Development trends and groups in Eastern Central Europe from the transition to the EU-accession

(1991-2005)

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Aims

This examination aims to investigate:

- **1**. the similarity and dissimilarity processes of the new EU members (+Croatia) between 1990-2005 based on various variables (using multivariate statistics),
- **2**. the level of and changes in development of the above mentioned nations,
- **3.** the cohesion and polarisation of the region: the persistence of borders between sub-regions, the stability, cohesion of subregions (i.e. is there any possibility for the territorial delimitation of countries at different level of development).

Methods 1.

In order to examine the above mentioned goals we created a database for **11 countries**, consisting of more than **30 variables**, which were grouped into 4 categories:

- macroeconomic indices,
- indices of industrial development and commerce,
- demographic indicators,
- indices of socio-economic welfare (**Table 1**).

- FDI/head **(1)** - FDI **(2)** - GDP compared to 1990 (%) **(3)** - *GDP compared to previous year* (%)* **(4)** - *Gross állóeszköz- felhalmozása compared to the preivious year* (%)* **(5)** - *household consumption compared to the previous year * (%)* **(6)** - *export/import ratio* (%)* **(7)** - GDP/head **(8)** - trade balance (%) **(9)** - annual budgetary deficit in GDP% **(10)** - gross debt in GDP% **(11)** - *changes of gross debt given in GDP% compared to the preious year* (%)* **(12)**	macroeconomic indices
- cars (per 1000 persons) **(31)** - rate of R&D (%) **(32)** - PC (per 1000 heads) **(33)** - rate of students at universities **(34)** - communal waste per head **(35)** - length of motorways per unit area (km/km^2) **(36)**	indices of socio-economic welfare

Table 1.a
The selected variables and variable groups

Variables with Italic letters were ommited from some of the investigations as they represent only yearly changes

*- value produced by husbandry compared to the previous year** **(13)** *- value of crops compared to the previous year** **(14)** - average crop/ha (1000 t) **(15)** - industrial output/head (1000 euro) **(16)** *- industrial output compared to the previus year* (%)* **(17)** *- outpust of constructions compared to the previous year* (%)* **(18)** - CO_2 output/head (kg) **(19)** - energy consumption/head **(20)** - % of economically active population **(26)** - rate of unemployment (%) **(27)** - employed in services(%) **(28)** *- yearly changes of net average salary* (%)* **(29)** *-changes of retail prices* (%)* **(30)**	indices of industrial development	**Table 1.b** The selected variables and variable groups
- difference of marriages and divorces (%)**(21)** - number of children per mother (%) **(22)** - net reproduction rate (%) **(23)** - infant mortality (%) **(24)** - cancer among death causes (%) - cardio-vascular problems among death causes (%) **(25)**	demographic indices	*Variables with Italic letters were ommited from some of the investigations as they represent only yearly changes*

Methods 2.

- **1.** for similaritity examinations we used **cluster analysis** (Ward method, only specific variables were used)
- **2.** for development level **PCA** was carried out for specific variables
- **3.** for the delimitation of sub-regions **discriminance-analysis** was used
  - data were standardised and normalised
  - 3 time-sections were selected: 1991, 2000, 2005 (static examinations + calculating ratio 2005/1991 for each variable – dynamic approach)
  - multivariate statistics were done by SPSS

Results 1.

