VARIATION OF THE BREEDING BIRD COMMUNITY IN A MOUNTAIN AREA AFFECTED BY INCREASING URBANIZATION IN A 20-YEAR PERIOD (2004-2024) AND MANAGEMENT IMPLICATIONS

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Riassunto - Variazione della comunità ornitica nidificante in un'area montana sottoposta ad urbanizzazione crescente in un arco temporale di 20 anni (2004-2024) e implicazioni gestionali. È stata esaminata la variazione della comunità ornitica nidificante in un settore della zona industriale di Amaro (Alpi Carniche, Friuli) dal 2004, quando era rappresentata da un agroecosistema, al 2024 quando era occupata per oltre l'80% da capannoni e infrastrutture. È stata verificata una semplificazione ed una destrutturazione della comunità ornitica composta nel 2024 da 12 specie a fronte delle 31 presenti nel 2004. Buona parte delle specie più esigenti erano già assenti nel 2014 quando, pur essendo libera da insediamenti circa metà dell'area, distruzione, semplificazione e mutazione degli habitat avevano già provocato un sostanziale cambiamento della cenosi ornitica verso caratteri più vicini a quelli di aree urbane. L'ulteriore aumento del grado di industrializzazione ha fatto definitivamente mutare la comunità da rurale ad urbana. Quanto verificato indica la necessità nella pianificazione territoriale e nella successiva urbanizzazione di adottare degli interventi gestionali miranti a ridurre l'impatto sulle biocenosi evitando di giungere ad una semplificazione eccessiva di habitat e comunità. Un fattore fondamentale a favore della conservazione è l'individuazione di aree di estensione significativa da lasciare libere dall'urbanizzazione.
Parole chiave - Comunità ornitica nidificante, Urbanizzazione, Industrializzazione, Gestione, Alpi Carniche, Friuli, Italia Nord-orientale.

Abstract – Variation of the breeding bird community in a sector of the Amaro industrial zone (Carnic Alps, Friuli, North-eastern Italy) was investigated from 2004, when it was an agroecosystem, to 2024 when it was occupied for over 80% by buildings and infrastructures. Simplification and destructuring of the breeding bird community, composed of 12 species in 2024 in comparison with 31 in 2004, was recorded. Many of the more demanding species were already absent in 2014 when, although about half of the area was free from settlements, habitat destruction, simplification and modification had already caused a substantial change in the bird community towards traits closer to those characteristic of urban areas. A further increase of the degree of industrialization definitively caused the change of the community from rural to urban. The results indicate the need, in the territorial planning and subsequent urbanization, for management interventions aimed at reducing the impact on the biocenoses to prevent oversimplification of habitats and communities. A fundamental factor in favor of conservation is the identification of significantly extensive areas to remain free from urbanization.
Key words - Breeding bird community, Urbanization, Industrialization, Management, Carnic Alps, Friuli, North-eastern Italy.

INTRODUCTION

Urbanization, one of the main factors in land consumption, assumes significant proportions in Italy, with a continuous increase (in terms of percentage) in the last twenty years. In Friuli-Venezia Giulia the percentage of land consumption is higher than the Italian average and the per capita consumption is among the highest (SNPA, 2024). Urbanization reduces ecological connectivity and biodiversity, simultaneously causing simplification and homogenization of animal and plant communities (Batten, 1972; Blair, 2001; Clergeau *et al.*, 2006; McKinney, 2008; Scarafino *et al.*, 2008; Meffert & Dziock, 2013; Aronson *et al.*, 2014; Clucas & Marzluff, 2015; Seress & Liker, 2015; Menon *et al.*, 2016; Tietze, 2018; Xie *et al.*, 2019). Industrialization, until a few decades ago scarcely present in mountain zones, is one of the aspects of urbanization. In the Friulan mountains, increasingly large areas have been occupied for production and commercial purposes since the 1970s. This is especially evident in Carnia, where the broadest valley floors and the largest urban area (Tolmezzo) are located and where the first extensive modern industrial complex was built in the first half of the 20th century. More recently, industrial zones have been established also in other locations. One of them is Amaro, where the effects of the increasing industrialization were investigated in the first period following the establishment of buildings and infrastructures (Rassati, 2017a; Rassati & Battisti, 2023).

