Additional information

General ecological features:

- 1. Dry light oak forest of Querceta roboris and Querceta petraea formations with 8 associations, correspondingly Querceto (roboris) cornoso (maris) aegonychosum, Querceto (roboris)-Carpinetum, Querceto (roboris) Carpinetum euonymosum (verrucosae), Tilieto (cordatae) Carpineto Quercetum (roboris) cornoso (maris) convallariosum, Quercetum (petraeae) caricosum (pilosae) and Quercetum (petraeae) cornosum, Quercetum (petraeae) cornoso poosum (nemoralis), Carpineto Quercetum (petraeae) hederosum. Second by area terrestrial biotope with many rare plant species and more diverse fauna of invertebrates.
- 2. Fresh oak forest (10 associations). Formation Querceta roboris is represented by associations Carpineto Quercetum (roboris) aegopodiosum, Carpineto Quercetum (roboris) caricosum (pilosae), Carpineto Quercetum (roboris) vincosum, Querceto (roboris) Carpinetum caricosum (pilosae), Querceto (roboris) Acero (platanoides) Carpinetum galiosum (odorati) and Querceto (roboris) Fraxinetum aceroso (campestris) staphyleoso (pinnatae) aegopodiosum. Formation Querceta petraea is represented by associations Quercetum (petraeae) cornosum, Carpineto Quercetum (petraeae) aegopodiosum, Carpineto Quercetum (petraeae) hederosum and Carpineto Quercetum (petraeae) caricosum (pilosae+brevicollis). That is main terrestrial natural biotope supporting most of rare plants with more abundance.
- 3. Damp oak forest in lower parts of slopes: Fraxineto Quercetum (roboris) aceroso (campestris) sambucoso aegopodiosum and Acero (campestris) Quercetum (roboris) sambucoso urtico chaerophyllosum (temulis). Smallest forest biotope with significantly weeded herbage.
- *4. Robinian (locust-tree) plantings* of anti-erosion and production purpose biodiversity scanty habitats.
- 5. **Plantings of Pinus pallasiana** of production purpose biodiversity scanty habitats that conserve petrophyte vegetation in some places.
 - <u>Native meadows and steppes</u> are mainly transformed into arable and also grazing lands and remainders of primarily ecosystems are impoverished. There are 4 biotopes and about 20 grassy associations.
- 1. Dry native grasslands (meadow and savanna steppe) are conserved by very small fragments in inaccessible steep places. They include meadow steppe of 6 associations: Festuceto (valesiacae) Stipetum (pulcherrimi) herbosum, Festuceto (valesiacae) Stipetum (pennati) herbosum, Stipeto (capillati) Botriochloetum cleistogenosum (bulgarici), Festuceto (valesiaci) Stipetum (capillati) herbosum, Bothriochloeta, Botriochloeto Stipetum (capillati) herbosum, Botriochloeto Festucetum (valesiacae) herbosum. There are also communities of endemic Poa versicolor.
- 2. Petrophyte calcicolous vegetation is also damaged especially during afforestation of stony slopes with Pinus plantings. However its remainders are especially valuable and form dependently on kind of

weathered rock 3 subtypes of biotopes that are rich by insects; *Coronelle austriaca* is characteristic snake here:

- petrophyte steppes with association *Botriochloetum cephalariosum (uralensisi)* on rocks.
- formation of thyme with associations *Thymetum cephalariosum (uralensisi) u Thymeto Teucrietum (chamaedrysi) herbosum* on stony-rubbly places of slopes.
- thyme steppes with associations Festucetum (valesiacae) thymosum (moldovicae),
 Stipetum (capillati) teucriosum (Teucrium chamaedrys + T. polium), Bothryohloetum
 thymosum (Th. moldavicus + Th. marschallianus), Stipeto (capillati) Botriochloetum

thymosum, Bothriochloetum teucriosum (Teucrium chamaedrys + T. polium) on rubbly places.

- 3. Upland dry pastures (usually Festuceto-Bothriochloetum and Bothriochloetum) are the most spread upland open semi-natural sites.
- 4. Lowland fresh pastures are covered mainly by formation Lolieta perenisi on middle levels and Festuceta

on upper levels of lowland while primarily meadows are absent practically.

Agricultural arable lands include mainly fields of annual crops and apple orchards in upland.

