the performed activities that held by participated student from the four local schools, during the opening ceremony of the Iris atrofusca mural painting.

The second part of the event was to raise the Palestinian flag on the highest point at Jabal Tammoun nature reserve, where all participants joined and the military orchestra of the governorate of Tubas district played several music including the Palestinian national anthem (picture 8). In addition, the General Director of the EQA announce the establishment of the *Iris atrofusca* botanical garden's trails. Thereafter, participants walked the trail (4.5 km) to the botanical garden, and in the middle of the trail, a poached Eagle owl by hunters was released after three months of rehabilitation by the team of NPS. After arriving to the botanical garden, both the governor of Tubas District and the General Director of the EQA, gave speeches about the project activities, the importance of establishing the In-situ conservation site for the Iris atrofusca, and appreciations for the CEPF and BirdLife for their generous support of the project (picture 9). The Executive Director of Nature Palestine Society-Dr. Anton Khalilieh- introduce the audience into the importance of conserving and protecting endemic, near endemic, threatened, and rare plant species, the importance of establishing the in-situ conservations site, and his gratitude to the donors (CEPF and BirdLife) for financing the project and for their support throughout the project activities. The plant taxonomist (Mr. Banan Al-Sheikh) gave a short introductory about near endemic and threatened plant species in Palestine, general

information about the KBA, and the importance of conserving and protecting *Iris atrofusca*.

Picture 8) represent the raising of the Palestinian flag at the top of Jabal Tammoun nature reserve by the military orchestra of the governorate of Tubas district, and the announcement of the *Iris atrofusca* botanical garden's trails.

Picture 9) represent part of the participants listening to the speech of the governor of tubas district and the director general of the EQA about the importance and values of protecting the *Iris atrofusca*, at the botanical garden.

c) Public awareness, capacity building, and Engagement of the local communities:

NPS conducted several events and activities to publicize the project, to increase public awareness, capacity building for NPS team, volunteers, and local communities on identifying *Iris atrofusca* and other near-endemic plant species, the concept and importance of in-situ conservation, and the values of KBAs and nature reserves.

I. Establishing school's gardens:

Three schools gardens were established at Tammoun Girls Secondary School, Golan Primary School for Girls, and Atuf Primary School (picture 10) to increase public awareness among young generations, engaging the local communities in the project activities, and to support the sustainability of the project goals of conserving *Iris atrofusca*.

Picture 10) Collection of activities during the establishment of three schools botanical gardens and planting of *Iris atrofusca.*

The director of the EQA's office and the directorate of education in Tubas district supervised this activity, as well as participated in planting *Iris atrofusca* clones and installing the informative signs. At the beginning of the activity at each school, the executive director of NPS and the plant taxonomist introduced the students and teaching staff to the importance of such gardens in supporting the conservation and protection efforts, to increasing public awareness, and to engage the local communities in conserving

and protecting of plant species. In addition, the participants learned about existing KBAs and nature reserves in Palestine, the important of the North Eastern slopes Region KBA, the goals of the project, and who are our partners and supporters. They also learned that they should spread the message and encourage others to help conserving and protecting *Iris atrofusca* and other near endemic and threatened plant species. We also received commitments from the principles of the schools, to take care of *Iris atrofusca* school garden, and to maintain it for the next generation as a way of sustaining the project gaols. Last to say, in each school between 5-9 clones of *Iris atrofusca* were planted in each garden. About 25-30 students (two schools for females and one school for both genders) from each school, in addition to 3-5 teaching staff and the principals participated in these events.

II. Capacity building:

Mr. Banan Al-Sheikh, the project's plant taxonomies, gave several introductory information regarding the identification of Iris species (*Iris haynei, Iris Atrofusca, and Iris lortetii*), in addition to other rare plant species that occur at the North Easter Slopes region KBA, including Jabal Tammoun nature reserve. The training on key plant species was carried out during the implementation of the project activities, during the outdoor workshops, the site visits, fieldwork, creating the schools gardens, or while conducting the plant survey (pictures 13 &14). The participants included the team of NPS, two University students (volunteers at NPS), the principles of the three schools, 70 students (males and females) from the local schools, 3 members (women) of Tammoun municipality, and the local ranger of Tammoun nature reserve. In addition, university students from Beir Zeit, and Alquds Open Universities (males and females) were introduced to proper identification of *Iris atrofusca* and other plant species during their visits to the in-situ conservation site *Iris atrofusca* botanical garden.

Picture 13) Mr. Banan Al-Sheikh, the project's plant taxonomies, in one of his introductory lessons about the

Picture 14) Mr. Banan Al-Sheikh teaching two of the volunteers about near endemic, threatened and rare plant species at Jabal Tammoun Nature Reserve

identification of *Iris atrofusca* and other rare, and threatened plant species.

