Scientific Papers. Series A. Agronomy, Vol. LVII, 2014
ISSN 2285-5785; ISSN CD-ROM 2285-5793; ISSN Online 2285-5807; ISSN-L 2285-5785

STUDY ABOUT BIODIVERSITY OF *Raphanus raphanistrum* PETALS COLOR

Nicolaie IONESCU[1], Sorin Gabriel IONESCU[2]

[1]Agricultural Research and Development Station Piteşti
Piteşti-Slatina road no 5, 117030, Piteşti, Romania
[2]University of Agronomic Sciences and Veterinary Medicine of Bucharest
59 Marasti Blvd, District 1, 011464, Bucharest, Romania

Corresponding author email: nicolae_ionescu@yahoo.com

Abstract

Weed Raphanus raphanistrum L. (RAPRA in code Bayer) is one of the important species in the white luvicsoils. Populations from cultivated surfaces have high competitive capacity through: high density and rapid rate of growth. Because of this, obviously affected crops, giving large losses, dangerous. The plant grows in both winter crops, as well as the spring. In the biological cycle, weed blooms in May for the spring generation and September to autumn generation. Biodiversity study was done on analyzing plant flowers two aspects: lamina petals color and lamina vines color. The data obtained were the dominant colors: yellow-white base, pale yellow and bright yellow, with different percentages depending on the ecosystem studied: wheat in May, the field before spring sowing, and autumn generation weed in September (new field plowed). From time to time were determined plants with white petals. The color of veins petals varied by the flowering season and by location: wheat and plowed field (weed vegetation increased in a short time). The yellow petals-white base have dominant purple vines in May and grey and purple in September. Petals pale yellow were dominant colors of gray and purple in spring and only grey in autumn. Bright yellow petals have veins in higher proportion in the gray, yellow and purple in spring and grey and yellow in September. In the present study R.raphanistrum have had the yellow-white base petals the best represented as the spring (34.8 %) and in autumn (48.4%). The veins best represented were gray (42.2%) and purple (36.0%) in May and gray veins in autumn season (48.2%).

Key words: *wild radish, biodiversity, petals color, veins color, field crops.*

INTRODUCTION

Weed species of importance to agriculture is wild radish, *Raphanus raphanistrum* L. Being a *Brassicaceae* family plant, it has flowers grouped in a raceme inflorescence, consisting of four petals arranged opposite one, two by two. Us, the plant has three varieties: *ochroleucus* with yellow-brown petals, pale yellow, purple veins, *luteus* with yellow petals and yellow and brown veins, *purpurascens* with purple petals and purple veins (Nyárady, 1955). Neither here or elsewhere does not make reference to the particular color dominance of the petals and veins of this plant. The world found that the color flowers of this weed are plentiful, diverse. Such were observed petals color: yellow with shades, cream, brown-yellow, white, pink, violet and purple. Veins which are in the petal structure, may vary from very light shades to the dark. Panetsos & Baker (1967) described the type of vein colors: yellow, green, brown, blue and purple. In Australia were found 17 colors, of which only the yellow and white were the most common (Cheam, 1995). In England, Kay (1976) noted a link between the color and the percentage of pollinated flowers with dominance role in ensuring some form or another in an agricultural area. Then, seeds of the plants collected from flowers yellow, white, purple, differ in time to maintain the viability of the other (Cheam, 1984). This character print a pronounced dominance of such plants in those areas. In other studies it was shown that yellow flowers are common in northern England (Benthan et al, 1954), and the white in South (Chapman et al., 1962). On this occasion they discovered a new variety: *aureus*, with golden yellow petals without veins. Later it was found that flowers with

yellow petals are the most common (Stace, 1991), while white flowers are rare (Perring, 1968). Veins biodiversity on the weed petals could not be characterized in terms of geography. In other observations (Rich, 1991; Cheam & Code, 1995) found that plants with yellow flowers had a much higher prevalence compared with whites and purple. In other studies (Holm et al, 1997) shows greater spread of yellow flowers, white and purple in Poland, the white and purple in Hungary, Yugoslavia, northern Greece and Turkey. Such research, with reference to some plant characters as colored petals and veins, could give some information in different areas of agricultural biodiversity. Maintain and possible increase of plants biodiversity, including all weeds, is obvious and necessary character of sustainable agricultural surfaces. Biodiversity of wild radish is best determined by studying ecotypes, resulting in the history of land cultivation and adaptation to geographical ecology (Figure 1).