Investigations on the impact on bird fauna are generally carried out by considering a spatial gradient of urbanization (cf. references cited at the beginning). The aim of the present study was to evaluate how the breeding bird community in a mountain area has changed by considering a temporal gradient: 20 years of industrialization. General management implications for possible mitigation of the consequences are also discussed.

STUDY AREA

A flat area (25 ha; 270 m a.s.l., 46°22'N, 13°04'E) in the floor of the Tagliamento Valley (Carnic Alps, North-eastern Italy) was taken into consideration; it was once represented by an agroecosystem but is now occupied by a sector of the Amaro industrial zone. The industrial zone arose in the early 1980s after construction of a motorway junction connected to the State Road 52. Over time, the development expanded to cover a large part of the valley floor between the Tagliamento and the slopes of Mount Amariana that close it to the north (Fig. 1).

Up to the beginning of the 21st century, the study area was occupied by meadows also with fruit trees (Common Walnut *Juglans regia*, Apple *Malus domestica*, *Prunus* spp.) and Mulberries *Morus* spp., cultivated fields (especially Maize *Zea mays*), uncultivated land, groves of Black Poplar *Populus nigra*, Scots Pine *Pinus sylvestris*, Black Locust *Robinia pseudacacia*, Manna Ash *Fraxinus ornus*, European Hop-Hornbeam *Ostrya carpinifolia*, Common Hawthorn *Crataegus monogyna*. There were also remains of rural buildings and dry stone walls. Subsequently, the lands were abandoned due to expropriation and industrial buildings and infrastructures were constructed, which in 2014 occupied ca. half of the investigated area while the other half was covered by uncultivated land and groves and to a minimal extent by meadows created by elimination of arboreal and shrubby vegetation, working of the soil and sowing with commercial seeds. In 2024, about 80% of the area was occupied by industrial buildings and infrastructures (Tab. 1).

Table 1. Land cover types (in %) in the study area (2004, 2014, 2024). / Tipi (in %) di uso del suolo nell'area di studio (2004, 2014, 2024).

	Meadow %	Cultivated land %	Uncultivated land %	Grove %	Building and infrastructure %
2004	51	18	14	17	0
2014	6	0	32	9	53
2024	8	0	9	2	81

METHODS

The breeding bird community was investigated, using the Territory Mapping Method (Bibby *et al*., 1992), in 2004 when the area was not affected by the industrial zone, in 2014 after establishment of an industrial park and in 2024 with increasing industrialization. Between April and July, 10 surveys were conducted on days with good weather conditions, during the hours of maximum singing activity; for the European Nightjar *Caprimulgus europaeus* and the Strigiformes the surveys took place at dusk and in the first hours of darkness. The visits were carried out along a pre-established path at a constant speed that allowed the entire area to be examined (see Bibby *et al*., 1992). The contacts, coded according to Bibby *et al.* (1992), were reported on a detailed map of the study area, allowing definition of single territories. Given the presence of both the House Sparrow *Passer domesticus* and Italian Sparrow *Passer italiae* (cf. Rassati, 2015a, 2016) whose songs and females are indistinguishable, individuals of the two species were considered to belong to the species "Sparrow": for this species and for the Tree Sparrow *Passer montanus*, which are difficult to census with the mapping method, the number of pairs was estimated on the basis of the observed individuals.

To analyze the structure of the breeding bird community, the following parameters were calculated:

- Species richness (S): total number of species;
- Density (D): number of pairs/100 ha;
- Percentage frequency of single species (F%);
- Number of dominant species (Nd): number of species with F%>5% (Turcek, 1956);
- Percentage frequency of dominant species (Fd%);
- Percentage of non-passerine species (%nP) (Ferry & Frochot, 1970);
- Shannon diversity index (H'): H' = - ∑ *pi* ln *pi*, where *pi* is the relative frequency of each species (Shannon & Weaver, 1963);
- Equitability index (E): E = - H'/ln S, where H' is the Shannon Index and S is the total number of sampled species (Magurran, 1988);

- Total biomass (Bt): total weight of all individuals of the community;
- Consuming biomass (Bc): sum of the weights of each individual of the community raised to the 0.7th power ($y^{0.7}$). Raising to the power allows one to obtain biomass values that are more directly comparable even between different species as this takes into account the specific variations in the metabolic rate mainly linked to the size of the bird (Salt, 1957). This value is directly proportional to the amount of energy the individual takes from the environment (Blondel, 1969).
- Ratio between Bc and Bt (Bc/Bt): since individuals with considerable body weight have consuming biomass values much lower than those of total biomass, the ratio varies according to the proportion between the abundance of small and large species.