Wetland and upland natural habitats together with agricultural lands create integrity for main part of wildlife. At the same time some clear **core areas** may be designated.

- 1. Calarasovca-Stynca forest tract comprises 3 associations of fresh and dry oak forests *Querceto* (roboris) Carpinetum caricosum (pilosae), Querceto (roboris) Acero (platanoides) Carpinetum galiosum (odorati) and Querceto (roboris) Carpinetum, and also fragment of primarily steppe on steep limestone slope Festuceto (valesiacae) Stipetum (pulcherrimi) herbosum. There are 32 rare plant species together with 7 ones of the Red Data Book of Moldova, 7 other species of the Red Data Book of Ukraine and 3 species else Cephalanthera damasonium (Mill.) Druce, Doronicum hungaricum Reichenb.fil., Galanthus nivalis L. included in the both red lists. Some of them and other, altogether 7 species, are recognized as relicts for Podillya-Bessarabian botanical sub-province. Butterflies Callimorpha quadripunctaria, Iphiclides podalirius u Zerinthia polyxena, wild bee Xylocopa valga are noted here; all 4 species relates to the both national red lists. Fauna of vertebrates includes species of the World Red List-2004: mammals Dryomys nitedula (LT/nr) and Myotis dasycneme (VU), Hyla arborea (NT) as well as of national red lists and list of the Bern Convention: snakes Coronilla austriaca and Elaphe longissima, amphibians Bombina bombina and Triturus cristatus.
- 2. Rudi-Arionesti series of connected forest tracts between Unguri, Arionesti and Rudi Villages and a sector of primarily meadow steppe Festuceto (valesiacae) - Stipetum (pennati) herbosum. There are 16 associations of fresh, dry and damp oak forests: Quercetum (roboris) cornoso (maris) aegonychosum, Tilieto (cordatae) – Carpineto – Quercetum (roboris) cornoso (maris) convallariosum, Querceto (roboris)-Carpinetum euonymosum (verrucosae), Carpineto Quercetum (roboris) aegopodiosum, Querceto (roboris) – Carpinetum, Querceto (roboris) – Fraxinetum aceroso (campestris) staphyleoso (pinnatae) aegopodiosum. Querceto (roboris) – Carpinetum caricosum (pilosae), Fraxineto - Quercetum (roboris) aceroso (campestris) sambucoso aegopodiosum, Acero (campestris) – Quercetum (roboris) sambucoso urtico – chaerophyllosum (temulis). Quercetum (petraeae) cornoso poosum (nemoralis), Quercetum (petraeae) cornosum, Quercetum (petraeae) caricosum, Quercetum (petraeae) aegopodiosum, Carpineto – Quercetum (petraeae) caricosum (pilosae+brevicollis), Carpineto – Quercetum (petraeae) aegopodiosum and Carpineto – Quercetum (petraeae) hederosum. There are 42 rare plant species together with 9 ones of the Red Data Book of Moldova, 8 other species of the Red Data Book of Ukraine and 3 species else Cephalanthera damasonium (Mill.) Druce, Galanthus nivalis L., Pulsatilla grandis Wend. included in the both red lists. Some species represents also relicts for Podillya-Bessarabian botanical sub-province. Insect species Cerambyx cerdo (VU) of the IUCN World Red Data List-2004 was noted in this area, and also species of Ukrainian and Moldovan Red Data Books Callimorpha quadripunctaria, Iphiclides podalirius, very numerous Lucanus cervus, Xylocopa valga, Scolia maculata. Fauna of vertebrates includes species of the World Red List-2004: mammals - Dryomys nitedula (LT/nr), Lutra lutra (NT) and Myotis dasycneme (VU), amphibians - Hyla arborea (NT) as well as of national red lists and list of the Bern Convention: mammals - Myotis daubentonii and Felis silvestris, snakes - Coronella austriaca, Elaphe longissima and Vipera berus, amphibians – Rana dalmatina (only Bern List), Bombina bombina and Pelobates fuscus.

