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A NEW VARIETY OF *PYRUS HYRCANA* FED. (ROSACEAE) FROM VAYOTS DZOR PROVINCE OF ARMENIA

A new variety *Pyrus hyrcana* Fed. var. *yeghegisi* Akopian found in the gorge of the Yeghegis River, in the vicinity of the village Vardahovit of Vayots Dzor province of Armenia has been described. Morphological description of the new variety based on the studies in flowering, fruiting and early stages of development has been carried out. Distinctive features of *P. hyrcana* var. *yeghegisi* and *P. hyrcana* var. *hyrcana* are presented. The article is illustrated with original photographs.

s Dzor province, Armenia

Հակոբյան Ժ. Ա. *Pyrus hyrcana* Fed. (Rosaceae) նոր տարատեսակ Հայաստանի Վայոց ձորի մարզից: Նկարագրված է *Pyrus hyrcana* Fed. var. *yeghegisi* Akopian տանձենու նոր տարատեսակ, որը հայտնաբերվել է Եղեգիս գետի կիրճում, Հայաստանի Վայոց ձորի մարզի Վարդահովիտ գյուղի շրջակայքում: Կատարվել է նոր տարատեսակի մորֆոլոգիական նկարագրությունը՝ ծաղկման, պտղաբերման և զարգացման վաղ փուլերի ուսումնասիրության հիման վրա: Բերվում են *P. hyrcana* var. *yeghegisi*-ի և *P. hyrcana* var. *hyrcana*-ի տարբերակիչ հատկանիշները: Հոդվածը պատկերված է օրիգինալ լուսանկարներով:

Pyrus hyrcana var. yeghegisii, նորտարատեսակ, Վայոցձորիմարզ, Հայաստան

Акопян Ж. А. Новая разновидность *Pyrus hyrcana* Fed. (Rosaceae) из области Вайоц Дзор Армении. Описана новая разновидность *Pyrus hyrcana* Fed. var. *yeghegisi* Akopian, найденная в ущелье реки Ехегис, в окрестностях селения Вардаовит области Вайоц Дзор Армении. Выполнено морфологическое описание новой разновидности, основанное на изучении цветения, плодоношения и ранних стадий развития. Приводятся отличительные признаки *P. hyrcana* var. *yeghegisi* от *P. hyrcana* var. *hyrcana*. Статья иллюстрирована оригинальными фотографиями.

Pyrus hyrcana var. yeghegisi, новая разновидность, область Вайоц Дзор, Армения

INTRODUCTION

Vayots Dzor province is situated in the south-east of the Republic of Armenia. It is a mountainous region with many mountain ranges, tops, canyons, plateaus, rivers, mountain springs and mineral water. The Arpa river in Vayots Dzor has a number of tributaries, the main tributary of which is the Yeghegis river. The administrative territory of Vayots Dzor coincides with borders of Darelegis floristic region, notable by one of the richest floras in Armenia. Caused by variability in relief, climatic conditions and soil cover in Vayots Dzor there are presented several types of vegetation – semi-deserts, steppes, phrygana, arid open woodlands, subalpine meadows and some others.

Vayots Dzor province of Armenia is a home to a rich diversity of wild pears contributed by the factors of spatial isolation of species due to relief fragmentation, differentiation of vegetation and climate types, pears frequent hybridization, ancient cultivars naturalization. Five *Pyrus* species were first described from Vayots Dzor: *P. browiczii* Mulk., *P. daralagezi* Mulk., *P. gergerana* Gladkova, *P. hajastana* Mulk., *P. pseudosyriaca* Gladkova. The province is remarkable for the diversity of rare and endemic pear species of Armenian flora: *Pyrus browiczii* Mulk. (CR), *P. complexa* Rubtzov (EN), *P. daralagezi* Mulk. (EN), *P. elata* Rubtzov (EN), *P. gergerana* Gladkova (EN) (Akopian, 2010).