The mean values of the weight data (in g) obtained from Snow & Perrins (1998) were used to calculate the biomass.

The breeding bird communities in the periods considered were compared by means of the Sørensen similarity index (1948): Cs = 2 j/(a + b) where j = number of species sampled in both periods and a, b = number of species sampled respectively in period a and in period b.

RESULTS

From 2004 to 2024, species richness decreased by almost 2/3 (31 vs 12) and abundance decreased by over 70% (Tab. 2, 3, 4). All species found in 2014 had already been recorded in 2004, while in 2024, with the exception of the Black Redstart *Phoenicurus ochruros*, Sparrow and Cirl Bunting *Emberiza cirlus*, all species had already been found in the two previous periods (Tab. 2, 3, 4). On average, for each survey session, 23 species were contacted in the first period (2.6 SD; Range 20-27), 15.2 in the second (1.2 SD; Range 14-18) and 7.1 in the third (1.6 SD; Range 4-10). On the assumption that a breeding pair was present in each territory permanently defended by a territorial male, 73 pairs were identified in 2004 (292 pairs/100 ha) of which 29 (39.7%) belonged to the 6 (19.4%) dominant species, 30 pairs in 2014 (120 pairs/100 ha) of which 18 (60%) belonged to the 8 (40%) dominant species, and 21 pairs in 2024 (84 pairs/100 ha) of which 17 (81%) belonged to the 8 (66.7%) dominant species (Tab. 2, 3, 4, 5). The percentage of non-passerine species was similar in the first two periods (22.6 and 20), while no non-passerine species were recorded in 2024 (Tab. 5). The diversity index in particular, but also the equitability index, decreased over time (Tab. 5). Biomass decreased substantially with the increase in areas occupied by buildings and infrastructures, and the ratio between consuming biomass and total biomass increased over time (2004: 0.12; 2014: 0.14; 2024: 0.16; Tab. 5).

The Sørensen index of similarity between bird communities in the different periods had the following values: 0.78 (2004 and 2014), 0.56 (2014 and 2024), 0.42 (2004 and 2024).

Table 2. Number of breeding pairs (Np), Percentage frequency (F%), Density (number of pairs/100 ha) (D) (Year 2004). / Numero di coppie nidificanti (Np), Frequenza percentuale (F%), Densità (numero di coppie/100 ha) (D) (Anno 2004).

Species		Np	F%	D
Eurasian Blackbird	*Turdus merula*	6	8.2	24
Great Tit	*Parus major*	5	6.8	20
Eurasian Blackcap	*Sylvia atricapilla*	5	6.8	20
Common Nightingale	*Luscinia megarhynchos*	5	6.8	20
Common Redstart	*Phoenicurus phoenicurus*	4	5.5	16
Common Chaffinch	*Fringilla coelebs*	4	5.5	16
Red-backed Shrike	*Lanius collurio*	3	4.1	12
Marsh Tit	*Poecile palustris*	3	4.1	12
Eurasian Blue Tit	*Cyanistes caeruleus*	3	4.1	12
European Greenfinch	*Chloris chloris*	3	4.1	12
European Goldfinch	*Carduelis carduelis*	3	4.1	12
European Serin	*Serinus serinus*	3	4.1	12
Common Cuckoo	*Cuculus canorus*	2	2.7	8
Eurasian Wryneck	*Jynx torquilla*	2	2.7	8
Great Spotted Woodpecker	*Dendrocopos major*	2	2.7	8
Melodious Warbler	*Hippolais polyglotta*	2	2.7	8
Common Chiffchaff	*Phylloscopus collybita*	2	2.7	8
Tree Sparrow	*Passer montanus*	2	2.7	8
Yellowhammer	*Emberiza citrinella*	2	2.7	8
European Nightjar	*Caprimulgus europaeus*	1	1.4	4
Scops Owl	*Otus scops*	1	1.4	4
Eurasian Hoopoe	*Upupa epops*	1	1.4	4
Green Woodpecker	*Picus viridis*	1	1.4	4
Eurasian Golden Oriole	*Oriolus oriolus*	1	1.4	4
Coal Tit	*Periparus ater*	1	1.4	4
Crested Tit	*Lophophanes cristatus*	1	1.4	4
Eurasian Nuthatch	*Sitta europaea*	1	1.4	4
Song Thrush	*Turdus philomelos*	1	1.4	4
Spotted Flycatcher	*Muscicapa striata*	1	1.4	4
White Wagtail	*Motacilla alba*	1	1.4	4
Corn Bunting	*Emberiza calandra*	1	1.4	4