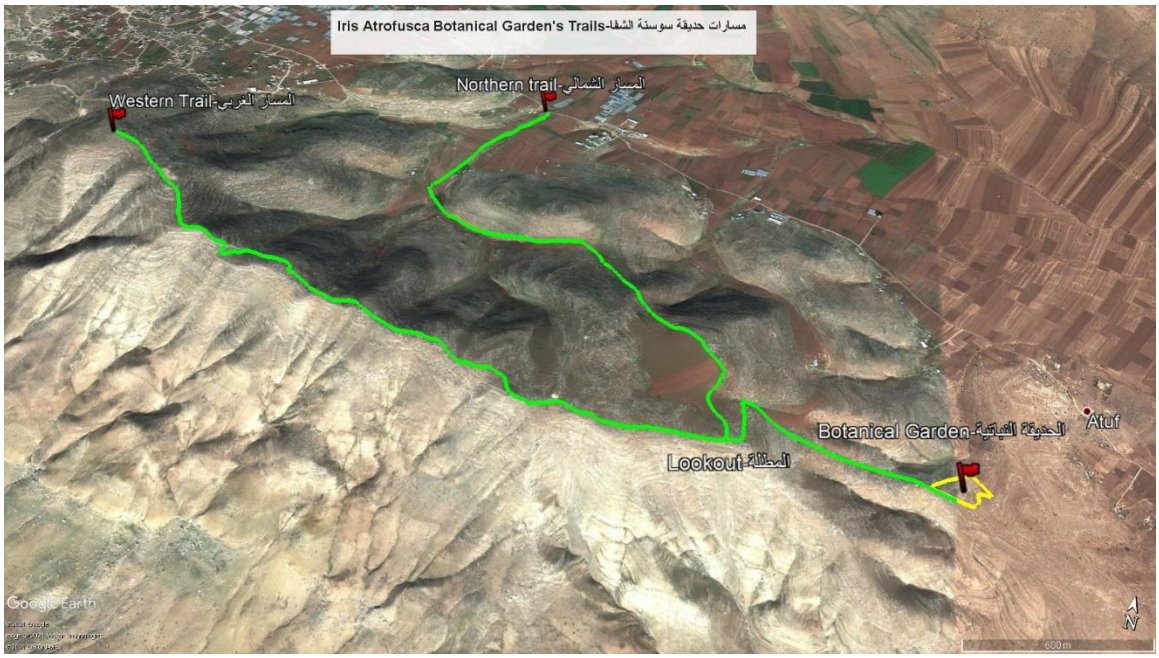
III. Outdoor Workshops:

NPS held three main outdoor workshops during the project's period. The first one took place on December 21st, 2020 at the in-situ conservation site, were about 30 people participated (see section b for more details). The second one was at the opening ceremony of the *Iris atrofusca* botanical garden on January 3rd 2021, were more than 80 people participated. The third one was on the Palestinian environmental day, which took place on the 29th of March 2020. More than 200 people participated in this event, with a wide spectrum of audience (picture 15). The participants of the three workshops were introduced to the project goals and objectives, partners (EQA, MoA, municipality of Tammoun, the village council of Atuf, and Ministry of Education), and the donors (CEPF and BirdLife International) whom supported implementing the project objectives and their role in conservation and protection activities at the national and international level. The participants were also introduced to the grant awarded institute and the implementation team- Palestinian NGO-Nature Palestine Society, its goals and activities (For more details about the activities of each workshop please refer to section b).

Picture 15) collection of activities (e.g., outdoor workshops & hiking) that took place during the project period.

IV. Creating hiking trails:

NPS team identified and developed two hiking trails at Jabal Tammoun Nature reserve where both intersects at a specific point, and continue to the botanical garden in a steep path (map 10). The first trail is about 3.5 km (map 10), is the main trail that pass the mural painting of the *Iris atrofusca* life cycle on the way to the highest point at the reserve (map 10), where the trail begin. At this stage, the municipality of Tammoun created a special sitting area, parking site, and ecological toilets. Walking the trail will allow hikers and tourists to explore the nature reserve, its flora and fauna, and surrounding landscape, throughout a longitudinal section (West to East). This trail ends up at the lookout site where people can observe the botanical garden from a distance and where it intersect with the second trail that begin at the center-northern part of the reserve, close to the main road that leads to Atuf village. The second trail is 3 km long, in a north-eastern direction, which ends at the lookout site. From the lookout site, hikers and tourists will walk through a steep landscape that descends from about 458m to 256m (m.a.s.l) within 1 km close to the *Iris atrofusca* botanical garden. In addition, the team of NPS installed six informative signs along the trails, which show the path of each trial (trail map), information about the nature reserve and *Iris atrofusca* botanical garden, and birds that can be seen, focusing on resident breeding species and migratory soaring birds that pass over in the reserve. In addition, the logos of the CEPF, BirdLife international, the EQA, and NPS were added.