Figure 1. RAPRA, yellow petals with white base

MATERIALS AND METHODS

In order to observe the color diversity of *R.raphanistrum* petals were identified and analyzed a total of 10 ecosystems with dense populations. The plants were in the intense flowering period, in two moments: May and September.

Choosing ecotypes. Each population was chosen with high density in areas of natural infestation. In May were analyzed 3 wheat ecosystems and 3 autumn plowed ecosystems before spring sowing. In September were investigated a field with stubble (wheat) and 3 plowed ecosystems. In the plowed ecosystems, regardless of season, the weed growing up and flourished accelerated, characteristic.

Sampling. He went in a zig-zag direction along the length of weed population. Every 5 steps was selected a higher plant that flowers were in young blooming. The procedure was repeated 50 times from each field.

Petal analysis. Petal color was observed on the top of them, the clear color on the circular portion (peak). To ignore the color of the base under angle portion, which may have a different tint. For veins was examined bottom flower petals and tone noted as such. The analysis of the two color directions: petals and veins, resulting combinations, e.g. pale yellow petals with green veining.

To study biodiversity weed flower color was using Excel to develop graphs. Expression data was done by participation rates. They show their petals by biotypes color variability and by specific dominant colors in the researched area.

RESULTS AND DISCUSSIONS

Flower color analysis demonstrated variability of *R. raphanistrum* species, depending on ecosystem analysis.

Variability of petals and veins color depending on ecosystem and season. Of all the comments made were found specific groups. The dominant colors of the petals were yellow-white base, pale yellow, bright yellow and white. Veins had a wider range of colors: white, green, yellow, purple, gray and brown. Were differences between these colors. So in winter wheat dominant was weed petals with pale yellow color (32.4%), followed by the yellow- white base and bright yellow, with percentages close. The white color was in a proportion of 1.6% (Figure 2). Veins were dominant colors: gray (42.8%) and purple (34.4%). Other colors have been found to a lesser extent.

If weed bloom on autumn plowed ecosystems, the pale yellow petals have large percentage (35.5%), followed by the yellow-white base type and less for those bright yellow (Figure 3). Veins colors were dominant in almost equal proportions, the gray (40%) and violet

(40.5%). In both cases yellow vines were third place, with similar percentages: 14%.
Analyzed flower petals showed different situations (Figure 4). Thus petals have dominant yellow-white base (48.4%), followed by the other two yellows: pale and bright.

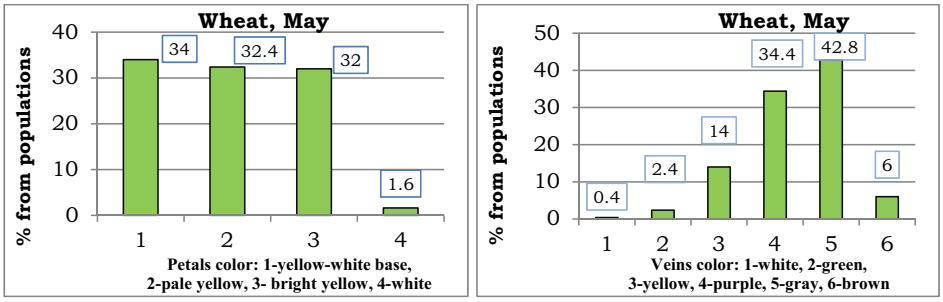

Figure 2. The structure of weed petals color and veins color from winter wheat, May

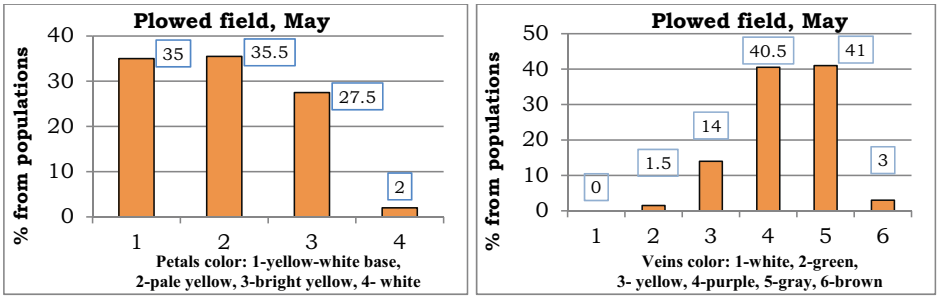

Figure 3. The structure of weed petals and veins color from plowing field before sowing, May