Proximity of development and actual status

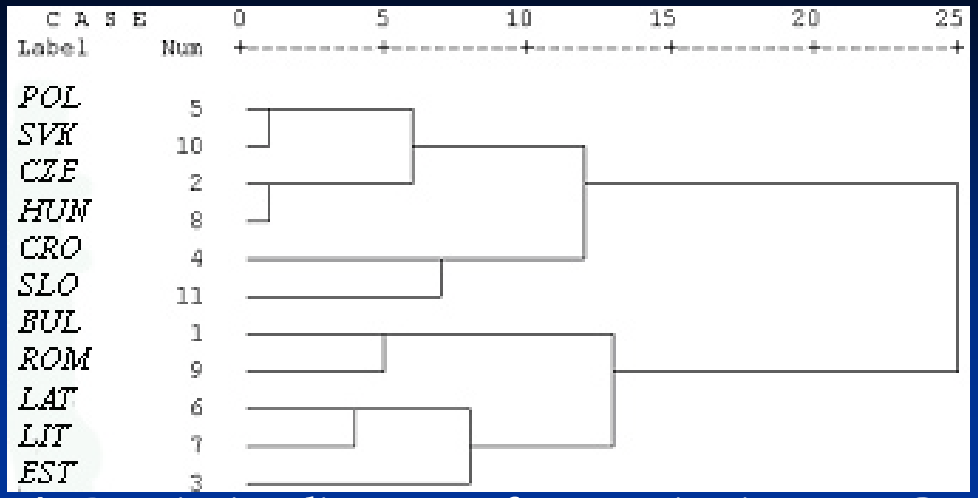


Fig. 1. Proximity diagram of countries in East-Central Europe in 1991

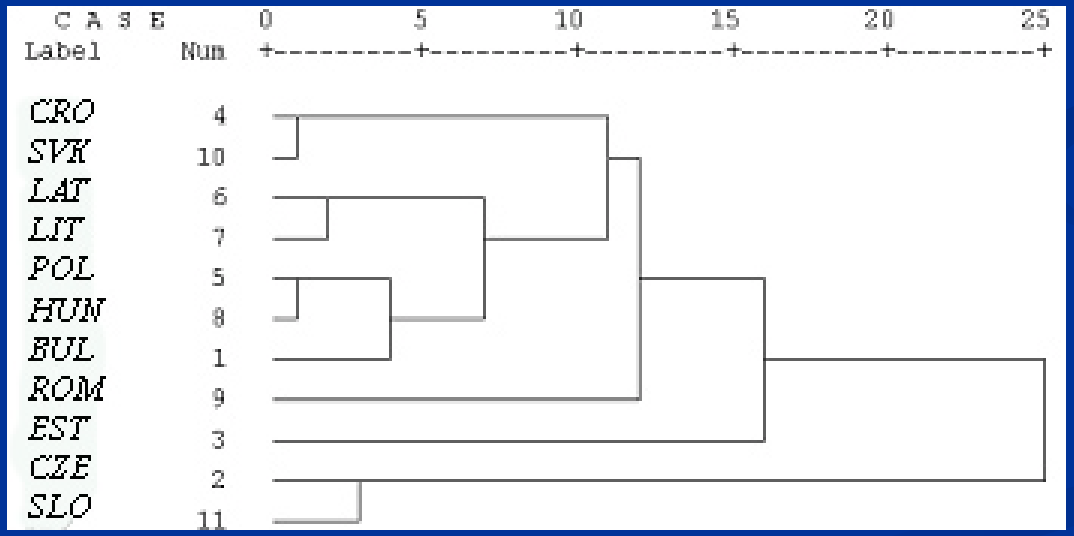


Fig. 2. Proximity diagram of countries in East-Central Europe in 2000

Results 1.