3. Holoshnita Forest Tract with a fragment upstream where parcels of steppe and petrophyte vegetation conserve among pine plantings on stony slopes and rocks. There are 5 main forest associations

only: Querceto (roboris) - Carpinetum caricosum(pilosae), Quercetum (roboris) hederosum, Querceto (roboris) - Acero (platanoides) Carpinetum galiosum (odorati) and Quercetum (petraeae) cornosum. There are 3 rare plant species together with 1 ones of the Red Data Book of Moldova, 1 other species of the Red Data Book of Ukraine and 1 species else Staphylea pinnata L. included in the both red lists. Insect rare species: Iphiclides podalirius μ Xylocopa valga. Fauna of vertebrates includes species of the World Red List-2004: nesting birds - Crex crex (NT), mammals - Lutra lutra (NT) and Myotis dasycneme (VU), amphibians - Hyla arborea (NT) as well as of national red lists and list of the Bern Convention: mammals – Myotis daubentonii, snakes – Coronilla austriaca and Elaphe longissima, amphibians - Bombina bombina.

Forests provide milieu for 34 mammal, 72 nesting bird, 9 reptile and 8 amphibian species. The usual animals in all parts of the site are Lepus europaeus, Vulpes vulpes, Martes foina, Meles meles, Capreolus capreolus among hoofed, Apodemus flavicollis and Clethrionomys glareolus.

In wetlands the most numerous waterfowl and waders during forage and seasonal migrations are ducks Anas platyrhynchos, A.querquedula, A. strepera, Aythya ferina and herons Egretta garzetta, E. alba, Ardea cinerea. Phalacrocorax carbo, Larus argentatus, Hirundo rustica, Riparia riparia, Sturnus vulgaris, Emberiza schoeniclus and some other are usual. Gatherings of water birds are in many shallow sectors of the river. Many birds spend the night along bank. Many species as gooses (Anser erythropus, A. albifrons) raptors, etc. pass here en route.

Different ducks dominate among hibernating birds –Anas platyrhynchos (first of all), A. strepera, Aythya ferina,

A. fuligula, Bucephala clangula, and also Larus argentatus; other species overwintering species include Tadorna tadorna, Ardea cinerea, Cygnus cygnus, C. olor, Mergus merganser, M. serrator, M. albellus, Aythya nyroca, A. marila, Tachybaptus ruficollis.

While patchy spreading is recently typical for rare, other herpetofauna is usual: Rana ridibunda, R. lessone, Lacerta viridis as well as L. agilis, Bombina bombina and Hyla arborea.

Alburnus alburnus, Rutilus rutilus rutilus, Perca fluviatilis and Leuciscus cephalus were the most common fish previous years. Currently Leuciscus leuciscus (prior rare) and Gymnocephalus cernuus comprise main part in catches of fishers now; Gasterosteus aculeatus is very numerous and probably take important part in foraging of water birds.

Physical features of the catchment area:

Catchment (local) area is 17,800 ha and mainly covered by the site. Adjacent to the site territory is partitioned by shallow hollows with gentle (3-6°) slopes complicated by ravines and rarely landslides. There are three general kinds of the land use: arable agriculture including orchards, forestry, and grazing. Main soil types in catchment area: leached, then ashen-grey chernozems and after dark grey wood soil.

Downstream (catchment) area is about 28871 km2.

Climate. Climate is moderate-continental with soft winter and warm summer. Average data: annual temperature 8-8.5°C (minimum -35°C, maximum 38°C); annual rainfall is 500-600 mm (longstanding average is 560 mm) in the site that is up to 23% more than in adjacent areas to the west of watershed, 70-75% falling between April and October. Summer rains are mainly torrential. Due to many valleys high irregularity of relief forms the variation in heights that reaches 50-200 m per 10-14 km; that phenomenon together with landscape diversity determines essential variations of

climatic elements (uneven warming-up, formation of convection and nebulosity, and therefore patchy distribution of summary radiation). The prevailing winds (50%) are from the northwest and southeast, with average velocity of 3-4 m/s. Average annual snow thickness is 20-25 cm, with mean cover duration of 70 days (end of December – beginning of March).

Ice cover on the river averaged 2.5-3 months with thickness 15-25 cm and each 6 years was absent. The last decade river is free of ice and paradox temperature regime takes place because hydro power station upstream discharges waters with thermocline parameters from the bottom of canyon reservoir. Being of above-zero temperature during winter the waters cannot be frost in the given fragment of Dniester while they are warmed up too later in summer that prevents normal spawning of fish besides cold-water species.

