

Sanicle-leaved Water Crowfoot

Chapter 2

HOTSPOTS OF VEGETATION DIVERSITY WITHIN THE MALTESE ISLANDS

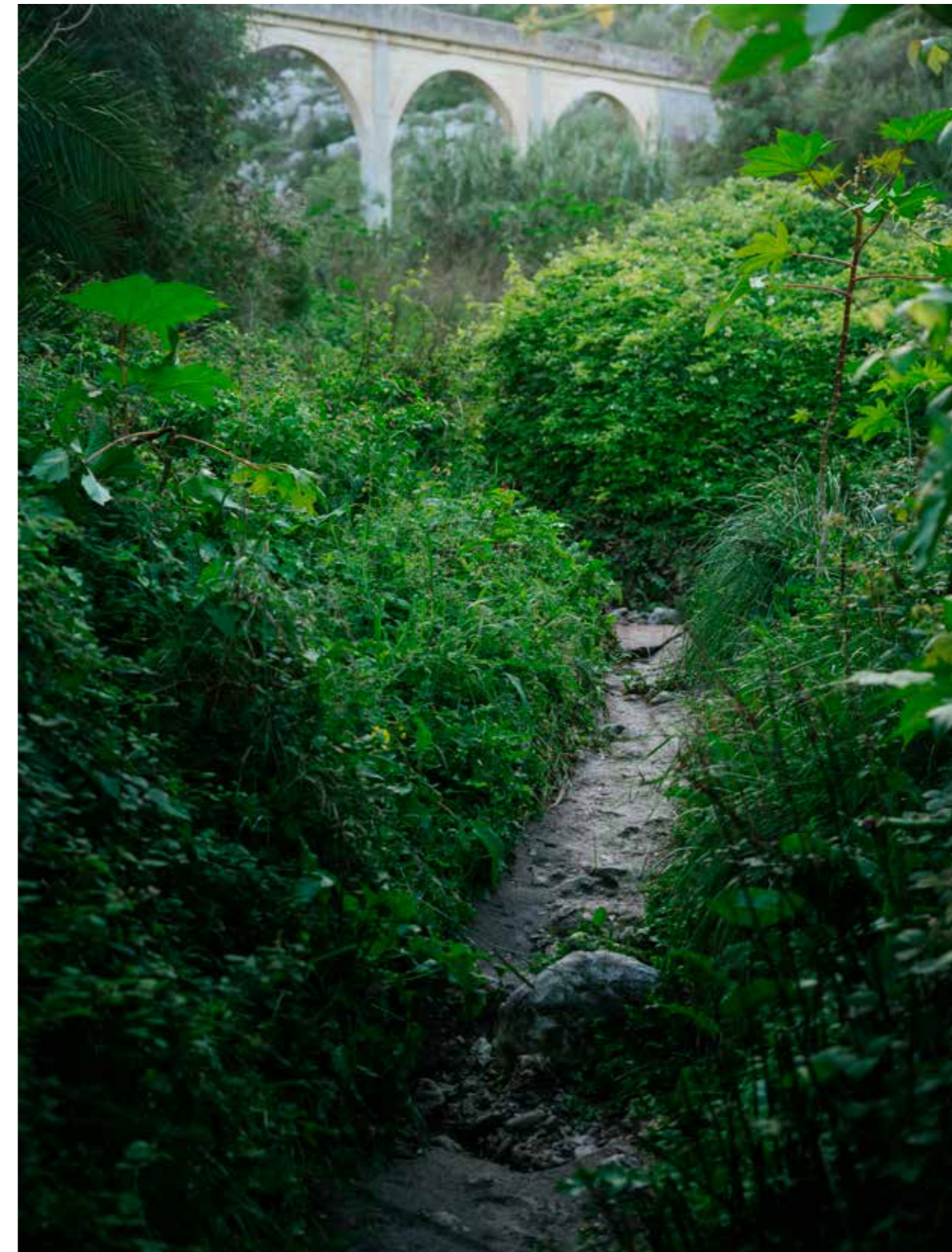
Dr Sandro Lanfranco and Ms Andrea Francesca Bellia

Plant growth and diversity are controlled by a large number of factors, including water availability, light intensity, soil depth, pH and salinity, the level of exposure to wind and the degree of human disturbance. The interaction between these factors creates a set of local conditions that favour certain species over others. Malta's valleys present a broad range of environmental conditions, where these factors vary dramatically over short distances. Changes in conditions along the length and across the width of the valleys interact with each other to form complex ecological units, capable of supporting a wide variety of plant species.