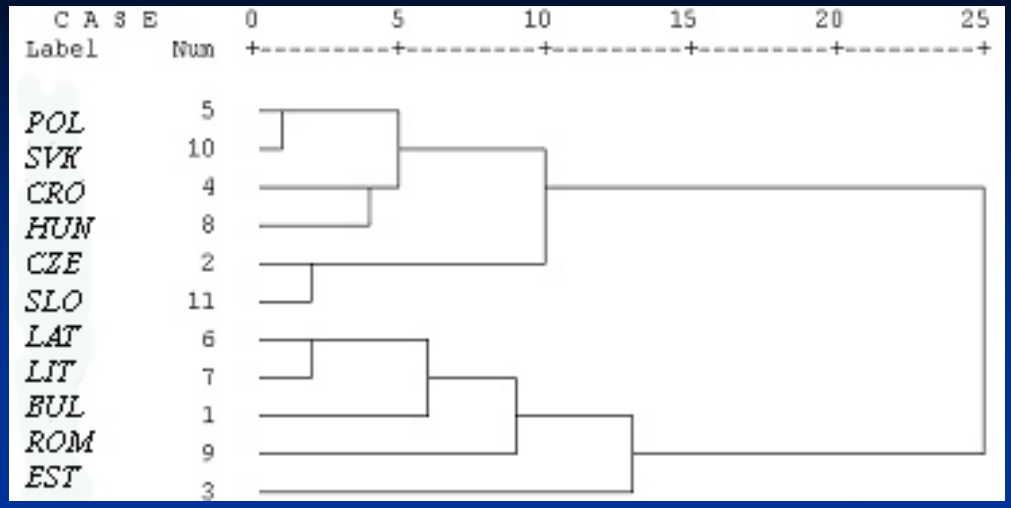


Fig. 3. Proximity diagram of countries in East-Central Europe in 2005

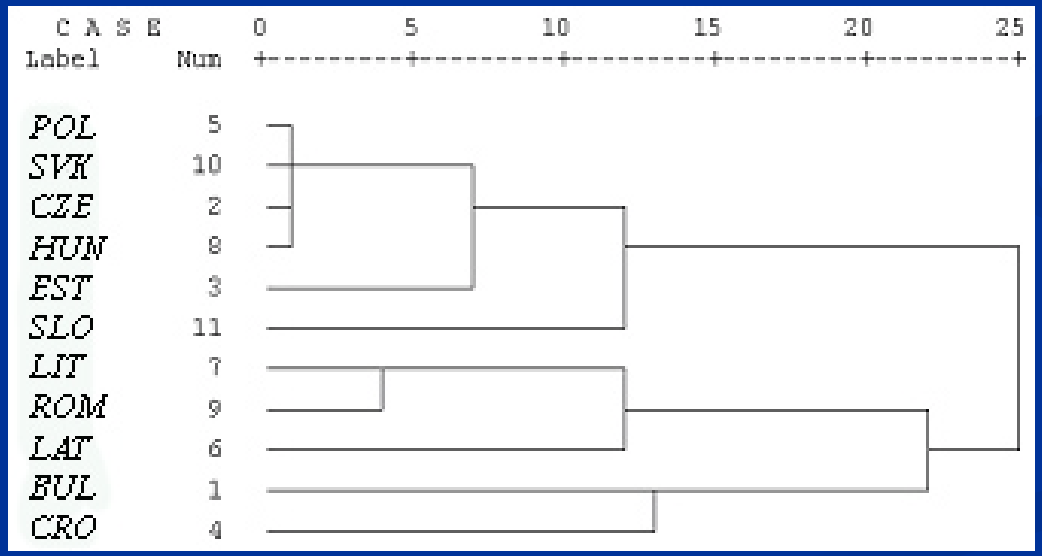


Fig. 4. Similarities of development based on the ratio of the values measured in 1990 and 2005

Results 2.

- changes in the level of development

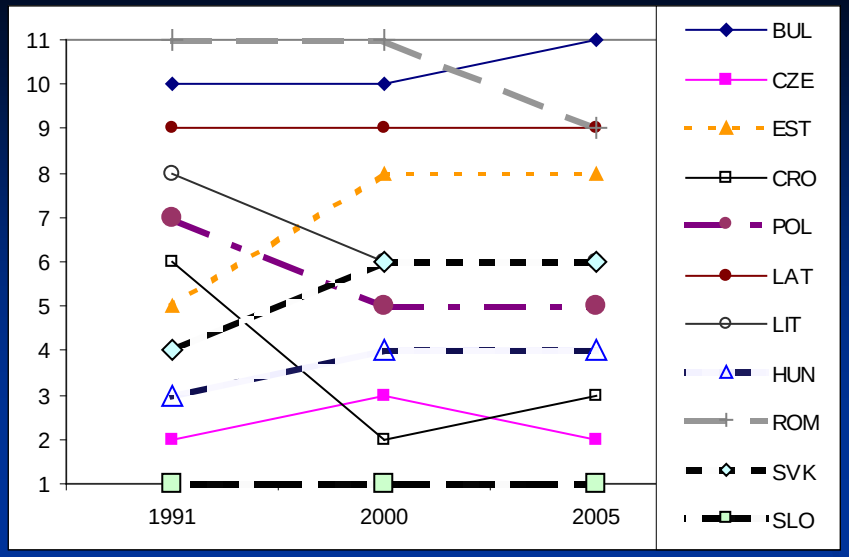


Fig. 6. Development rankings based on the values of the 1st factor derived from all variables

