FIELD SURVEY ON SUITABLE CONDITION OF HABITAT FOR AYU, PLECOGLOSSUS ALTIVELIS

YOSHIKI SHIRAISHI [1], KOUKI ONITSUKA [2], TAKAYUKI NAGAYA [3], MAKOTO HIGASHINO [4], TOHRU TAKAMI [4], NORIHARU OTSUKA [5], JUICHIRO AKIYAMA [6] and HIROAKI OZEKI [7]

[1] Engineer, CTI Engineering Co., Ltd., Daimyo, Fukuoka 810-0041, Japan (Fax: +81-92-715-4352)
[2] Associate Prof., Dept. of Civil Eng., Kyushu Institute of Tech., Kitakyushu, 804-8550, Japan (Fax: +81-93-884-3100, e-mail: onitsuka@civil.kyutech.ac.jp)
[3] Manager, CTI Engineering Co., Ltd., Daimyo, Fukuoka 810-0041, Japan
[4] Associate Prof., Dept. of Civil Eng., Oita Nat. College of Tech., Oita 870-0152 Japan
[5] Manager, Nobeoka Work Office, Ministry of Land, Infrastructure and Transport, Nobeoka 882-0803, Japan
[6] Prof., Dept. of Civil Eng., Kyushu Institute of Tech.
[7] Graduate student, Kyushu Institute of Tech.

It is known that sometimes strong ayu makes a territory almost in the rapids and sometimes in the pools. However, this reason is not clear, because the flow characteristics have not been investigated. Further, the suitable flow depth and bulk mean velocity for ayu to inhabit are not known. In this study, velocity measurements in the territory of ayu were conducted to investigate the suitable condition of habitat for ayu and also the suitable flow depth and bulk mean velocity were investigated.

The area of the territory is about $1m^2$. A lot of territories are observed not in the pools but in the rapids. This reason is supposed as that the growth rate of attached algae in the rapids is higher than that in the pools, due to the re-aeration coefficient is high in the rapids. However, this supposition has not been verified by the field survey.

Fig.1 shows the situation in the territory of ayu near the large rock which were observed in the Kita River in 26th August, 2004. The height, the diameters of the major axis and minor one are 0.3m, 0.3m and 0.2m, respectively. The velocity measurements points (T1-T9) are described in Fig. 1.

In the case of uniform open-channel flows over rough bed, the turbulence intensity u' normalized by the friction velocity U_* is described by the following formula.

$$\frac{u'}{U_*} = D_u \exp\left(-\lambda_u \cdot \frac{y}{h}\right) \tag{1}$$

Nezu & Rodi(1986) pointed out that the empirical values such as D_u (=2.26) and λ_u (=0.88) are universal ones in uniform open-channel flows. Fig. 2 shows the distributions of the turbulence intensity u' in the territory of ayu normalized by the friction velocity U_*, together with Nezu & Rodi(1986)'s empirical formula. The distributions of the turbulence intensity u'/U_* at all points except for T-5 and T-8 are described by the empirical formula (1). Therefore, the re-aeration coefficient in the territory of ayu may be

same as that in the other region. The reason why ayu makes a territory here may caused by the other reason.

Ayu likes attached algae without fine sediments. Sometimes, fine sediments deposit on the bed in the pools. On the other hand, such fine sediments can not be observed on the large rock in the present field survey. This is because the velocity is accelerated when the flow reaches to the large rock, so that the fine sediments on the large rock may be flushed. However, this consideration is a supposition. The relationship between the volume of deposited fine sediments and velocity will be investigated near future.

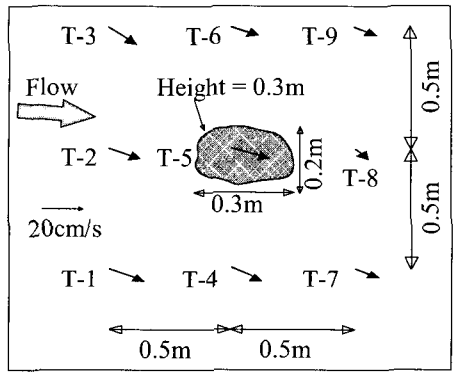

Fig. 1 Situation in territory of ayu near large rock (15K300m in Kita River)

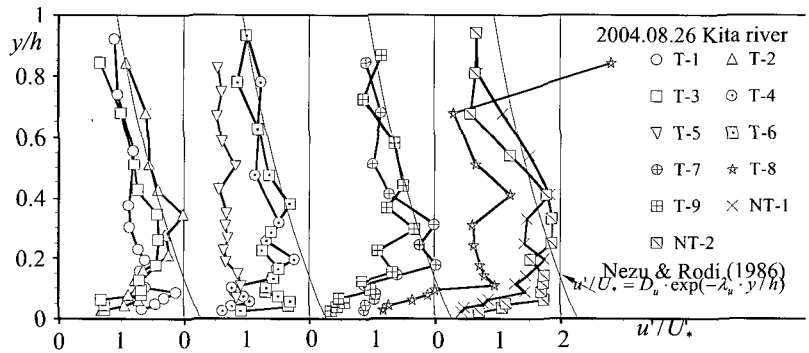

Fig. 2 Distributions of turbulence intensity in territory of ayu (15K300m in Kita River)