Table 3. Number of breeding pairs (Np), Percentage frequency (F%), Density (number of pairs/100 ha) (D) (Year 2014). / Numero di coppie nidificanti (Np), Frequenza percentuale (F%), Densità (numero di coppie/100 ha) (D) (Anno 2014).

Species		**Np**	**F%**	**D**
Eurasian Blackbird	*Turdus merula*	3	10.0	12
Common Nightingale	*Luscinia megarhynchos*	3	10.0	12
Great Tit	*Parus major*	2	6.7	8
Eurasian Blackcap	*Sylvia atricapilla*	2	6.7	8
Common Redstart	*Phoenicurus phoenicurus*	2	6.7	8
Tree Sparrow	*Passer montanus*	2	6.7	8
Common Chaffinch	*Fringilla coelebs*	2	6.7	8
European Serin	*Serinus serinus*	2	6.7	8
European Nightjar	*Caprimulgus europaeus*	1	3.3	4
Common Cuckoo	*Cuculus canorus*	1	3.3	4
Eurasian Wryneck	*Jynx torquilla*	1	3.3	4
Great Spotted Woodpecker	*Dendrocopos major*	1	3.3	4
Melodious Warbler	*Hippolais polyglotta*	1	3.3	4
Common Chiffchaff	*Phylloscopus collybita*	1	3.3	4
Marsh Tit	*Poecile palustris*	1	3.3	4
Eurasian Blue Tit	*Cyanistes caeruleus*	1	3.3	4
Spotted Flycatcher	*Muscicapa striata*	1	3.3	4
White Wagtail	*Motacilla alba*	1	3.3	4
European Greenfinch	*Chloris chloris*	1	3.3	4
European Goldfinch	*Carduelis carduelis*	1	3.3	4

Table 4. Number of breeding pairs (Np), Percentage frequency (F%), Density (number of pairs/100 ha) (D) (Year 2024). / Numero di coppie nidificanti (Np), Frequenza percentuale (F%), Densità (numero di coppie/100 ha) (D) (Anno 2024).

Species		**Np**	**F%**	**D**
Black Redstart	*Phoenicurus ochruros*	3	14.3	12
Great Tit	*Parus major*	2	9.5	8
Eurasian Blackbird	*Turdus merula*	2	9.5	8
Sparrow	*Passer* spp.	2	9.5	8
White Wagtail	*Motacilla alba*	2	9.5	8
Common Chaffinch	*Fringilla coelebs*	2	9.5	8
European Serin	*Serinus serinus*	2	9.5	8
Cirl Bunting	*Emberiza cirlus*	2	9.5	8
Melodious Warbler	*Hippolais polyglotta*	1	4.8	4
Eurasian Blackcap	*Sylvia atricapilla*	1	4.8	4
Common Redstart	*Phoenicurus phoenicurus*	1	4.8	4
European Goldfinch	*Carduelis carduelis*	1	4.8	4

Table 5. Breeding bird community structure. S = number of species, Np = number of breeding pairs, D = density (number of pairs/100 ha), Nd = number of dominant species, Fd% = percentage frequency of dominant species, % nP = percentage of non-passerine species, H' = diversity index, E = equitability index, Bt = total biomass/100 ha, Bc = consuming biomass/100 ha. / Struttura della comunità ornitica nidificante. S = numero di specie, Np = numero di coppie nidificanti, D = densità (numero di coppie/100 ha), Nd = numero di specie dominanti, Fd% = frequenza percentuale delle specie dominanti, % nP = percentuale delle specie non *Passeriformes*, H' = indice di diversità, E = indice di equidistribuzione, Bt = biomassa bruta/100 ha, Bc = biomassa consumante/100 ha.