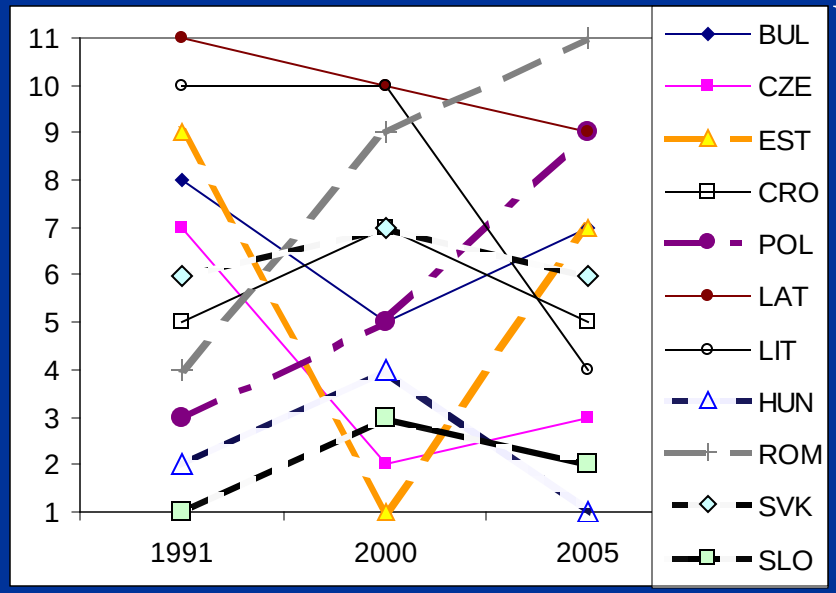


Fig. 7. Development rankings based on the values of the 1st factor representing indices of industrial development

Results 2.

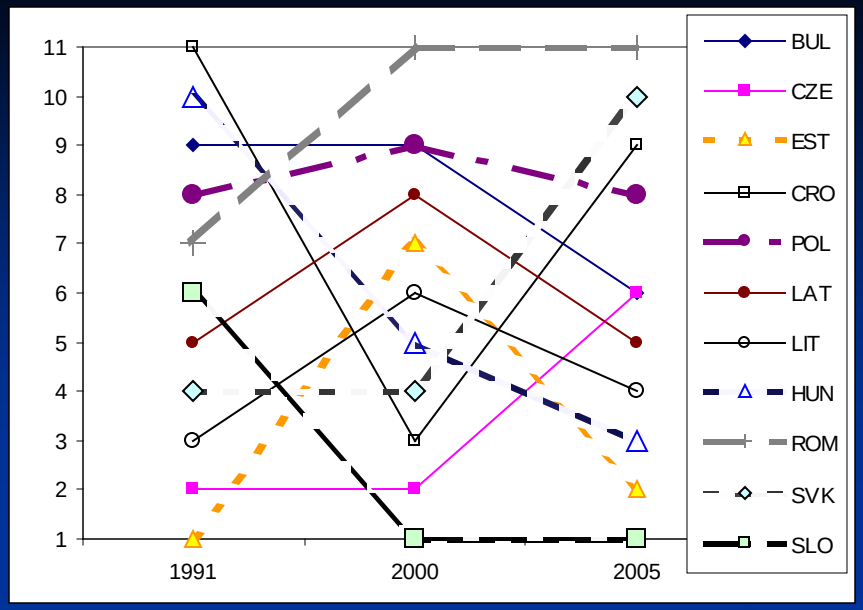


Fig. 8. Development rankings based on the values of the 1st factor representing indices of socio-economic welfare