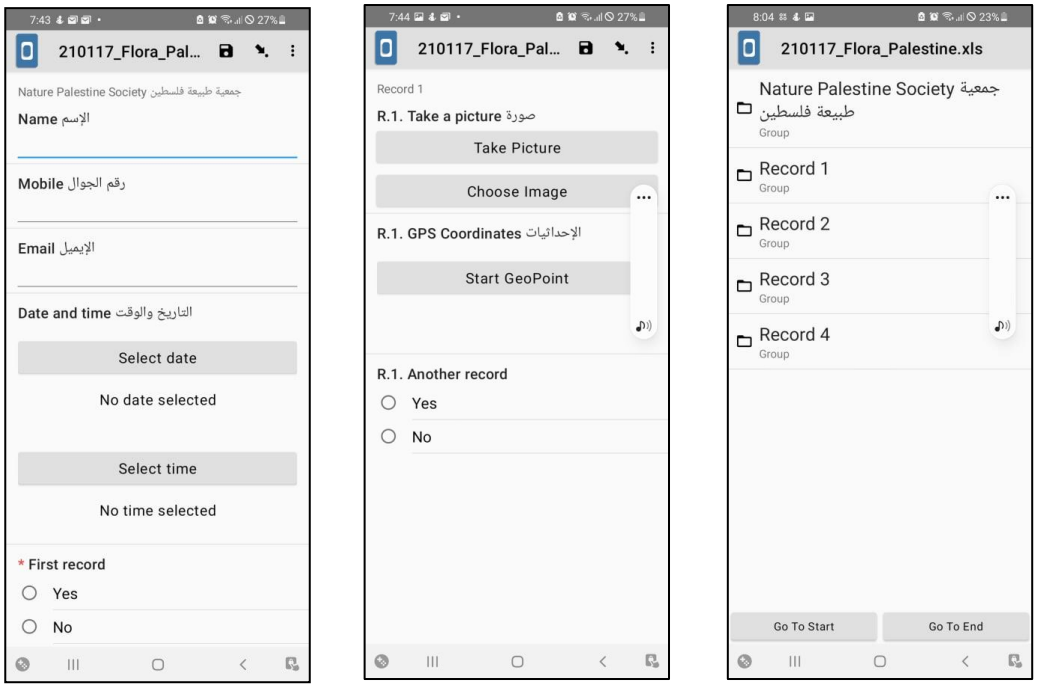
Map 10) show the Jabal Tammoun nature reserve and the two trails (green lines) that lead to the botanical garden (yellow polygon. The western trial cross the reserve in a west to eastern direction, while the northern trail cross the reserve in a north to eastern direction. Both trails intersect at the Lookout site, where the botanical garden can be seen, and then the trail continue in a steep route to the botanical garden.

V. Attended workshops by NPS team.

NPS team attended two seminars that were organized by the Critical Ecosystem Partnership Fund (CEPF), and the Regional Implementation Team for the Mediterranean Basin Biodiversity Hotspot. The first one entitled "Conservation of Endemic Plants in the Eastern Mediterranean" which was held June 2nd, 2020. The second one entitled "Plant KBAs: Criteria and Thresholds" which was held on June 22nd, 2020. These two seminars were of great importance to the team of NPS to enhance their knowledge, experience and skill on plant conservation, endemic and near endemic plant species in the Eastern Mediterranean, creating connections at the regional level, and sharing experiences, and networks.

VI. Use of Smart Applications

The team of NPS used KoboCollect application, which is an open source ODK Collect app used for primary data collection in humanitarian emergencies and other challenging field environments. An IT volunteer at NPS was able to manipulate its settings in order to meet our requirements of collecting field data. These data include the name of the researcher, time, date, number of individuals, pictures and GPS points in order to record the location of recorded *Iris atrofusca* clones, and number of clones. The team of NPS were trained to use this application before starting the field survey of the spring season of 2021. Collected date was easy to be analysed, visualize, and to create the needed distribution maps for recorded Iris species.



Picture 16) represent the first three pages of the open source application that was modified by the team of NPS. Through this smart application, data collection, sorting, and analysis was more efficient and accurate.