In Vayotz Dzor wild pears grow in broad-leaved forests (Kechut forest), by river valleys, gorges and banks (Arpa, Yeghegis, Herher), in deciduous arid open woodlands (in various areas of the province), in juniper forests, rock slopes, hill foots, near villages. Diverse natural and climatic conditions of Vayots Dzor province, as well as various types of habitats, lead to the origin of adaptive morphological and bio-ecological properties of native pear species. In all of the habitats, especially in arid open woodlands, rich diversity of species and intraspecific forms of pears are observed. The composition of Vayots Dzor wild pears poses difficulties for researchers, because of its remarkable species polymorphism and variability and needs further clarification. Concentration of groups of numerous pear species in the Vayots Dzor

province is observed in the gorge of the Yeghegis river, in the vicinity of the Hermon and Vardahovit villages (Akopian, 2007; Akopian et al., 2020).

The mesophilic species *Pyrus hyrcana* Fed. was described by An. A. Fedorov (1952) from the forests of the foothills of the Talysh ridge: "Distr. Lenkoran. Prope pag. Schui. 11. VIII. 1936. Leg. Al. Theodorov" (holo LE).

The protologue diagnosis of *P. hyrcana* in Grossheim Fl. Kavkaza ed. 2, 5: 421 (Fedorov, 1952) is based on the species characters in fruits, but flowers have not been described.

P. hyrcana also occurs in Hyrcanian forests of Northern Iran (Alborz Mts) (Schönbeck-Temesy, 1969; Zamani et al., 2012). By some notes in the Flora Iranica (Schönbeck-Temesy, 1969) on the species morphological features, the sepals of *P. hyrcana* are characterized as lingulate, obtuse at the tips. A detailed description of the *P. hyrcana* from Iran, including flower, is given in Zamani et al. (2012).

In Armenia *P. hyrcana* is reported from Zangezur (Kapan, Vachagan, Khustup Mountain) and Meghri (Shvanidzor) floristic regions. A part of the *P. hyrcana* population grows in the area of "Shikahogh" State Reserve. The species is included in the Red Book of Plants of RA (Akopian, 2010).

P. hyrcana was not previously known on the territory of the Darelegis floristic region. During our recent expeditions in the Vayots Dzor province a new variety of *P. hyrcana* was discovered in the gorge of the river Yeghegis, in pear open woodland (fig. 1).

MATERIAL AND METHODS

The study was based on the *P. hyrcana* variety herbarium material collected from Vayots Dzor province of Armenia during expeditions on October 11, 2019 and May 11, 2021 both in flowering and fruiting phases. Seed material was also collected.

To identify distinctive morphological features of described variety, specimens of *P. hyrcana* stored in the Herbarium (ERE) of the Institute of Botany after A. Takhtajyan were examined: "Hyrcania. Distr. Astara, circa pagum Schui. In regione pedemontana sylvis frondosis carpineto-quercinis. 11. VIII. 1936. Leg. Al. Theodorov" (Iso, ERE 14131, barcode ERE 0000858); "Distr. Zangezur, prope Kapan. 16. VIII. 1944. Leg. A. Takhadzhian" (Sp. auth., ERE 29974, barcode ERE 0000860); "Distr. Zangezur, prope pag. Vachagan, ad marginem silvae frondosae. 17. VIII. 1944. Leg. A. Takhadzhian" (Sp. auth., ERE 29932, barcode ERE 0000859); "Distr. Zangezur, prope pag. Kapan, in declivitate montis Chustup, silva frondosa. 16. VIII. 1934. Leg. A. Takhtadzhian" (ERE 29956, barcode ERE 0006228); "Зангезур, с. Вачаган, подножье г. Хуступ, грабовый лес, северо-восточный склон, 1000 м над ур. м. 20. IX. 1966. Собр. В. Манакян" (ERE 95304, barcode ERE 0006233); "Зангезур, с. Вачаган, грушовники в 3 км к северо-западу от села, 1200-1700 м над ур. м. 13. XI. 1966. Собр. В. Манакян" (ERE 95512, barcode ERE 0006232);"Кафанский район, платановая роща. 6. VI. 1967. Собр. Я. Мулкиджанян" (ERE 93830, barcode ERE 0006238); "Армения, Кафанский район, Шикахохский заповедник, развалины деревни старый Неркин Анд, восточная окраина деревни, левый борт речки, 850 м над ур. м. 05. VI. 2000. Э. Габриелян, М. Оганесян" (ERE 172136, barcode ERE 0006227).