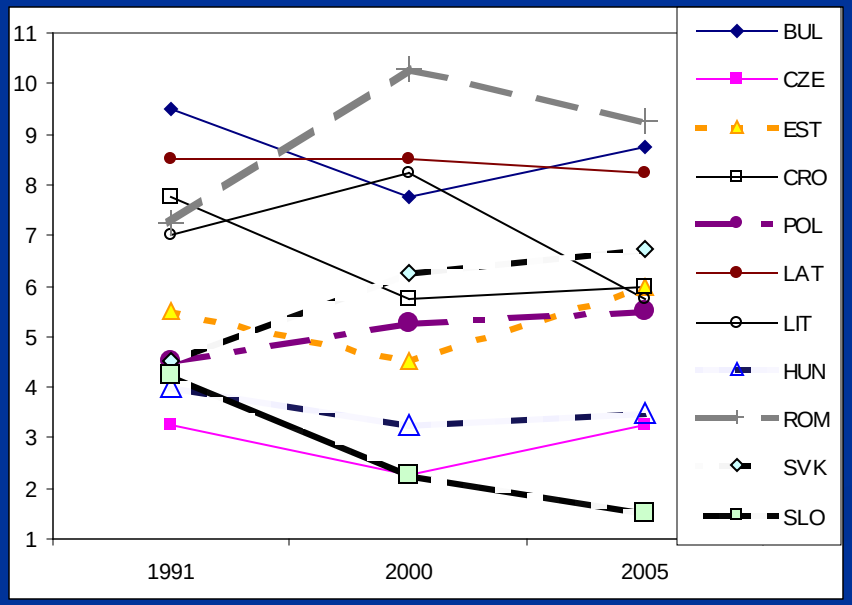


Fig. 9. Development rankings based on the average of 4 ranking numbers

Results 3.

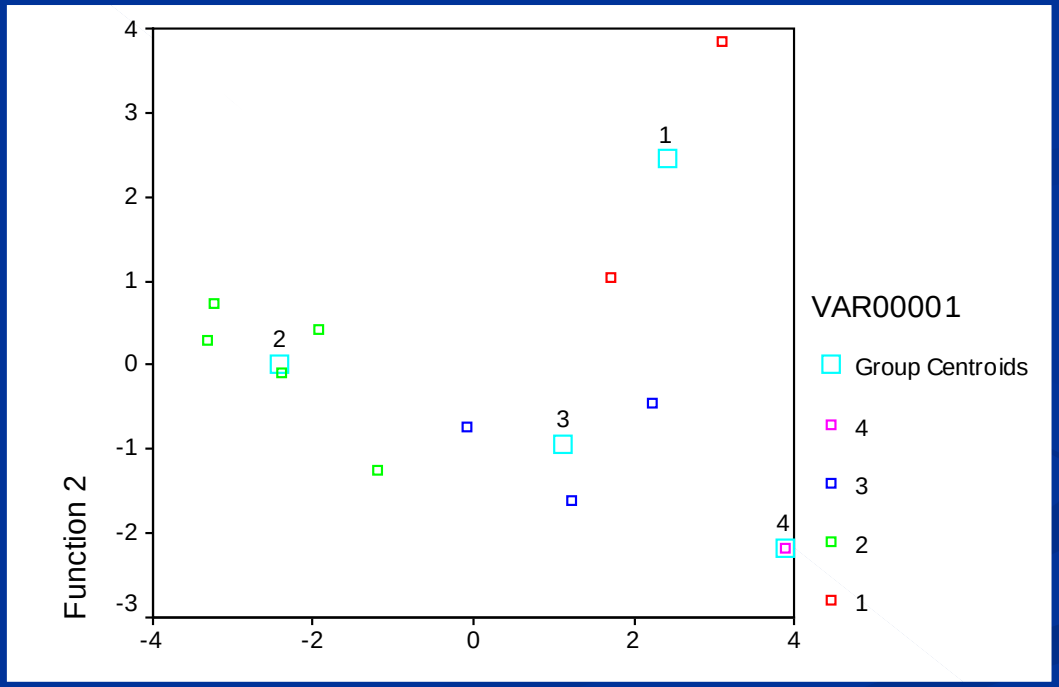
delimitation of zones with similar development and trends

artificial territorial units are defined and investigated at which accuracy regrouped the software the countries into the artificial groups based on the values of the variables representing the changes between 1991-2005.

Originally 91% of the cases was successfully grouped based on the variable values. Slovenia was the only mismatch, which was originally grouped together with Croatia by us, but the SPSS classified it together with the Visegrad Countries.