VII. Media coverage:

The team of NPS made sure that the project's goals, objectives and implemented activities are publicized at the local, national, and the international level to increase the public awareness and to spread the project goals and objectives at the national level. The major events were covered by the local and national media (radio stations, social media, national TV, news agencies, EQA website and Facebook, NPS Facebook, and local schools Facebook) The following links covers most of media coverages during the project period:

a) <u>During 2020</u>

1) **Environmental Quality Authority main page:** http://environment.pna.ps/ar/index.php?p=newsdetails&id=704
2) **Environmental Quality Authority Facebook page:** https://www.facebook.com/environment.quality.authority/posts/4930451257024877
3) **NPS Facebook Page:** https://www.facebook.com/Naturepalestinesociety.org/posts/1209840972745434
4) **NPS Facebook page:** https://www.facebook.com/Naturepalestinesociety.org/posts/1197214404008091
5) **NPS Facebook Page** https://www.facebook.com/Naturepalestinesociety.org/posts/1189208911475307
6) **Dr. Anton Khalilieh's Interview with radio Shabab FM:** https://fb.watch/3vMIcAeAcQ/
7) **Alwatan Voice:** https://www.alwatanvoice.com/arabic/news/2021/01/04/1391353.html
8) **Wafa news:** https://www.wafa.ps/Pages/Details/15671
9) **PNN.ps:** http://pnn.ps/news/563504
10) **Maan News:** https://www.maannews.net/news/2028957.html
11) **Wafa:** https://www.facebook.com/wafagency/posts/3626817324063055/
12) **Sada news:** https://www.sadaa.ps/261452.html
13) **Quds news:** https://qudsnet.com/tag/30823/%D8%B3%D9%88%D8%B3%D9%86%D8%A9-%D8%A7%D9%84%D8%B4%D9%81%D8%A7
14) **Falestinona:** http://www.falestinona.com/flst/Art/144590#gsc.tab=0
15) **PANET news:** https://www.panet.co.il/article/3116842
16) **Fateh Media:** https://fatehmedia.ps/page-101380.html
17) **The World News:** https://theworldnews.net/ps-news/ftth-hdyq-swsn-lshf-fy-tmwn-jnwb-twbs
18) **Birdlife international:** http://www.birdlife.org/middle-east/news/palestinian-conservationists-overcome-adversity-research-rare-plant?fbclid=IwAR1HwwhWKob9XgxZJPyRwuL3hQRSYusMV6igWzE6Uo-nn3ENPg1XFrL0_Bw
19) **EBird.eu:** http://ebird.eu/birds/palestinian-conservationists-overcome-adversity-to-research-rare-plant/
20) **Nature Palestine Society:** https://www.facebook.com/Naturepalestinesociety.org

b) <u>During 2021</u>

21) https://www.birdlife.org/middle-east/news/growing-hope-plant-conservation-palestine
22) **National TV:** https://www.facebook.com/watch/?v=122341149803319
23) **WAFA News:** https://www.wafa.ps/Pages/Details/20024
24) **Dunia Al-Wattan:** https://www.alwatanvoice.com/arabic/news/2021/03/30/1405970.html
25) **Environment Quality Authority Website:** http://environment.pna.ps/ar/index.php?p=newsdetails&id=734

26) **Palestine News Network: http://pnn.ps/news/578288**
27) **Amad for News:** https://www.amad.ps/ar/post/395836?utm_campaign=nabdapp.com&utm_medium=referral&utm_source=nabdapp.com&ocid=Nabd_App
28) **Raya network: https://www.raya.ps/news/1105623.html**
29) **State of Palestine: https://s-palestine.net/ar/?Action=Details&ID=135524**
30) **Fateh Media: https://fatehmedia.eu/?p=206378**
31) **The voic of the Palestinian Scouts: https://scout-ps.net/9485_الكشاف-المدرسي-والاهلي-بمفوضية-كشافة-محافظة-طو**
32) **Quds net new agency**
33) **Nature Palestine Society: https://www.facebook.com/Naturepalestinesociety.org/posts/1253205691742295**
34) **Nature Palestine Society: https://fb.watch/6SF3el3O1I/**
35) **Nature Palestine Society: https://www.facebook.com/environment.quality.authority/posts/5308554779214521**
36) **Nature Palestine Society: https://www.facebook.com/Naturepalestinesociety.org/posts/1231039277292270**
37) **BirdLife International: https://www.birdlife.org/middle-east/news/growing-hope-plant-conservation-palestine?fbclid=IwAR1bVVye3fWCycKE5kcqa8ISLTQzFIMyxrn7HEYN6kAN8jE9OAtMPinNU0Y**
38) **Nature Palestine Society: https://www.facebook.com/Naturepalestinesociety.org/posts/1209840972745434**
39) **Radio Shabab FM- Nablus: https://fb.watch/6SFtv5j4pS/**
40) **Nature Palestine Society: https://www.facebook.com/Naturepalestinesociety.org/posts/1197214404008091**
41) **Nature Palestine Society: https://www.facebook.com/Naturepalestinesociety.org/posts/1189208911475307**
42) **En'am Bsharat, the principle of Golan Primary School for Girls, https://www.facebook.com/inibsharat/posts/3663074223821556**