P. hyrcana new variety was introduced in the wild pears living collection at the "Flora and vegetation of Armenia" Plot of the Yerevan Botanical Garden in autumn 2019. Morphological characters of seedlings and juvenile samples were observed.

In the studies carried out Stereo Microscope MBC-9 was used. Photos of the plants and their details were done with digital camera NIKON D3400.

RESULTS

Taxonomy an d Description

***Pyrus* L.**

Section *Pyrus*

Calyx persistent in fruits. Styles 5. Leaves rounded or ovate, entire or serrate, sometimes aristate-serrate, suddenly narrowed into a long thin petiole; pubescence absent or sparse, tomentose, arachnoid or ciliate only along margins. The fruits are usually smooth.

Type: *P. communis* L.

Pyrus hyrcana* Fed.** var. ***yeghegisi Akopian var. nova. (fig. 2).

Tree up to 7-8 m with spherical crown; branches

A

B

Fig. 1. View on *Pyrus hyrcana* var. *yeghegisi* trees in the natural habitat: A – in flowering (May, 2021), B – in fruiting (October, 2019)

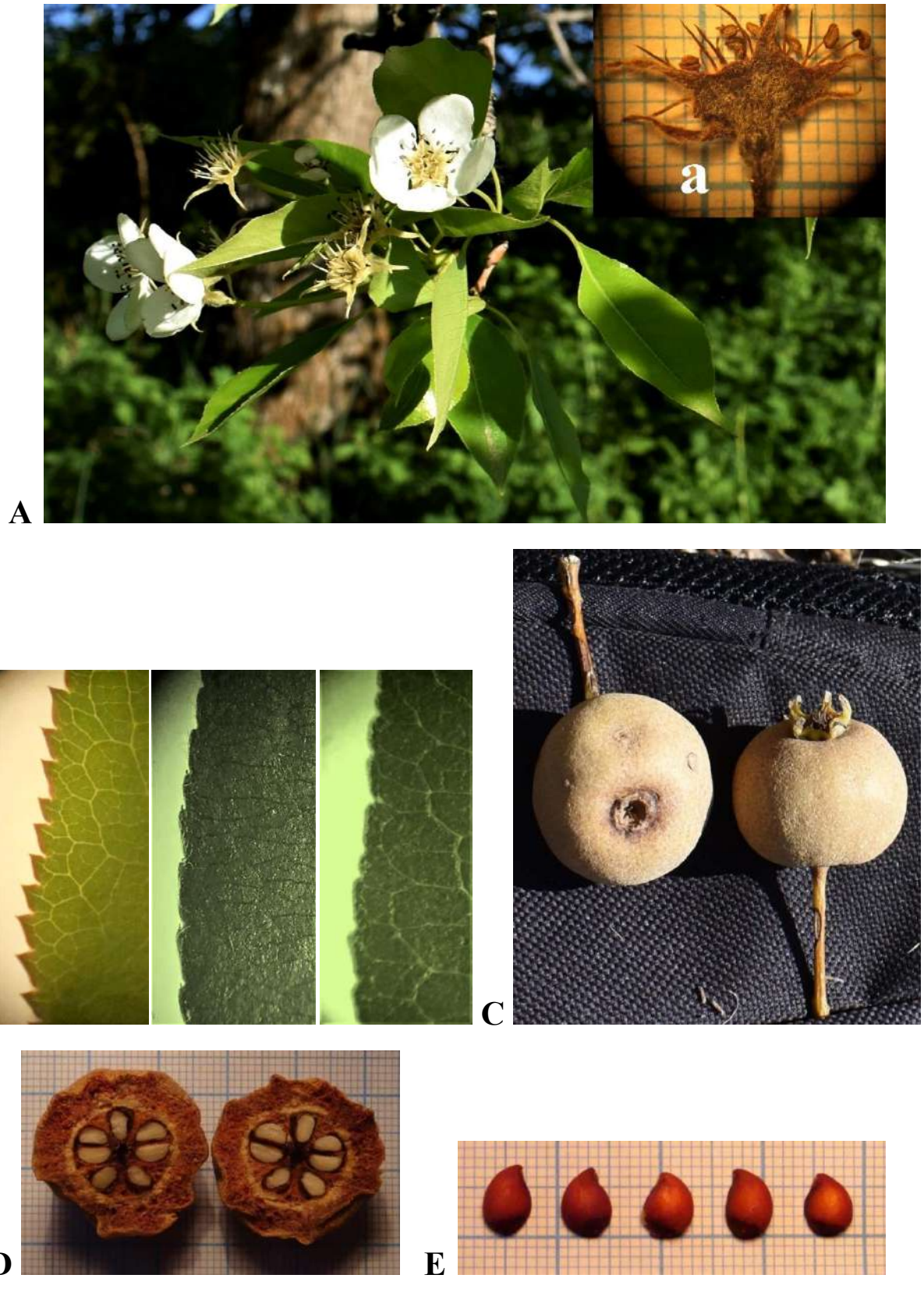

Fig. 2. *Pyrus hyrcana* var. *yeghegisi*: A – flowers, a –calyx; B – leaf blade margin variation; C – fruits; D – fruit transversal section; E–seeds

without thorns. Bark greyish-brown, on perennial and one-year-old branches dotted with small whitish lenticels. Buds 6×2-2.5 mm, narrowly acute-conical. Leaves 6.2-6.5×3.4 cm, lustrous green, drying slightly blackish, elliptic, long acuminate or attenuate at apex, cuneate at base, aristate-serrate-dentate when