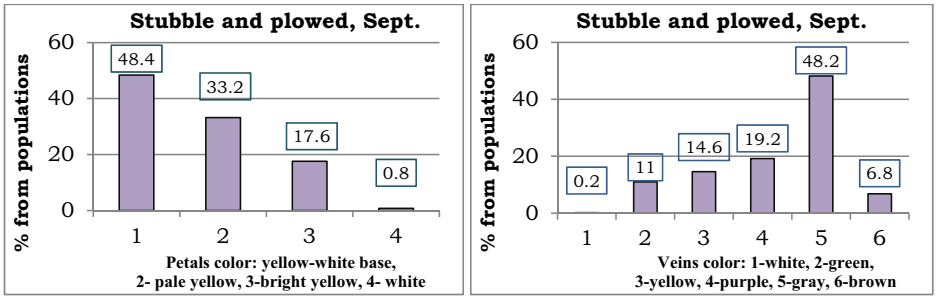

Figure 4. The structure of weed petals and veins color from stubble and plowing field

Veins color variability of the main biotypes. Analysis of the veins color shows the biotypes color petals with yellow-white base, the pale yellow and bright yellow, compared the spring and the autumn state. If yellow-white base formed in May were dominant purple veins (45.98%) and grey (Figure 5). At the September, dominated the gray (46.28%) and the purple stood at somewhat lower values (33.47%).
Yellow petals with grey veins were dominant in May (42.25%), followed by purple (38.1%). Among other shades followed of brown and yellow (both 7.74%), and the last green ones (3.57%). In September only gray veins dominated (53.01%), the other being below 20% (Figure 6).

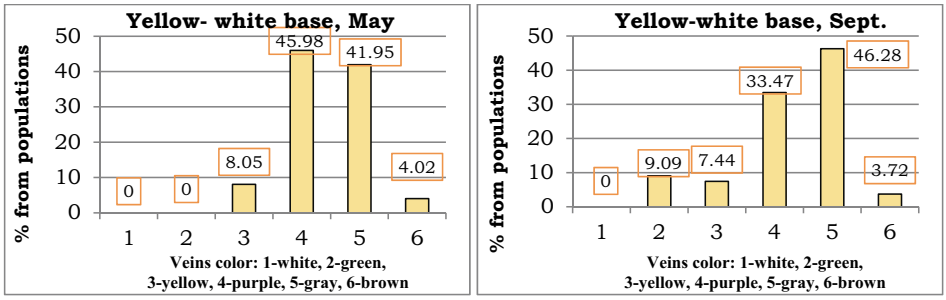

Figure 5. The veins color structure of yellow-white base petals, May and September