Year	S	Np	D	Nd	Fd%	% nP	H'	E	Bt	Bc	Bc/Bt
2004	31	73	292	6	19.4	22.6	2.97	0.95	24354	2978	0.12
2014	20	30	120	8	40.0	20.0	2.56	0.94	9206	1334	0.14
2024	12	21	84	8	66.7	0	1.76	0.90	4636	721	0.16

DISCUSSION

Variation of the bird community

Simplification of the bird community is evident from the modification of the parameters over time.

Only 9 of the 31 species present in 2004 "resisted" the industrial development, although they did show a strong decline in abundance (see Tab. 4). This caused destructuring of the community, with disappearance of all the non-passerine species, the purely arboreal species (e.g. Great Spotted Woodpecker *Dendrocopos major* and Eurasian Nuthatch *Sitta europaea*) and the only bird of prey: the Scops Owl *Otus scops*. In contrast, three new taxa occupied the area, the first two in connection with the presence of human-made structures and, especially for the second one, in relation to breeding in conditions of synanthropy: Black Redstart, Sparrow and Cirl Bunting. Moreover, the first two species can be considered vicariants in a strictly urban environment of the Common Redstart *Phoenicurus phoenicurus* and the Tree Sparrow respectively. The Common Redstart, although still present in 2024, had suffered a 75% reduction in abundance and the single pair bred in the only remaining grove. The Sparrow, a strictly synanthropic taxon, replaced the Tree Sparrow, typical of rural zones. The type of change in the bird community at different degrees of urbanization also depends on the level of species-specific response (Blair, 1996; Croci *et al*., 2008; Tietze, 2018): in the present study, urbanization clearly favored some species to the detriment of others, also since the only one that showed increased abundance over time is the White Wagtail *Motacilla alba*, due to the increase in breeding sites on human-made structures. The Cirl Bunting was less distributed at the beginning of the century and subsequently underwent a significant expansion of its mountain range in Friuli. Hence its settlement in the area could be due to this factor, although the abandonment of expropriated lands has certainly led to the presence of xeric meadows with little shrubby and arboreal vegetation near the groves close to the Tagliamento, a habitat strongly selected during the expansion phase (cf. Rassati, 2017b). Modification and destructuring of original habitats and their replacement with areas managed as “urban greenery” is one of the factors most affecting the bird fauna (Luck & Smallbone, 2010; Aronson *et al*., 2014; Rassati, 2017a).

The decrease in various parameters related to a bird community that is structured and functionally suitable to its environment, such as species richness, diversity and presence of non-passerine species, is further highlighted by the collapse of total biomass (over 80% decrease). Many of the most demanding species, i.e. linked to specific habitats and/or the presence of certain breeding sites (e.g. Eurasian Hoopoe *Upupa epops*, Song Thrush *Turdus philomelos*, Eurasian Golden Oriole *Oriolus oriolus*, Red-backed Shrike *Lanius collurio*), were already absent in 2014, confirming the results of other studies indicating an impact on them even in the early stages of urbanization (cf. e.g. Møller, 2009; Meffert & Dziock, 2013). However, since about half of the area was free from development in this period (Tab. 1), suitable habitats and breeding sites were available as residual elements that allowed the presence of some species such as the European Nightjar and the Eurasian Wryneck *Jynx torquilla*. The subsequent intensification of urbanization has, de facto, made breeding impossible for most of the species originally present (see also Aronson *et al*., 2014).

The disappearance or reduction of species more closely linked to wooded areas and/or sensitive to disturbance is an outcome common to another aspect of urbanization, namely the construction of infrastructures: this was the result of a survey also conducted in Carnia on the consequences of construction of a stretch of a state road that affected wooded and rural zones (Rassati, 2018). This confirms that the effects of urbanization are visible and incisive even in small urbanized zones and not only in large urban areas where studies are usually conducted (e.g. Batten, 1972; Bezzel, 1985; Clergeau *et al.*, 2006; Clucas & Marzluff, 2015; Menon *et al.*, 2016; Xie *et al.*, 2019).

Ultimately, the present study showed that even in the early phase of industrialization, although about half of the surface was not directly affected by buildings and infrastructures, the destruction, simplification and modification of habitats caused a substantial change in the bird community: it became impoverished and took on characteristics closer to those of communities living in urban areas. The further increase in industrialization, in addition to causing additional destructuring and impoverishment, definitively changed the community from rural to urban (remember the “replacement” of the Tree Sparrow with the Sparrow and the “entry” of the Black Redstart with a consequent collapse of the Common Redstart). In confirmation of this: all the species recorded in 2024 in the Amaro industrial zone were found in the breeding bird community within a plain urban area (Cividale del Friuli; 46°06' 13°26') with the exception of the Black Redstart because it is much more frequent in mountains than in plains (Rassati, 2016).