Hydrological values:

Dniester River creates hydrological and hydrogeological background for the territory, and promotes intensive interchange of surface and ground waters, increases discharge of the latter. That intensifies also purification from human-made pollution. Alternating of shoals and lateral erosion of banks is characteristic for the river.

Physical features of the site:

Geology and geomorphology. The eldest Archaean crystalline rocks (gneisses, gabbros and gabbronorites) relates to fundament of south-western margin of the East-European Platform. Deposits of Moghilev-Podolsk Series of Vendian System (terrigenous sandstones, aleurits, argillites with strata of gravelites and pelites) outcrop in riverbed and lower part of slopes to the Dniester for the all this space practically. There are also deposits of Audarminian Series of the Medium Vend near Cremenciug and Holosnita Villages (argillites, siltstones and sandstones with strata of pelite tuffs). Limestones and rottenstones of Senoman Layer of Cretaceous System lie on Vendian System with stratigraphic discrepancy and outcrop in lower and medium parts of the Dniester right bank. The territory was moved out to surface before Middle Miocene and exposed to intensive wash-out. Limestones, sands, loams and reef limestones of Baden Layer were formed during this period as the transgression result in conditions of shallow warm sea. They form mainly medium and lower parts of slopes to the Dniester and lower parts of slopes of Dniester's tributaries while upper parts of slopes and significant part of watersheds is presented by Sarmatian limestones, sands and loams. In the beginning of Middle Miocene sea receded to south anew that caused formation of continental deposits. Pliocene alluvial deposits of XII-X terraces of Akchagyl Layer are met on highest watersheds mainly. Quaternary alluvial, coluvial and diluvial deposits are everywhere and begin to dominate in southern part of the site.

Steep (20-40°) and high (up to 80 m) crumbling-sloughing slopes that lean on well developed asymmetric flood land is the main feature of area where surface is relatively flat near watershed and in lowland only. Upper parts of slopes are destructed by landslides here and there; ravine erosion is widely spread. Meandering of riverbed promotes development of lateral and hypogene erosion. Maximal width of flood land is 3-4 km while on the bank of Moldova not more than 500 m. Accumulative relief is forming in large prominent meanders. Watershed surfaces take important territory being created by complex denudation during development of Pleistocene river network.

Dominated soils are: stratified meadow, sod carbonate ruby-talus, dark grey and grey heavy-loamy wood, heavy-loamy leached and ashen-grey chernozems of middle or low humus.

Hydrology. There are three types of years: with dominant spring floods and sparse floods later; with an absence of spring floods and prevalence of summer floods; with a constant flood of equal height during spring, summer and autumn. Depending on the character of the recharge flood, the low-water period is unclear most years in the main stream – the Dniester River. The maximum spring water level in an average low flow period is 4.0-5.0 m. Normally 3-5 floods occur each summer and autumn, (sometimes as many as 12-15), with an average length of 10-15 and maximum of 55 days, the number of floods decreases to 1-2 in dry years. The pattern of water discharge in the Dniester depends on the management of the Novodnestrovsk Reservoir in Ukraine. It is especially visible in the site situated just downstream of power dam while large tributaries are absent here. Average velocity of the Dniester River is 0.7-1.2 km/our; velocities in creaks are high. Underground waters form three water-bearing complexes with fractured sheet accumulations mainly in sandstones, aleurites, argillites, marls, loamy sandstones and conglomerates, limestones.

Water quality. The waters of the Middle Dniester are attributed to hydrocarbonate class of calcium group with mineralisation 350-750 mg/l and dissolved oxygen content 10-12 mg/l, pH 7-8; quality is classified as relative good. Average content of suspended substances is 40-100 mg/l, sulfates – 90, chlorides – 30-40, calcium – 30-60 mg/l. Content of phenols and phosphorus is high – 0.002-0.006 and 0.05-0.10 mg/l , oil products 0.02-0.04, copper – 2-8 mcg/l, zinc – 10-13 mcg/l. Content of mineral and organic nitrogen is in permissible limits.

Underground waters are hydrocarbonate-sodium and hydrocarbonate-calcium of mineralization 0.5-1 g/l, hydrocarbonate-calcium-sodium 1-3 g/l, and contamination is low. Water discharge in boreholes is 1-3 l/sec.