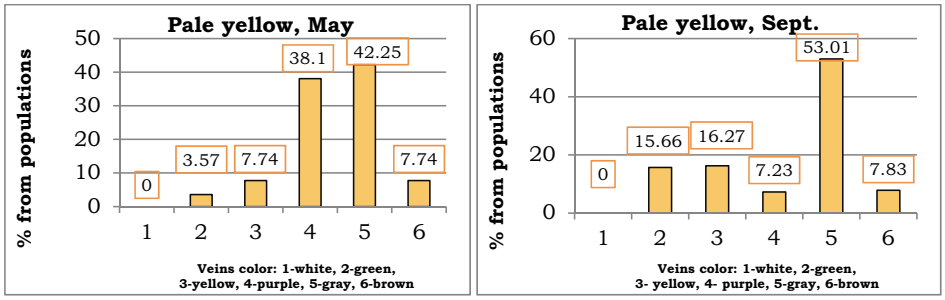

Figure 6. The veins color structure of pale yellow petals, May and September

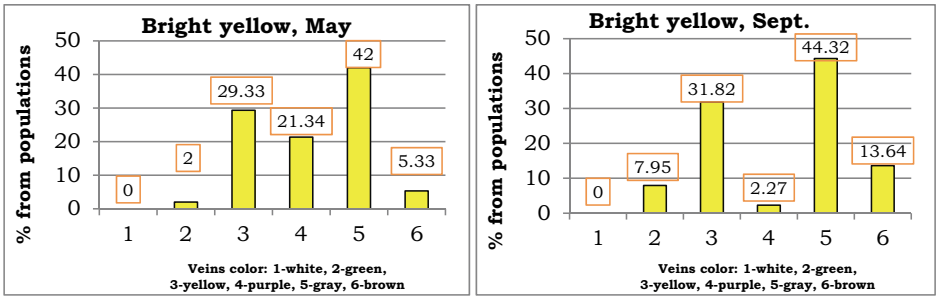

Figure 7. The veins structure of bright yellow petals, May and September

Category bright yellow petals were several categories of veins evident in May (Figure 7). The gray dominated (42%), followed by the yellow (29.33%) and then the purple (21.34%). In September gray was dominant (44.32%) and were followed by yellow (31.82%) and brown (13.64%).

Characterization color flower petals and veins of R.raphanistrum. In general, the color of the weed biotypes petals expressed by three dominant: the yellow-white base, pale yellow and bright yellow, and a secondary biotype with white petals (Table 1 and Figure 8).

Proportions differed between the two seasons of bloom. Veins color had a larger structure, but the gray was dominant, followed by the purple in both periods analyzed (Table 2).

Table 1. The *R. raphanistrum* petals color structure (%) by flowering seasons

Petals color	May	September
Yellow type, white base	34.8	48.4
Pale yellow	33.6	33.2
Bright yellow	30.0	17.6
White	1.6	0.8

Figure 8. Wild radish with white petals

Table 2. The *R. raphanistrum* weed petal veins color by flowering seasons

Veins color	May	September
White	0.2	0.2
Green	1.8	11.0
Yellow	14.2	14.6
Purple	36.0	19.2
Gray	42.2	48.2
Brown	5.6	6.8

CONCLUSIONS

The color of petals and veins showed variability depending on the ecosystems examined. Petals were four categories: yellow-white base, pale yellow, bright yellow and white. Veins had their colors: white, green, yellow, purple, gray and brown.

In the ecosystem analyzed were the dominant colors of the petals of the first three categories, both in May and in September. Thus, the most dominant in wheat was yellow petals-white base, in the plowed field (May) pale yellow ones and the yellow-white base (September). The two dominant veins were in May: gray and purple both in wheat and in the field plowed, and in autumn dominated only gray veins.

Ecotype with yellow petals-white base was gray and purple veins dominant in both seasons. Pale yellow ecotype had more gray and purple veining in May, and only gray in September. Bright yellow ecotype was most evident in the colors gray, yellow and purple veining in May, and gray and yellow veining in September.

The structure of color petals at blooming between the two seasons show a similarity in the relative dominance between the yellow-white base and pale yellow.

The base veins were gray in both seasons, followed by the purple, and then the yellow. Green veins were observed more over the flowering of the September, the brown in the both periods, and white was under-represented.

REFERENCES

Bentham G., Hooker J.D., Rendle A.B., 1954. Handbook of the British Flora. Reeve & Co., Ashford, Kent, UK.

Cheam A.H., 1984. Coat-imposed dormancy controlling germination in wild radish and fiddle dock seeds. Proceedings 7th Australian Weeds Conference, p. 184- 190.

Cheam A.H., Code G.R., 1995. The biology of Australian weeds. 24. *Raphanus raphanistrum*. Plant Protection Quarterly, 10, p. 2-13.

Clapham A.R., Tutin T.G., Warburg E.F., 1962. Flora of the British Isles. Second Edition, Cambridge University Press, cambridge, UK.

Holm L., Doll J., Holm E., Pancho J., Herberger J., 1997. World Weeds: Natural Histories and Distribution. John Wiley & Sons, New York, USA.

Kay Q.O.N., 1976. Preferential pollination of yellow-flowered morphs of Raphanus raphanistrum by Pieris and Eristalis ssp. Nature, 261, p. 230- 232.

Panetsos C.A., & Baker H.G., 1967. The origin of variation in „Wild" Raphanus sativus (*Cruciferae*) in California. Genetica, 38, p. 243- 274.

Perring F.H., 1968. Critical Supplement to the Atlas of the British Flora. Botanical Society of the British Isles, London, UK.

Rich T.C.G., 1991. Crucifers of Great Britain and Ireland. BSBI Handbook nr. 6, Botanical Society of the British Isles, London, UK.

Stace C., 1991. New Flora of the British Isles. Cambridge University Press, Cambridge, UK.

xxx Flora României, 1955. Editura Academiei R.P.R., 3, p. 492- 501.