The nature of plant communities found along the valley sides is determined by two interconnected characteristics: the angle of slope and the land use. Gently sloping valley sides, such as those found in Wied Liemu, Wied tal-Imselliet and Wied il-Luq, have generally been transformed into agricultural land through terracing. This process eradicates the natural valley-side plant communities and replaces them with agricultural species. Conversely, valleys with steeper, rockier sides, such as Wied Żnuber, Wied Moqbol and Wied Babu, have typically never been agricultural. The valley side plant communities are therefore dominated by a natural mix of shrubs and cliff-dwelling specialists such as the Maltese Salt-Tree (*Salsola melitensis*), Maltese Sea Lavender (*Limonium melitense*), Maltese Cliff-Orache (*Atriplex lanfrancoi*) and Maltese Rock-Centaury (*Cheirolophus crassifolius*).

The valley bed is the most sheltered part of the system and where most water accumulates. Depending on the valley form, land uses, and the presence of dams or other modifications, streams or freshwater pools may form. Most Maltese valley beds can support a flowing stream for a period of days or weeks following heavy rainfall, but not usually for a whole wet season. Undergrowth species found along valley beds include Italian Lords-and-Ladies (*Arum italicum*), Friar's Cowl (*Arisarum vulgare*) and Bear's Breeches (*Acanthus mollis*), while the most humid and shaded areas may support Mediterranean Pellitory (*Parietaria lusitanica*). In some valleys, such as Wied il-Luq, the valley bed also hosts populations of White Poplar (*Populus alba*).

Aquatic habitats in valley beds promote a gradient of plant life, reflecting the adaptations of individual species. The central parts of the bed are covered with water most frequently, and for the longest durations. These zones are colonised by species with high water requirements, such as sedges, rushes, and reeds. Towards the margins of the valley bed, the frequency and duration of inundation drops. Aquatic plants are gradually replaced by amphibious species, and then by terrestrial plants tolerant of high soil moisture, such as Pennyroyal (*Mentha pulegium*) and Autumn Buttercup (*Ranunculus bullatus*). Further from the centre of the valley bed, soil moisture levels continue to fall, promoting colonisation by terrestrial plants unable to cope with prolonged periods of submergence.



Wied il-Ghasel, Malta



Wied Ghajn Rihana, Malta



Tree Spurge

Valley bed vegetation also differs between valleys. At Wied tal-Imselliet for example, the banks of the watercourse are colonised by Round-Headed Club Rush (*Scirpoides holoschoenus*) and Spear-Leaved Orache (*Atriplex prostrata*). The central portion of the watercourse hosts Common Water-Plantain (*Alisma plantago-aquatica*), Southern Cattail (*Typha domingensis*), Clustered Dock (*Rumex conglomeratus*), Scilly Buttercup (*Ranunculus muricatus*), Knotgrass (*Polygonum aviculare*), and Creeping Loosestrife (*Lythrum junceum*). Deeper areas contain submerged vegetation, including plant-like (*Chara*) algal species.

At Wied Żnuber, the valley bed is constrained by the very steep relief, leading to more shading. Valley bed vegetation includes dense stands of the invasive Great Reed (*Arundo donax*) interspersed with patches of maquis, which are dominated by Carob (*Ceratonia siliqua*) and Olive (*Olea europaea*), along with less common Lentisk (*Pistacia lentiscus*), Almond (*Prunus dulcis*), Fig (*Ficus carica*), Azarole (*Crataegus azarolus*) and Hawthorn (*Crataegus monogyna*).

Changes in the nature of plant communities along the length of the valleys are generally more subtle than those across their widths because the gradients in environmental conditions are less marked. In some of the shorter, coastal valleys, distance from the sea creates a noticeable gradient. In such cases, vegetation close to the valley mouth is characterised by salt-tolerant species. Often, human activity is the key factor leading to changes in the composition of plant communities along the length of a valley. Agriculture, rock quarrying, waste disposal, residential development, and many other activities create pockets of disturbance that are colonised by species differing from those in more natural, undisturbed parts of the valley. The plateaux flanking valley systems also exert an important ecological influence, by providing a pool of potential colonisers. This is of concern when the natural cliff plateaux have been modified into agricultural land or harbour alien species, which may then infiltrate valley communities.