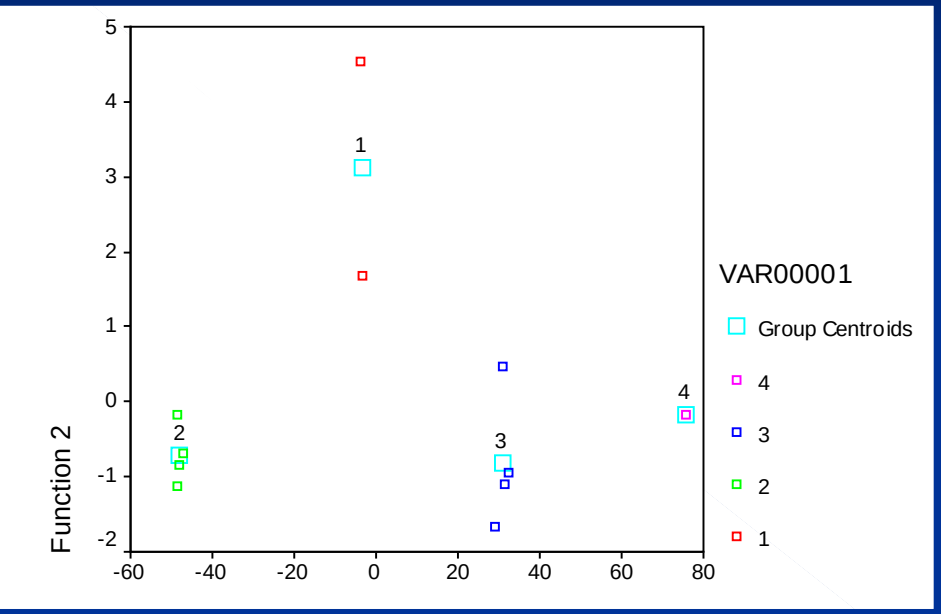
Reclassification of countries into artificially defined sub-regions based on the values of the variables representing changes between 1991-2005

- When we grouped Slovenia to the Visegrad group and Croatia to the East-Balkans the reclassification resulted 100% success.

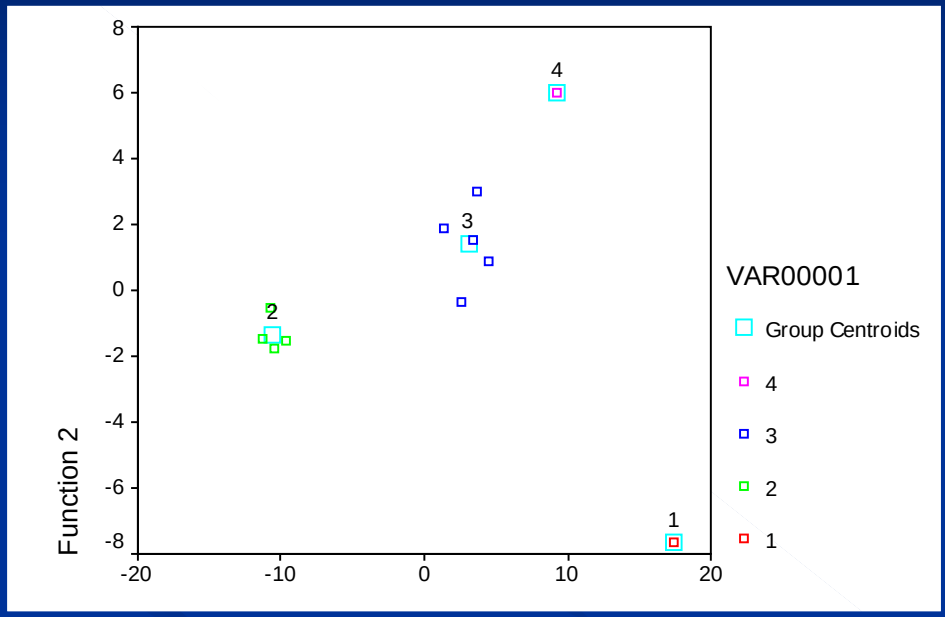


a, (1) Bulgaria, Romania, (2) Hungary, Slovakia, Slovenia, Poland and the Czech Republic (3) Baltic countries, (4) Croatia.

- However, the same percentage value of reclassification (100%) was resulted when Poland was grouped together with the Baltic countries, or Lithuania with the Visegrád Countries (without Slovenia), and also the same phenomenon occured, when Hungary was grouped together with Romania and Bulgaria.



b, (1) Bulgaria, Romania, (2) Hungary, Slovakia, Slovenia and the Czech Republic, (3) Baltic countries + Poland, (4) Croatia,



c, (1) Bulgaria, (2) Hungary, Slovakia, Slovenia and the Czech Republic, (3) Baltic countries + Poland + Romania, (4) Croatia

- *Therefore the border among the sub-regions of East-Central Europe is inaccurate, elastic with a thick transitional stripe.*