Management implications

One of the first species to be affected by anthropization, abandoning the area as a breeding site between the end of the last century and beginning of this one, was the

Corncrake *Crex crex* (Rassati, 2006; Rassati & Battisti, 2025). Subsequently, devastation of the environment affected all the taxa, including those listed in Annex I of Directive 2009/147/EC on the conservation of wild birds requiring priority protection (Corncrake, European Nightjar and Red-backed Shrike). This clashes with the type of planning that has excluded professional figures with expertise in conservation and with the "environmental sustainability" reported in the industrial plans related to the "mission" of the industrial consortia. Moreover, in reports on land consumption, when "Plain", "Hill" and "Mountain" are compared, the percentage reported for the latter is clearly lower than that of the others and very low with respect to the total surface (cf. e.g. SNPA, 2024), leading to underestimation of the problem. This underestimation is also due to the type of subdivision, based on altitude and not on orography, and thus some mountain zones fall into the "Hill" category. To deal with this problem, attention must be given to the concentration of land consumption (e.g. in the valley floors) and to the type of urbanization (presently without a general vision that includes, as much as possible, concrete actions of mitigation and maintenance of connecting areas). Concerning the latter, in the planning related to urbanization aimed at the creation of industrial zones, the vegetation is never taken into account and indeed is considered an obstacle to the construction of infrastructures and buildings; instead, it is fundamental to maintain ecological connectivity and a certain level of biodiversity (cf. e.g. Aronson *et al*., 2014; Rassati, 2015b).

In agreement with the results of other studies (Batten, 1972; Bezzel, 1985; Jokimäki & Suhonen, 1993; McKinney, 2008; Sorace & Gustin, 2008; Scirè *et al*., 2009; Seress & Liker, 2015; Xie *et al*., 2019), it was found that urbanization has a strong impact on the animal communities, with loss of biodiversity. In addition, urbanization is considered one of the strongest threats to the environment and biodiversity (Czech *et al*., 2000; Sala *et al*., 2000; Tietze, 2018). This notwithstanding, structured and complex bird communities can persist even in areas heavily influenced by humans, and thus interventions must be carried out to preserve them (Rassati, 2016). Hence it is necessary that, instead of dealing superficially with the impact of this phenomenon (as demonstrated by the absence of projections and specific provisions), legislators ensure the involvement of the aforesaid professional figures and make adoption of their proposals mandatory. This is particularly necessary in mountain zones, limited by orography and where urban and infrastructural expansion is "eating away" increasingly large sectors especially of the valley floors. The latter contain fundamental habitats for many species, and thus areas of significant extension to be left free from urbanization must be identified as soon as possible (cf. Rassati, 2015a, 2017a, 2023). It also must be considered that increasing urbanization occurs in a context of general decline of the human population. Hence, for correct territorial planning, it is necessary to prevent empty buildings from assuming unsustainable proportions (in Carnia, unoccupied homes already exceed 50%; ISTAT 2021 data) before the construction of others is allowed. Another aspect of the problem is the occupation of floodplain areas via riverbank defense interventions that reduce the hydrogeological risk and "render" previously at-risk land buildable. In this regard, expansion of the Amaro industrial zone by approximately 9 ha was recently approved. This will obviously have a further impact on the biocenoses, which should be mitigated as much as possible by the implementation of suitable measures.

Acknowledgments. Thanks go to Giancarlo Rassati for his help in the data collection phase.

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Figure 1. Western edge of the Amaro industrial zone. In addition to the industrial buildings, one can see what remains of the agroecosystem and riparian vegetation near the Tagliamento riverbed, the State Road 52 (bottom), the A23-E55 motorway (in the background) (Photo G. Rassati). / Estremità occidentale della zona industriale di Amaro. Oltre ai capannoni, si vede ciò che resta dell'agroecosistema e della vegetazione ripariale nei pressi del greto del Tagliamento, la SS 52 (in basso), l'Autostrada A23-E55 (sullo sfondo) (Foto G. Rassati).