Vegetation survey data show that almost half of the 1,306 higher plant species reported in the Maltese Islands² can be found within valleys³. When looking on the scale of a few square meters, the number of species per unit area does not differ significantly between valleys and the areas outside. However, because of the large variation in habitat types found within the valleys, when taken as a whole, valleys have a significantly higher number of plant species, and markedly different species compositions, when compared with the surrounding areas. This characteristic makes Malta's valleys important repositories for plant diversity, and therefore key targets for conservation and environmental management efforts.

² Ellul, M. A. (2014). An annotated checklist of the vascular flora of the Maltese Islands. (MSc). University of Malta, Malta.

³ Lanfranco, S. (1994-2019). Unpublished species lists; Lanfranco, S. and Bellia, A. F. (2019). Unpublished species lists.



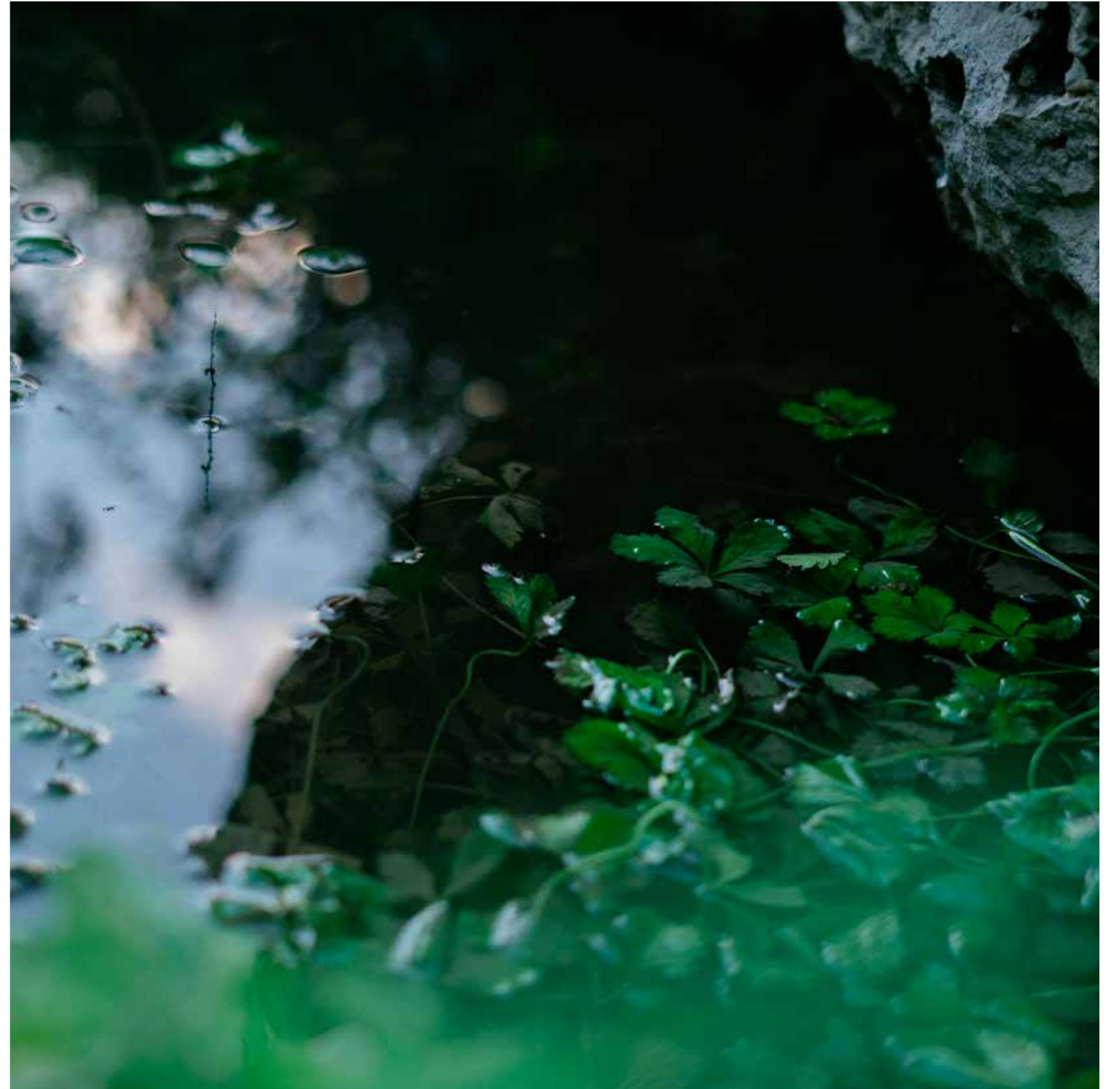
Wied ta' San Niklaw, Malta



Indigenous Hawthorn



Invasive Flora



Watercourse at Wied il-Ghasel



Mastic Tree



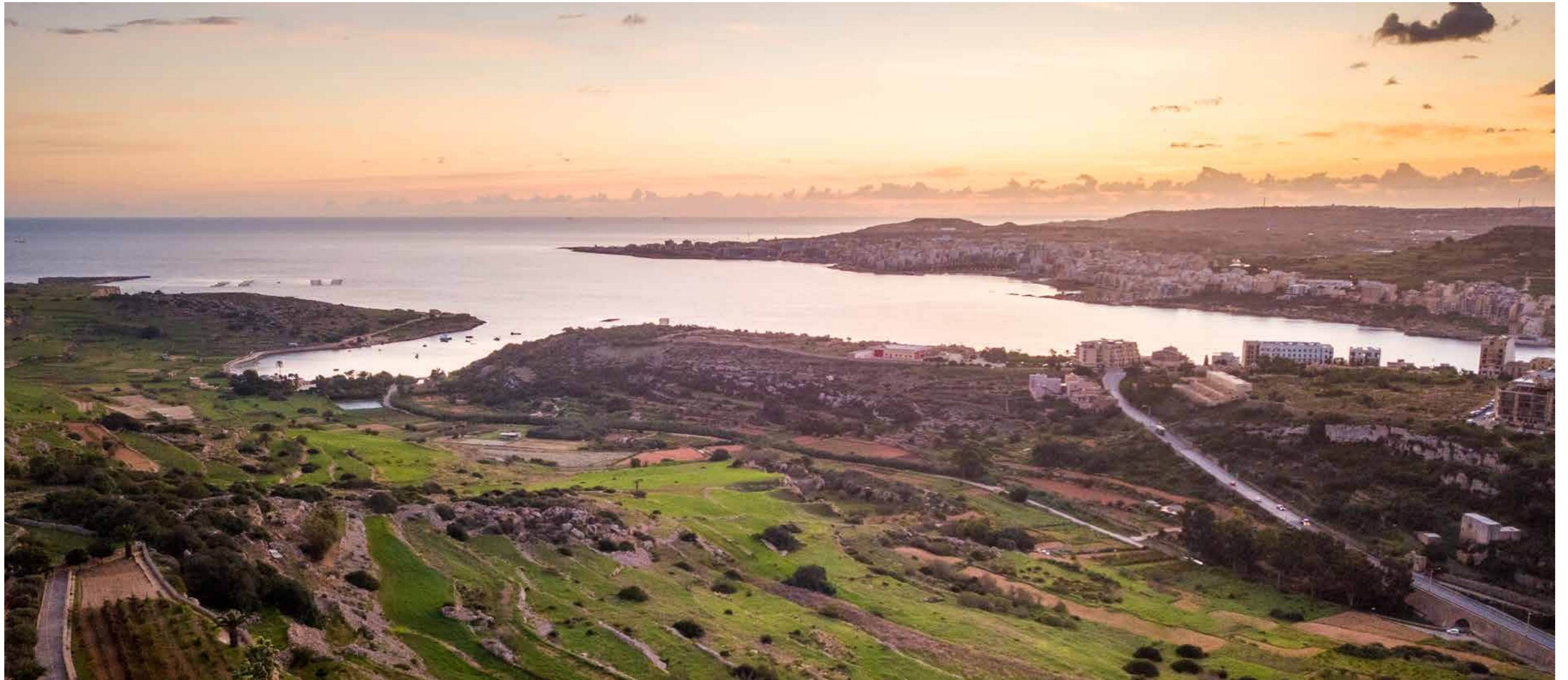
Hawthorn at Wied il-Ghasel



Typical riparian vegetation



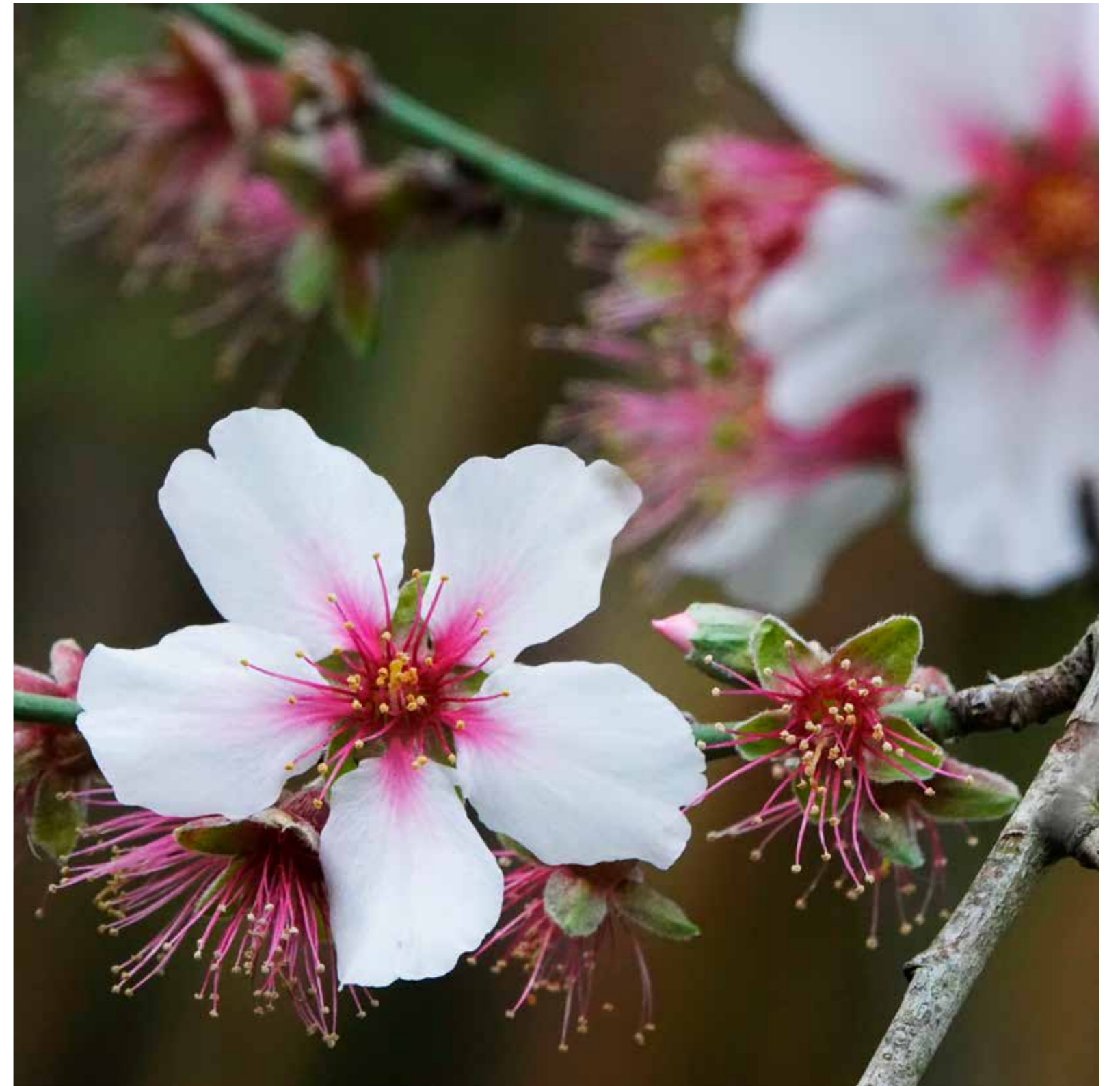
Wied tad-Dwejra, Gozo



Wied tal-Mistra, Malta



Wied tal-Ġnejna, Malta



Almond Blossoms



Friar's Cowl



Southern Bullrush