young, crenate-dentate in mature leaves, upper surface glabrous, lower surface of young leaves sparsely haired especially by margins and main vein, sometimes with sparse red glands. Stipules deciduous, 7-8×1 mm, narrowly-lanceolate, with 3-4 teeth, glabrous. Petioles 2.3-4 cm, slightly pubescent with rare, short, erect hairs. Inflorescence corymbose, 8-flowered. Flowers 1.5-2.0 cm in diameter, pedicels (2.8)3.5-4 cm, pubescent. Sepals 7-9 mm, narrowly linear-lanceolate, at margin entire, acute at top, brownish-tomentose above, white-tomentose beneath. Hypanthium cupulate, 3×2.2 mm, hairy, receptacle cup-like, 4.8-5 mmin diameter, glabrous, covered with whitish glands. Corolla saucer-shaped with concave petals, almost brought together by edges. Petals white, suborbicular or orbicular, 10×9 – 8×8 mm, rounded at apex, with short 0.8 mm claw at base. Stamens 20, in two rings, in outer ring 3.8-4.5 mm long, in inner ring 2.5-3 mm long, filaments glabrous, sparsely haired only at base, anthers 1.0 mm long. Styles glabrous, usually 4, rarely 3 or 5, 5.5-6.5 mm long, not exceeding stamens; stigma slightly clavate. Fruits 2×1.8 – 2.5×2.5 cm, globose, single or by 2-3, light brown or bright brown, usually with yellow-greyish lenticels; ovary 5-loculed, with 2 or 1 ovules per locule; sepals persistent in fruit, erect, crown-like or breaking off, but not deciduous. Pedicels in fruits (2.5)3.5-4.5 cm long, thin. Seeds 7×4.5-5 mm, bright brown, ovate, at apex acute, flat at one side, convex at other side.