Hydrological background. The Dniester River bed has a width of 150-246, in segments with islands up to 700 m; depths vary in main limits of 1.5-5.0 m, 0.6-1.50 m in reaches and 4.0-12.0 m in vortexes; there are many rifts, 4-5 km per 10 km of river length. Riverbed is mainly stony, bottom and banks are constituted of boulders and gravel, sometimes with shoal. There are 9 ponds of 0.25-1.3 ha within the site and near 19 ponds else, up to 6.5 ha. River network is not dense – less than 0.1 km/km2, riverbeds are mainly of limestone, sometimes with sand, Ruggedness of adjacent territory (while slopes of the Dniester are intensively partitioned by large ravines) is modest; therefore surface run-off is not intensive and transformed into underground run-off significantly. Well-permeable fractured rocks are favorable for intensive water circulation with surface and ground waters.

Ecosystem services:

Social and cultural values:

Agriculture provides main sources for economical life of population. The site contains important agricultural arable areas; main crops are corn, sunflower, wheat, sugar-beet; apple dominates in orchards but there are also pear, plum and raspberry plantations; vegetables are cultivated also. Stock-rising (cattle, sheep) became extensive and based on grazing; in spite livestock is not numerous here, over-pasturing on gentle slopes is evident. Forestry is developed; it uses more artificial plantations on steep often stony slopes and native tree stands on relatively flat areas. Fishing is the traditional trade, but lost economical value due to the trade fish resources became scarce.

There are two convents: quite popular one near Calarasovca Village and quite old one of high cultural importance near Rudi Village. Pocrovca represents settlement of Old Believers with peculiar stile of life.

Location includes many attractive picturesque places, and more than 60 geological, paleontological and archeological (from paleaolith to early-medieval epoch) sites especially between Arionesti, Pocrovca, Rudi, Tolocanesti, Tatarauca Veche and Decebal Villages and downstream near Cremenciug Village.

Tourist business is undeveloped; however traditional water and pass tourist routes cross the site along the Dniester.

Current scientific research and facilities:

There are no permanent research facilities. Earlier relevant institutes of the Academy Sciences of Moldova, Fishery Research Station, specialists of the State University of Moldova did some fragmentary studies. The most recent studies (1998) were conducted by the BIOTICA Ecological Society, funded by a grant from the John & Catherine MacArthur Foundation, and then in 2003 at the expenses of Ramsar Support Grant Program of the Society of Wetland Scientists.

Current recreation and tourism:

There is no organized recreation/tourism; expeditions of boating and passing sportive tourists and excursions are held by tourist agencies for Rudi Cloister.

Management authority:

Addresses of regional; and local authorities are: Moldova, the name of region, the name of village. Ocnita District.

Ocnita District Authority – District head Mr. Rusu Iurie, tel. (+373 271) 22 058.

Village Calarasovca – mayor Mr. Marinciuc Serghei Alexei (+373 271) 79 924

Village Unguri – mayor Mr. Ianciuc Mihail Ivan (+373 271) 62 000

Donduseni District.

Donduseni District Authority – District head Paylov Anastasii (+373 251) 22 650

Village Arionestu – mayor, Mr. Cantir Vasile Ion, tel. (+373 251) 46 236

Village Pocrovca – mayor Mr. Rilschi Cuprian, (+373 251) 53 236

Soroca District.

Soroca District Authority – District head Mr. Prisacari Anatolii, (+373 230) 22 650, 22 840

Village Rudi – mayor Ms. Raneta Zinaida Vasile, (+373 230) 47 236

Village Tatarauca Veche – mayor Mr. Popa Valentin, (+373 230) 48 236

Village Oclanda – mayor Mr. Bram Vladimir (+373 230) 44 544

Village Cremenciug – mayor Mr. Pinzari Anatol (+373 230) 31 236

Village Holosnita – mayor Mr. Groapa Veaceslav (+373 230) 70 236

<u>Iarova – Mr. Orlov M. (+373 230) 76 236</u>

Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

in the surrounding area:

The surrounding zone is characterized by extensive land use for arable agriculture and pasturing. The same factors influence upon the left bank in Ukraine borders. Formation of the international biological corridor in this transboundary area touches upon Ukrainian territory which is also under agriculture and forestry use.

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