Seedlings. The seeds were sown in beds (2-3 cm deep) in mid-November. Seed germination is high, noted in the second decade of March of the next year. Cotyledons of seedlings 10×8-9 mm, greenish, fleshy, obovate. The first to the third leaves lanceolate, rounded or cuneate at base, serrate, glabrous. Subsequent leaves lustrous, bright green, broadly obovate or elliptical, obtuse or mucronate, rounded or broadly cuneate, sometimes attenuate at base, serrate-dentate, with reddish tips of denticles, sometimes slightly wavy at margin. Venation pinnate-reticulate, represented by a central vein with secondary and higher-order branching veins forming loops and fine netlike (reticulate) pattern.

Differences between *Pyrus hyrcana* var. *hyrcana* and *P. hyrcana* var. *yeghegisi*

Character	***P. hyrcana* var. *hyrcana***	***P. hyrcana* var. *yeghegisi***
Leaf size	2.5-4.5×2-3.5 cm	6.2-6.5 ×3.4 cm
Leaf shape	Broadly orbicular or ovate	Elliptic
Leaf apex	Mucronate – rounded	Acuminate or attenuate
Leaf margin	Serrulate or serrate	Aristate-serrate-dentate to crenate-dentate
Petioles length	4-6 cm	2.3-4 cm
Stipules margin	Entire	Dentate
Sepals length	3 mm	7-9 mm
Sepals shape	Triangular, (?)obtuse	Narrowly linear-lanceolate, acute
Fruit color	Dark green to brown	Light brown or bright brown
Sepals in fruits	Persistent in fruits, crown-like, erect	Persistent in fruits, crown-like, erect or sometimes breaking off, but not deciduous

Holotype: "Armenia. Vayots Dzor province, Yeghegis river gorge, in the vicinity of village Vardahovit, 1970 m a.s.l., 39°53'N, 45°27'E, pear open woodland. 11. 10. 2019. J. Akopian, A. Ghukasyan, M. Oganesian (ERE 199486, barcode ERE 0012060) (fig. 3).

Paratypes (The same tree): "Armenia. Vayots Dzor province, Yeghegis river gorge, in the vicinity of village Vardahovit, 1970 m a.s.l., 39°53'N, 45°27'E, pear open woodland. 11. 05. 2021. J. Akopian, A. Ghukasyan, G. Fayvush, A. Rudov (ERE 199488, barcode ERE 0012062; ERE 199489, barcode ERE 0012063).

Fig. 3. Holotype of *Pyrus hyrcana* Fed. var. *yeghegisi* Akopian var. nova

A

B

Fig. 4. ***Pyrus hyrcana*** **var. yeghegisi one- (A) and two-year-old (B) seedlings in the wild pears living collection of the "Flora and vegetation of Armenia" Plot (Yerevan Botanical Gar den)**

Distribution, Ecology and Habitat. The described variety grows in the gorge of the Yeghegis river, at an altitude of 1800-2000 m above sea level, at the edges of broad-leaved forests, on the open pear woodlands, mostly solitary, rare found. The habitat is characterized by the presence of various wild fruit trees and shrubs, e. g. *Crataegus pojarkoviae* Kossych, *Malus orientalis* Uglitzk., *Prunus avium* (L.) L., *P. divaricata* Ledeb., *Pyrus browiczii* Mulk., *P. fedorovii* Kuth., *P. pseudosyriaca* Gladkova, *P. syriaca* Boiss., *P. takhtadzhianii* Fed., *Rosa corymbifera* Borkh., *R. spinosissima* L., *Sorbus aucuparia* L. and some others. *P. hyrcana* var. *eghegisi* flowering is observed in April – May, fruiting in September – October, abundant. Seed productivity is high, vegetative propagation was not noted. The described variety may have a hybrid origin with one of the East Asian introduced *Pyrus* species or ancient cultivars.

Protection measures. There are currently no measures to protect the described variety in the habitat. Within the present study *P. hyrcana* var. *yeghegisi* was introduced in the wild pears living collection at the "Flora and vegetation of Armenia" Plot of the Yerevan Botanical Garden NAS RA for *ex situ* conservation and investigation. Seedlings and young plants (fig. 4) were grown at the Plot from seeds collected in the natural habitat.

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